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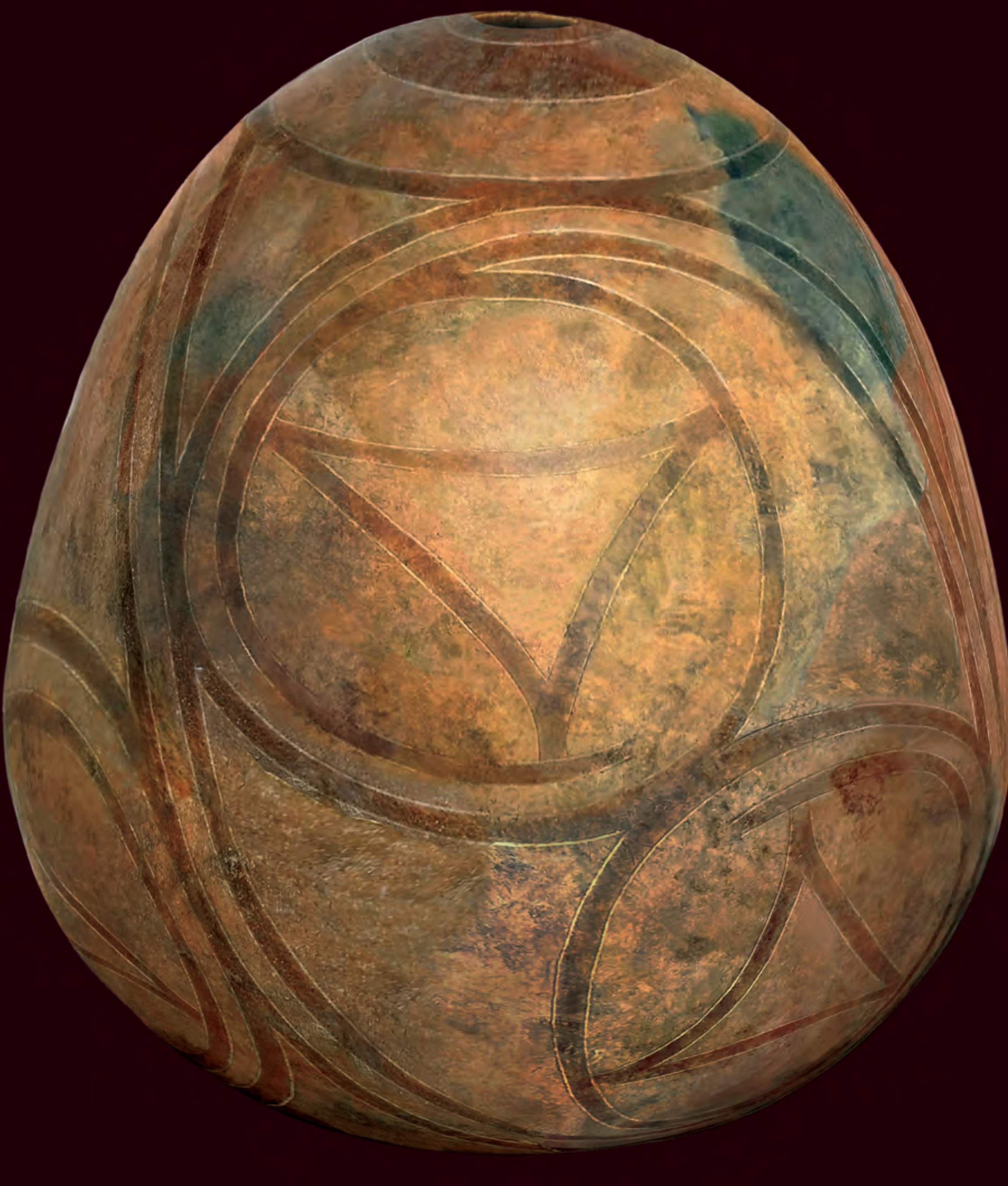
Paso de la Amada

AN EARLY MESOAMERICAN CEREMONIAL CENTER



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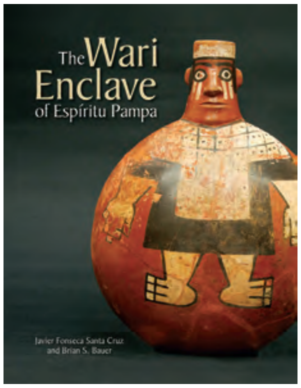

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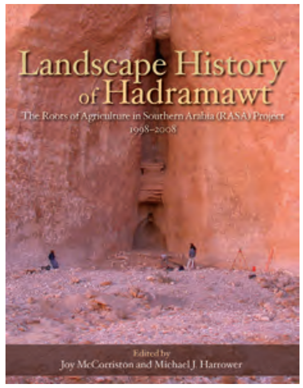

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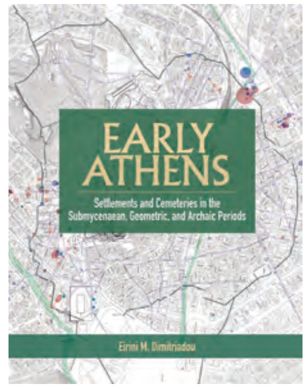

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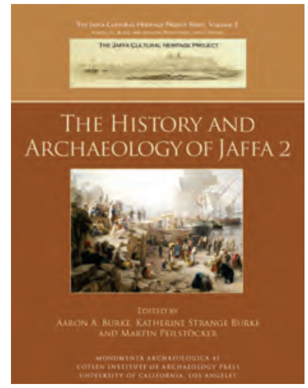

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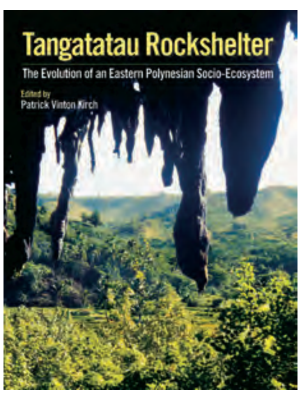

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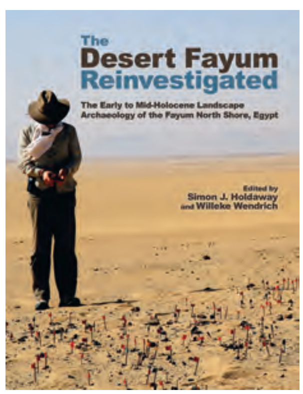

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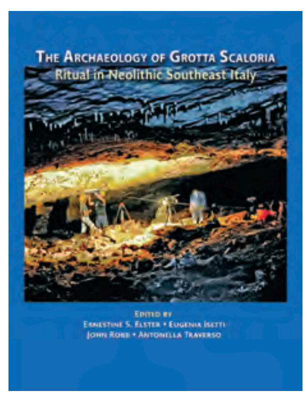

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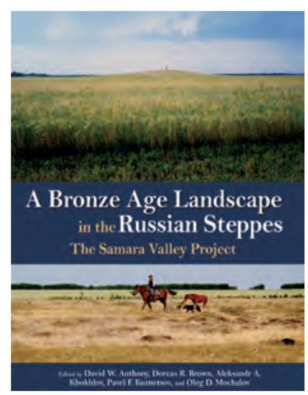

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RICHARD G. LESURE

EDITOR AND PRINCIPAL AUTHOR

WITH CONTRIBUTIONS BY:

JOHN E. CLARK

MICHAEL BLAKE

THOMAS A. WAKE

KRISTIN HOFFMEISTER

R. J. SINENSKY

TERRY G. POWIS

KATELYN J. BISHOP

PAOLA DEMATTÈ

NILESH W. GAIKWAD

AND

LOUIS GRIVETTI

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MARILYN BEAUDRY-CORBETT

MARCH 17, 1932 – JULY 14, 2020

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(Online at www.dig.ucla.edu/paso-de-la-amada)

Acknowledgments

It is sobering to realize that I have been studying Paso de la Amada for more than half of my life. The debts acquired along the way are considerable. I would first like to thank the people of the municipality of Mazatán, Chiapas, Mexico, for welcoming us so warmly during the course of the fieldwork. Along with my colleagues John Clark and Michael Blake, I am also deeply appreciative of official authorization for the project from the Mexican Instituto Nacional de Antropología e Historia, including the advice and support of Joaquín García Bárcena, Emiliano Gallaga, Alejandro Martínez, Lorena Mirambell, and Carlos Silva Rhodes, among others.

The research described in this volume has relied crucially on four streams or pillars of support. First, I can't imagine how this could have been achieved without the benevolent patronage of the New World Archaeological Foundation (NWAF) of Brigham Young University. During every field season, we relied on the NWAF for most of our field equipment, including vehicles. Those wonderful old tents may have leaked a bit, but that hardly mattered during the dry season. During the two decades since the end of the excavations, the entire collection of artifacts has been curated at the NWAF laboratory in San Cristóbal de Las Casas, Chiapas, allowing plenty of time for thorough study in a wonderfully quirky facility.

Second, John Clark and Michael Blake, codirectors of the Mazatán Early Formative Project—of which the investigations reported here formed part—have contributed in numerous, indispensable ways to all my research efforts in Chiapas. When I was a graduate student, their inspired mentoring contributed greatly to my education as an archaeologist and anthropologist. They also offered an opportunity to work at one of the most fascinating Formative-era sites in Mesoamerica. I am deeply indebted to them for their encouragement, advice, skepticism, and support over more than a quarter of a century.

Third, I would like to gratefully acknowledge two academic institutions with which I have been associated over the years, along with numerous individuals in each. The University of Michigan Department of Anthropology was a fabulously stimulating setting in which to pursue doctoral research in archaeology. I owe a great deal to my doctoral committee: Joyce Marcus, Kent Flannery, Jeffrey Parsons, Henry Wright, and William Farrand. As an adviser and mentor, Joyce Marcus unflaggingly supported my intellectual wanderings during eight years of graduate school. It is amazing to think that I have now spent three times that long at the University of California–Los Angeles, where numerous administrators, professors, staff, and students have been involved in one way or another in encouraging, supporting, overseeing, and/or working on the project. I particularly acknowledge the help and encouragement of two former directors of the Cotsen Institute of Archaeology, Richard Leventhal and Charles Stanish, and two former deans of the Division of Social Sciences, Scott Waugh and Alessandro Duranti. Thomas Wake has been collaborating on the project as a faunal analyst since his arrival at UCLA late in the last century.

Fourth, despite all of the above, I am not sure how I would ever have managed to finish this book without support provided by research funds of the Marilyn Beaudry-Corbett Endowed Chair in Mesoamerican Archaeology. It is to Marilyn Beaudry-Corbett that this book is dedicated, in recognition of her contribution to UCLA, her vision for graduate education and research in Mesoamerican archaeology, and her long-standing interest in the southeastern Pacific Coast of Mesoamerica.

Funds for the research described here have come from numerous sources. My dissertation fieldwork in 1992, including excavations at Mound 1 and Pit 32, part of the Mound 12 work, and soundings in several locations, was funded by a Fulbright (IIE) Grant, a grant from the Wenner-Gren Foundation for Anthropological Research, a Social Science Research Council Doctoral Dissertation Grant, the NWAF, and the University of Michigan. In 1993 Michael Blake generously brought me back to continue work at Mound 12 as part of his project funded by the Social Sciences and Humanities Research Council of Canada. My post-dissertation work at Mounds 15 and 32 (1997) was supported by another grant from the Wenner-Gren Foundation as well as the University of California Institute for Mexico and the United States (UC Mexus), the H. John Heinz III Fund Grant Program for Latin American Archaeology, and the NWAF. Part of the laboratory work at that time was supported by Arthur and Fran Sherwood, the UCLA Academic Senate, and the UCLA Division of Social Sciences.

Renewed laboratory work began in 2010, with support from a third Wenner-Gren grant, another grant from UC Mexus, and UCLA sources, including the Academic Senate, the Ahmanson Field Research Fund at the Cotsen Institute of Archaeology, and the Division of Social Sciences. A Collaborative Research Grant from the National Endowment for the Humanities supported important aspects of data analysis and writing, including the initial stages of the production of figures. Research funds provided by the Marilyn Beaudry-Corbett Endowed Chair in Mesoamerican Archaeology were crucial in allowing continuation of those efforts, including what turned out to be very labor-intensive and time-consuming work on the figures and three final seasons of laboratory work in San Cristóbal de Las Casas.

Of course, any views, findings, conclusions, or recommendations expressed in this book do not necessarily represent those of the National Endowment for the Humanities (or, for that matter, any of the other funding agencies just listed).

Thinking back to the original fieldwork, I wish particularly to acknowledge the *ejido* of Buenos Aires and the owners of the land on which we worked: Manuel Palomeque, Concepción Gómez Pérez, and Alberto Sánchez. I remember the 14 weeks I spent living in the *ejido* of Buenos Aires in 1992 with great fondness. Tomás Pérez Suárez was a wonderful excavation companion in 1992 and an energetic and wise codirector of fieldwork in 1997. As an employee of the NWAF, Artemio Villatoro helped out in every field and laboratory season from the beginning until the present. Ronald Lowe mapped the excavation areas back in predigital days and always provided rich insight into Mexico and Chiapas. Other dig companions and project participants have included Christopher Attarian, Deborah Cembellin, Daniel Cummings, Sheila Egan, Vicki Feddema, Enrique Flores, and Warren Hill. Most of the actual excavating was done by workmen from the *ejido* of Buenos Aires. I wish to acknowledge especially Pablo Álvarez, Bernardo Benegas, Isauro Cancino, Romeo Cancino, Silvano Cancino, Exar Cruz, Neftalí Espinoza, Ponciano Escobar, Isaac Espinoza, Alfonso Hernández, Francisco Palomeque, Alfonso Regalado, Chilo Regalado, Didier Regalado, and Ramón Regalado for their hard work and enthusiasm. In 1992, Hilda Nieto Flores cooked us delicious meals, Silvano Arroyo generously rented us his old house, and Norma Arroyo was always a source of encouragement and support.

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Richard G. Lesure

Editor and Contributors

Editor

Richard G. Lesure is professor of anthropology and holds the Marilyn Beaudry-Corbett Endowed Chair in Mesoamerican Archaeology at the University of California, Los Angeles. A specialist in the Formative era of ancient Mesoamerican civilizations, he has previously published two monographs with the Cotsen Institute of Archaeology Press, including *Formative Lifeways in Central Tlaxcala, Volume 1: Excavations, Ceramics, and Chronology* (2015). His publications on ancient art include *Interpreting Ancient Figurines: Context, Comparison, and Prehistoric Art*, a comparative analysis of how archaeologists working in different world regions have interpreted prehistoric human imagery (Cambridge University Press, 2011).

Contributors

Katelyn J. Bishop
University of Illinois at Urbana-Champaign

Michael Blake
The University of British Columbia

John E. Clark
Brigham Young University

Paola Demattè
Rhode Island School of Design

Nilesh W. Gaikwad
Gaikwad Steroidomics Laboratory

Louis E. Grivetti
University of California, Davis

Kristin K. Hoffmeister
Texas A&M University

Terry G. Powis
Kennesaw State University

R. J. Sinensky
University of California, Los Angeles

Thomas A. Wake
University of California, Los Angeles

PART I

RESEARCH PROBLEMS AND METHODS

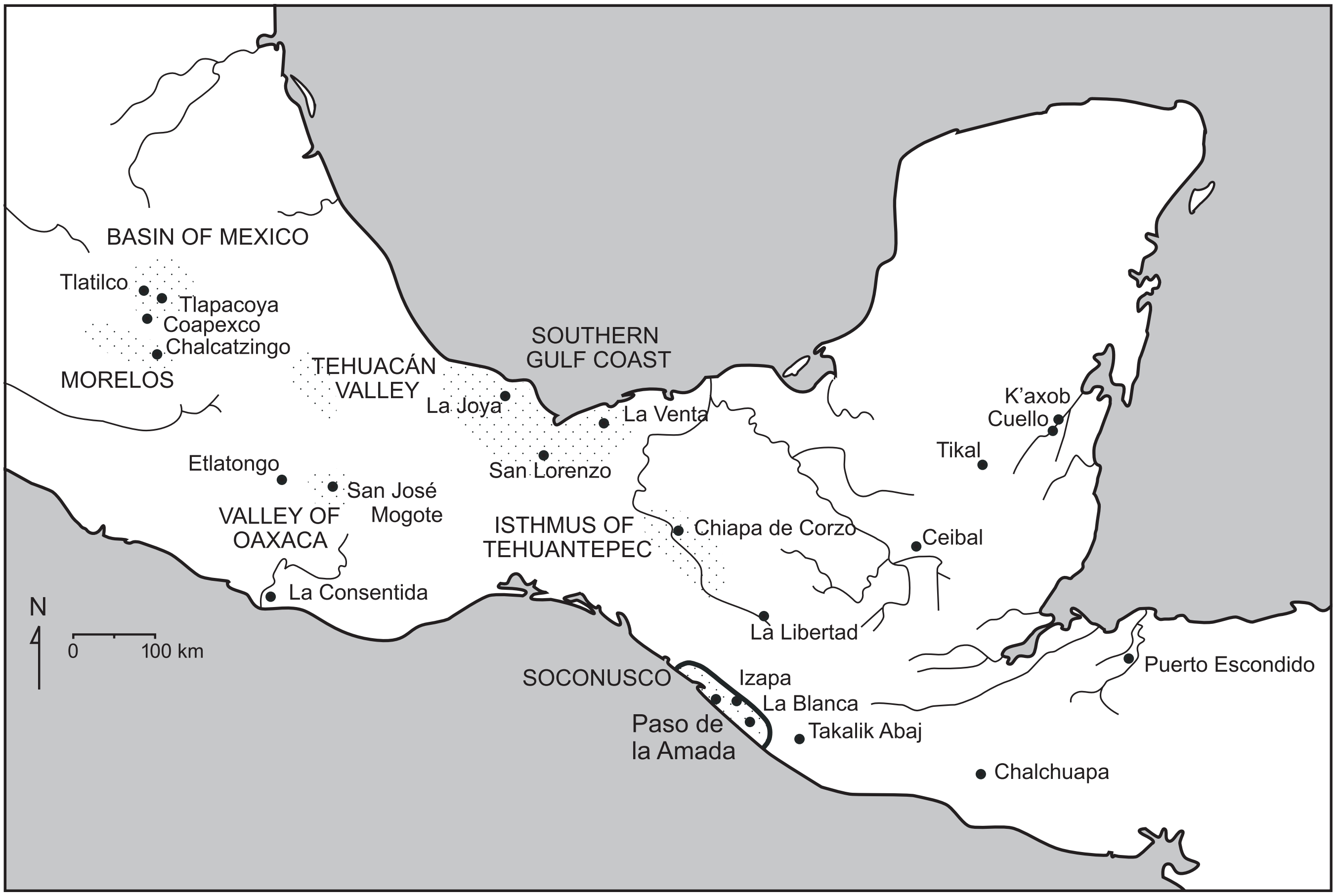


Figure 1.1. Map of Mesoamerica, showing selected sites, regions, and geographical features. *Illustration by R. Lesure.*

CHAPTER 1

Research at Paso de la Amada

Richard G. Lesure, John E. Clark,
and Michael Blake

PASO DE LA AMADA, an archaeological site in the Soconusco region of the Pacific Coast of Mexico, was among the earliest sedentary, ceramic-using villages of Mesoamerica. With an occupation that extended across 140 ha in 1600 BC,[1] it was also one of the largest communities of its era (Figure 1.1). First settled around 1900 BC, the site was abandoned 600 years later during what appears to have been a period of local political turmoil. A new large center, Cantón Corralito, emerged, contesting Paso de la Amada's prominence. The decline of Paso de la Amada corresponded with a rupture in local traditions of material culture, intensified contacts with peoples of the southern Gulf Coast, and adoption, in the Soconusco, of a range of elements of Early Olmec style. Stylistically, the material culture of Paso de la Amada corresponds predominantly to the pre-Olmec "Mokaya" tradition (Clark and Blake 1994:22).

Except for what seem to have been a few isolated homesteads between 1200 and 1000 BC and again during the twentieth century AD, the site has not been occupied since 1300 BC. Today it is farmland. Although plow damage to the archaeological deposits is significant, the lack of any overburden from later occupation means that remains of the occupation from 1900 through 1300 BC are readily accessible to investigation. Excavations have revealed significant earthen constructions from as early as 1700 BC. Those include the earliest known Mesoamerican ballcourt and traces of a series of high-status residences. Although the houses themselves were of perishable materials, the remains of one residence in the series include a spectacularly preserved earthen platform, 22 m long, with low earthen walls defining the interior space.

Under the aegis of the Mazatán Early Formative Project, directed by John Clark and Michael Blake, Paso de la Amada was excavated by various investigators from 1985 through 1997. This volume is one of what we anticipate will be several final reports on the project. Here we describe various mound and off-mound excavations *other* than those at the elite residence (Mound 6) and the ballcourt (Mound 7). Most of the investigations and associated materials reported here derive from Lesure's dissertation and post-dissertation excavations. We also include several other test excavations and a study of human remains excavated from 1992 through 1997.

The present chapter provides an overview of the region, the site, and the three general research topics. Initially, the primary topic of research was the origin of social inequality. The goal was to study residential differentiation and social inequality at a large Initial Formative chiefdom. Although the resulting body of evidence is uneven, the artifact assemblage represents one of the largest currently available for consideration of residential differences at a large village of that era (1900–1400 BC). A second topic has been the nature of subsistence in the Soconusco during the second millennium BC and what that might tell us about development of the agricultural system of later Mesoamerican civilizations. The third research topic is the social archaeology of Paso de la Amada, an effort to understand the specific history an early sedentary community.

1. All dates in this volume are in calendar years unless otherwise specified.

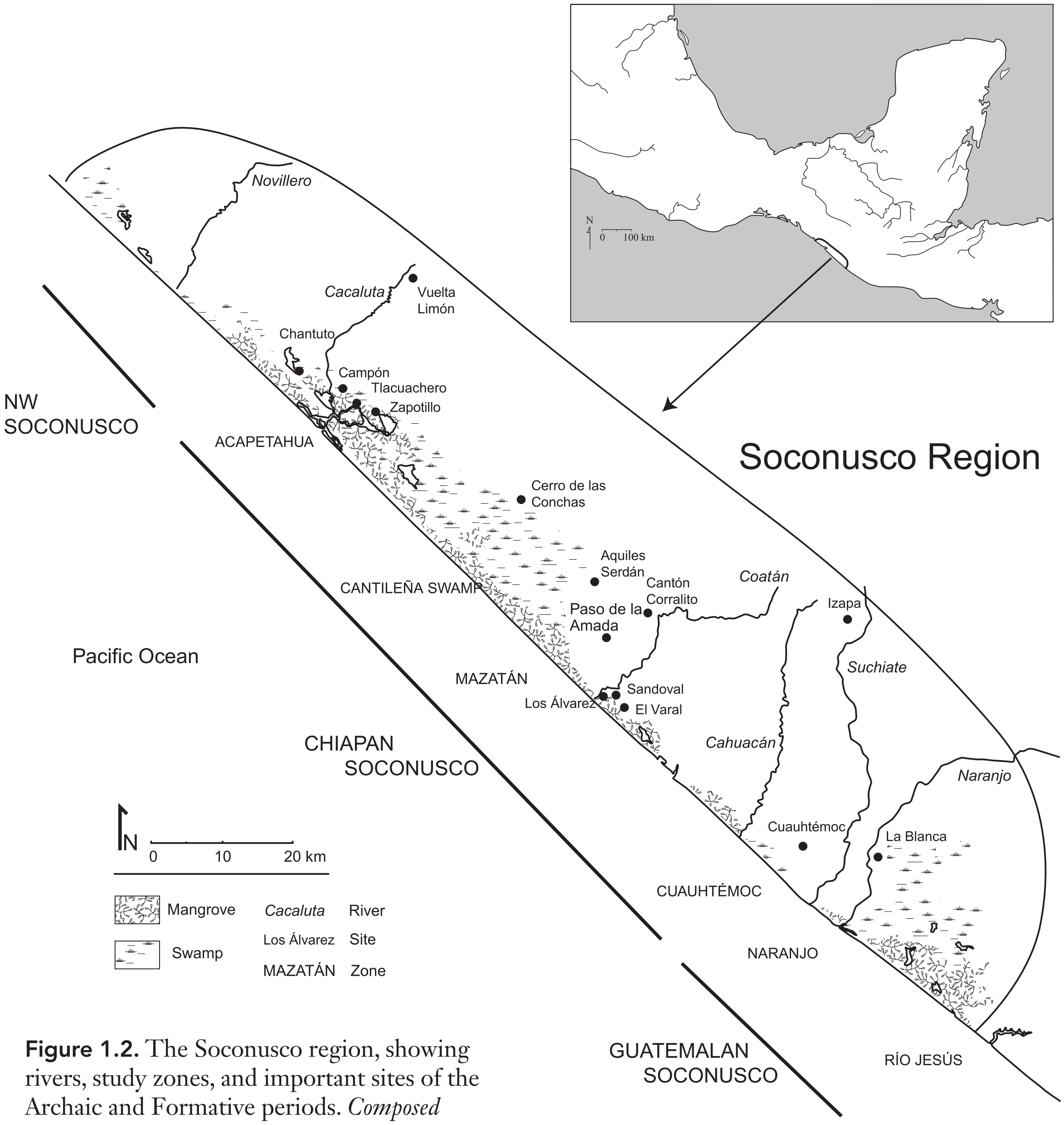


Figure 1.2. The Soconusco region, showing rivers, study zones, and important sites of the Archaic and Formative periods. *Composed by R. Lesure and project staff.*

THE SOCONUSCO REGION

The Soconusco, shown in Figure 1.2, is a narrow strip of the Pacific Coast of Chiapas, Mexico, and neighboring Guatemala (Clark 1994a:58–80; Coe and Flannery 1967:11–15; Lowe et al. 1982:55–62; Voorhies 1976:18–23). It is sharply delimited inland by the rise of the Sierra Madre. High rainfall feeds numerous rivers that descend from the mountains to feed an estuary system protected from the ocean by a sandy barrier beach. The tidal influx of saltwater to the estuary system is offset by the continual input of river-borne freshwater, creating gradients of salinity from points of tidal inflow (the lower estuary) to lagoons and freshwater swamps of the upper estuary, closest to the sources of freshwater (Michaels and Voorhies 1999:42; Voorhies 1976:22–23).

Virtually all the rain falls between mid-May and mid-October, leading to sharply defined wet and dry seasons. The input of water has dramatic effects on the estuary system. Salinity decreases in lagoons (Voorhies 2004:12). Water levels also increase. One result is seasonal flooding in savanna zones dominated by grasses and low trees along the margins of the estuary as well as in old river channels farther inland, including those within the vicinity of Paso de la Amada (Figure 1.3). Seasonally flooded lands would have provided a succession of subsistence opportunities during the dry season, first as a source of aquatic foods, then as choice locations for an extra agricultural crop when

Figure 1.3. Flooded oxbow south of Paso de la Amada in May 1992, looking north across the oxbow toward Mound 6. Mound 6 is the light-colored strip in the center of the photograph, behind the flock of birds. *Photo by R. Lesure.*

surrounding lands were completely dry (Clark 1994a:76; Clark et al. 2007:37).

The wild resources of the Soconusco were diverse and abundant (Alvarez del Toro 1990:Chapter 6). Important potential foods for inhabitants included fish, mollusks, shrimp, crabs, reptiles, and mammals, as well as a plethora of fruits and other less well-documented plant products (Blake and Neff 2011; Clark 1994a:Table 2; Kennett et al. 2006:Table 6.1; Lowe et al. 1982:62–71). The inhabitants of Paso de la Amada ate a diverse array of animals from most of the various habitats within several kilometers of the site.

The agricultural potential of the Soconusco coastal plain is also considerable. Still, one pattern that affects agriculture in the region is a drop-off in rainfall from the slopes of the Sierra Madre to the coastline. The rainfall differential between foothill and seashore locations less than 40 km apart can reach 200 cm per year (see Lowe et al. 1982:55–62). The rainy season is also longer in the foothills than on the coast. One result is that lands 20 km or more inland can provide two or even three crops a year without irrigation, an opportunity unavailable closer to the estuary except through use of seasonally flooded areas (Clark 1994a:72–82). For people dwelling immediately beside or in the estuary, a general scarcity of salt-free soils capable of supporting crops is compounded by a lack of water during the dry season, both for drinking and for crops.

As a result of these patterns, optimal settlement locations for agriculture and exploitation of wild aquatic resources are different: inland on the coastal plain for agriculture, near the estuary for wild resources. A change in settlement focus is apparent over the course of the Formative. Between the second millennium BC (Initial and Early Formative) and the first millennium BC (Middle and Late Formative), the locations of the largest centers shifted from near the estuary (Paso de la Amada, Aquiles Serdán, Chilo) to inland on the coastal plain (Izapa, Takalik Abaj). The shift appears to be the result of the gradual reformulation of subsistence strategies toward an emphasis on agricultural production over wild aquatic foods (Kennett et al. 2006:132–33).

Consideration of the settlement system of the Late Archaic complicates the picture, since it undermines the impression of unidirectional shift. Most known Archaic sites are shell mounds in the estuary, but these appear to have been special-purpose sites for the harvesting of shellfish and other resources. In Barbara Voorhies's (2004) model of Archaic settlement patterns in the region, base camps for the mobile hunter-gather-fisher-farmers of the era were located inland, on the coastal plain. Following that argument, the establishment of sedentary villages in the Initial Formative involved a shift in the focus of settlement toward the estuary (with its abundant wild aquatic resources) and therefore away from the optimal location for agriculture. Yet, by the later Formative, the focus of settlement had returned to the coastal plain. The Initial Formative pattern thus may have been part of a long-term oscillation in which the focus of settlement shifted from the interior coastal plain (Archaic) to near-estuary areas like the Coatán delta (Initial and Early Formative) and back to the

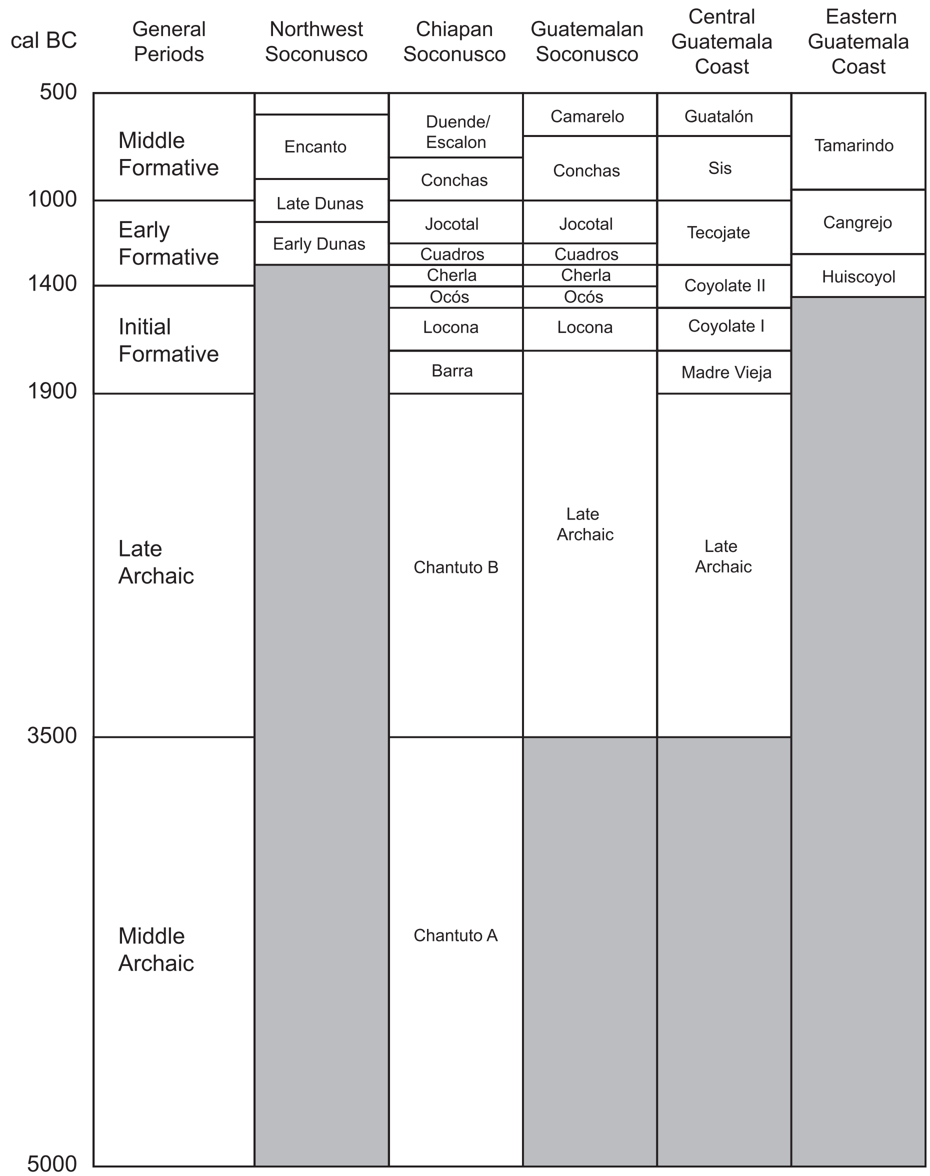


Figure 1.4. Archaic and Formative chronologies along the Pacific Coast of Mesoamerica. Sources: Arroyo 1994; Arroyo et al. 2002; Blake et al. 1995; Clark and Cheetham 2005; Love 2007; Lowe 2007:66; Morgan 2011; Rosenswig 2011; Voorhies 2004. *Composed by R. Lesure.*

coastal plain (Middle–Late Formative). The authors of this chapter disagree on the status of Voorhies's model. Lesure finds it convincing, while Clark does not. The authors of Chapter 26 of this book accept the model for their consideration of diet in Initial Formative Paso de la Amada in the context of long-term trajectories of changing subsistence practices.

THE MAZATÁN ZONE OF THE SOCONUSCO

Paso de la Amada is one of a dense cluster of sites in the Mazatán zone of the Soconusco, a subregion that essentially corresponds to the delta of the Coatán River. During much of the second millennium BC, the Mazatán zone appears to have been at least *among* the most densely populated areas of the entire Soconusco—and likely *the* most densely settled area. One reason may have been that the Coatán delta provided a particularly effective location for a broad subsistence system reliant on both agriculture and the harvesting of wild resources in the estuaries. As is argued in Chapter 26, it represented an optimal location appropriate for the broad-based subsistence system of the Initial Formative.

Immediately to the northwest of the Mazatán zone is the freshwater Cantileña Swamp (also referred to as the

Hueyate Swamp) and beyond that the Acapetahua zone. In the Acapetahua area, the estuary extends farther inland than in Mazatán (9 km as opposed to 1 to 3 km). Initial and Early Formative settlement in Acapetahua is significantly less dense than in Mazatán, but use of the estuary during the Late Archaic is well documented at half a dozen shell mounds (Voorhies 2004, 2015). Clark and Hodgson (2009) report significant Archaic occupation also in the Cantileña Swamp. To the southeast of Mazatán there is a continued extension of Initial–Early Formative settlement of gradually diminishing density. The large village of Cuauhtémoc was of similar size to those of Mazatán, but it does not appear to have been part of such a dense settlement cluster.

In the Mazatán zone, by the Locona phase (Figure 1.4), there were seven sites of more than 10 ha, including Paso de la Amada, Chilo, and San Carlos (Clark 1994a: 196–203, 2004a:54–55). Paso de la Amada, at approximately 140 ha, appears to have been a "first among equals." It was not a paramount center for the region but rather the seat of a small chiefdom among a cluster of such polities (Clark and Blake 1994). That basic political system persisted through the abandonment of the site. It would be the newly prominent center of Cantón Corralito that would, for the first time, integrate much of the Mazatán zone into a regional polity (Cheetham 2010a, 2010b; Clark 1997), during the Cuadros phase of 1300–1200 BC and thus after the abandonment of Paso de la Amada.

PASO DE LA AMADA: AN INITIAL FORMATIVE CEREMONIAL CENTER

Paso de la Amada is located in farmlands of the *ejido* (collective farm) of Buenos Aires (Figure 1.5). Today the terrain is gently undulating. Old oxbows of the Coatán are identifiable within and around the site (Figure 1.6). Excavations reported here indicate that surface relief at the time of initial settlement was more pronounced than it is today (see Chapter 7). The Coatán may have shifted to its current course (and thus away from the vicinity of Paso de la Amada) not long before the Initial Formative occupation of the site (Gutiérrez 2011). The first inhabitants built houses preferentially on the elevated terrain of old overbank deposits. Yet excavations reveal that part of the relief visible on the surface today is the result of artificial earthen constructions dating to the Initial and Early Formative periods.

Fifty low mounds were mapped by Jorge Fausto Ceja Tenorio (1985) in the 1970s and/or more recently by Clark and colleagues (Clark 2004a:57). By the 1990s, some of those were identifiable only as light-colored patches of soil with high artifact densities; the surface relief originally observed by Ceja had been plowed away.

In most of the mounds tested, excavations revealed artificial earthen construction. (Mound 15 is a possible exception.) There was also settlement in off-mound, naturally elevated areas. Examples reported here include Mz-250

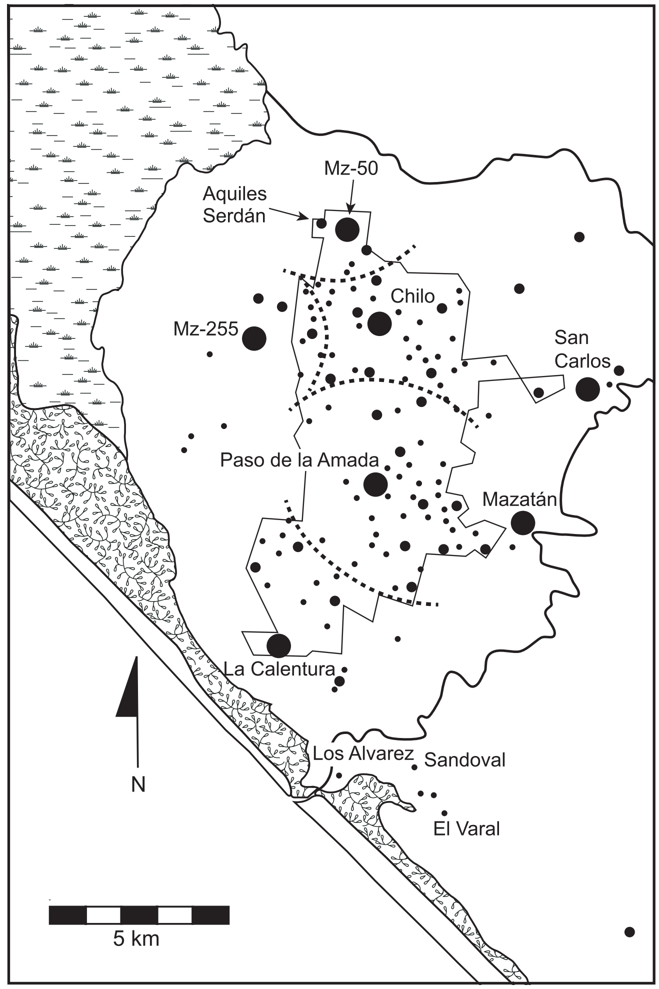


Figure 1.5. Interpretation of Locona settlement patterns in the Mazatán zone of the Soconusco. Large villages were spaced at approximately 5 km intervals and surrounded by clusters of hamlets and homesteads. Large sites and a few others mentioned in chapters to follow are labeled. *Composed by R. Lesure based on Clark 1994a:Figure 62 and Clark 2004a:Figure 2.3.*

and the Pit 32 excavations. The latter area today appears to be a random point on the gentle slope that descends from Mound 1 into the old oxbow that forms the southern margin of the site. Yet excavation shows that this was a locally elevated area in the Locona phase; the original undulating relief has been evened out by erosion and plowing.

In initial excavations at the site, Ceja Tenorio (1985) clearly established its surprising size and early date. Three important discoveries in work conducted since 1985 help lay the basis for current understandings of the site.

First is the sequence of high-status residences in Mound 6. Excavated traces of perishable structures from the Initial and even the Early Formative are rare, and they are known mainly from highland regions, where the buildings were typically 6 to 8 m in length (Flannery and Marcus 2005; Tolstoy 1989a). Mound 6 of Paso de la Amada, excavated

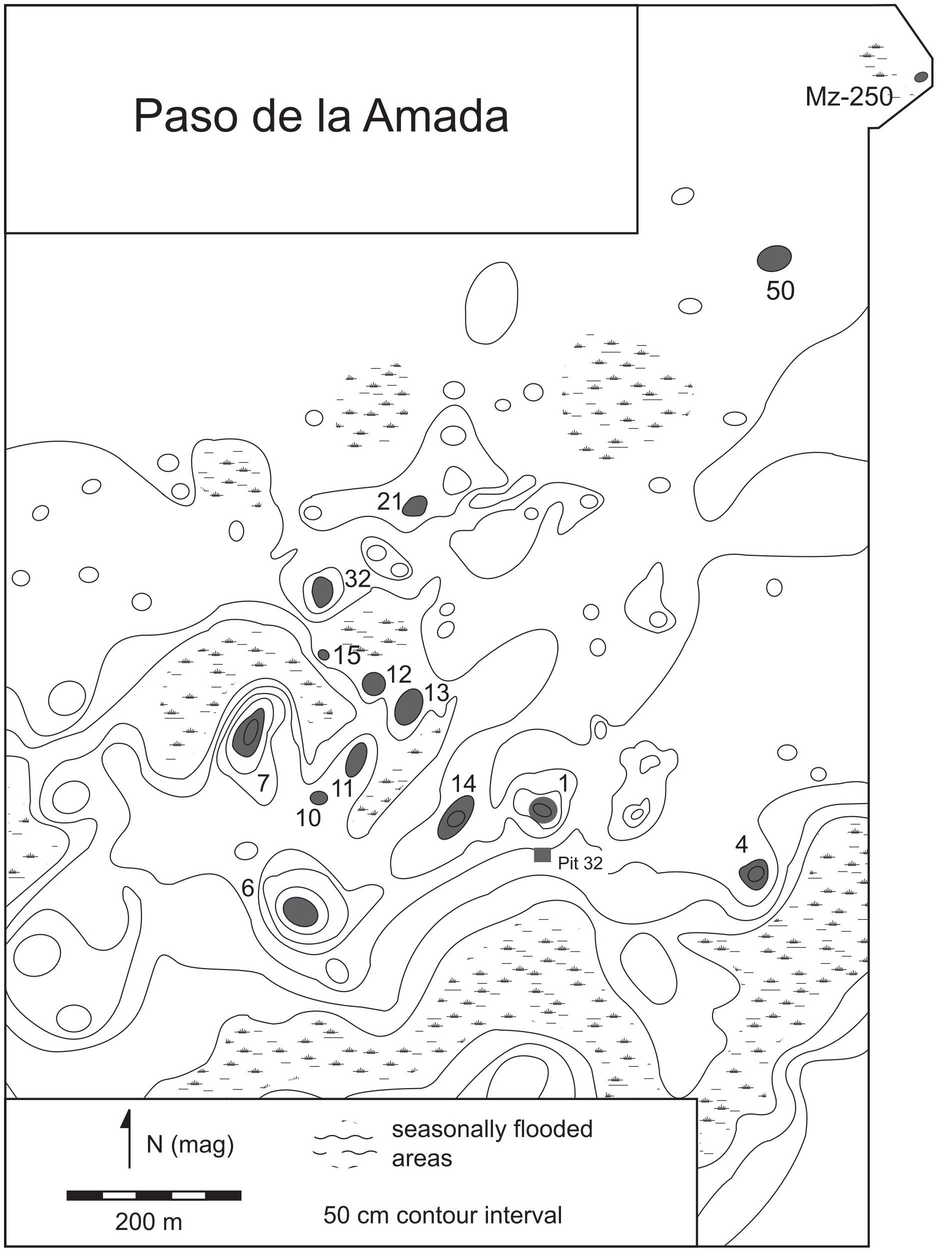


Figure 1.6. Map of Paso de la Amada showing excavated mounds (identified by number) and the locations of two significant off-mound excavations, Pit 32 and Mz-250. Contour interval is 50 cm. *Topographic base map by Ronald Lowe. Figure composed by R. Lesure.*

by Michael Blake between 1985 and 1995, proved to contain traces of a sequence of large pole-and-thatch buildings constructed one after another on a steadily expanding earthen platform (Figure 1.7a). The most startling was a building early in the sequence (Figure 1.7b). It was 22 m long, with low clay walls or benches, well preserved in this case beneath the fill of later structures.

The artifacts and features associated with the Mound 6 structures indicate that people lived in them, engaging in the full range of domestic activities evidenced elsewhere at the site. We identify the sequence of buildings at Mound 6 as comprising high-status residences, probably successive residences of a series of village chiefs (Blake 1991, 2011; Blake and Clark 1999; Blake et al. 2006; Clark 1994a, 2004a). For debate over interpretation of the structures, see Clark (2004a), Lesure and Blake (2002), and Marcus and Flannery (1996:90–91).

The second important discovery is the ballcourt (Figure 1.7c). Blake initially expected to find another large building in Mound 7, the biggest mound at the site. Intensive exca-

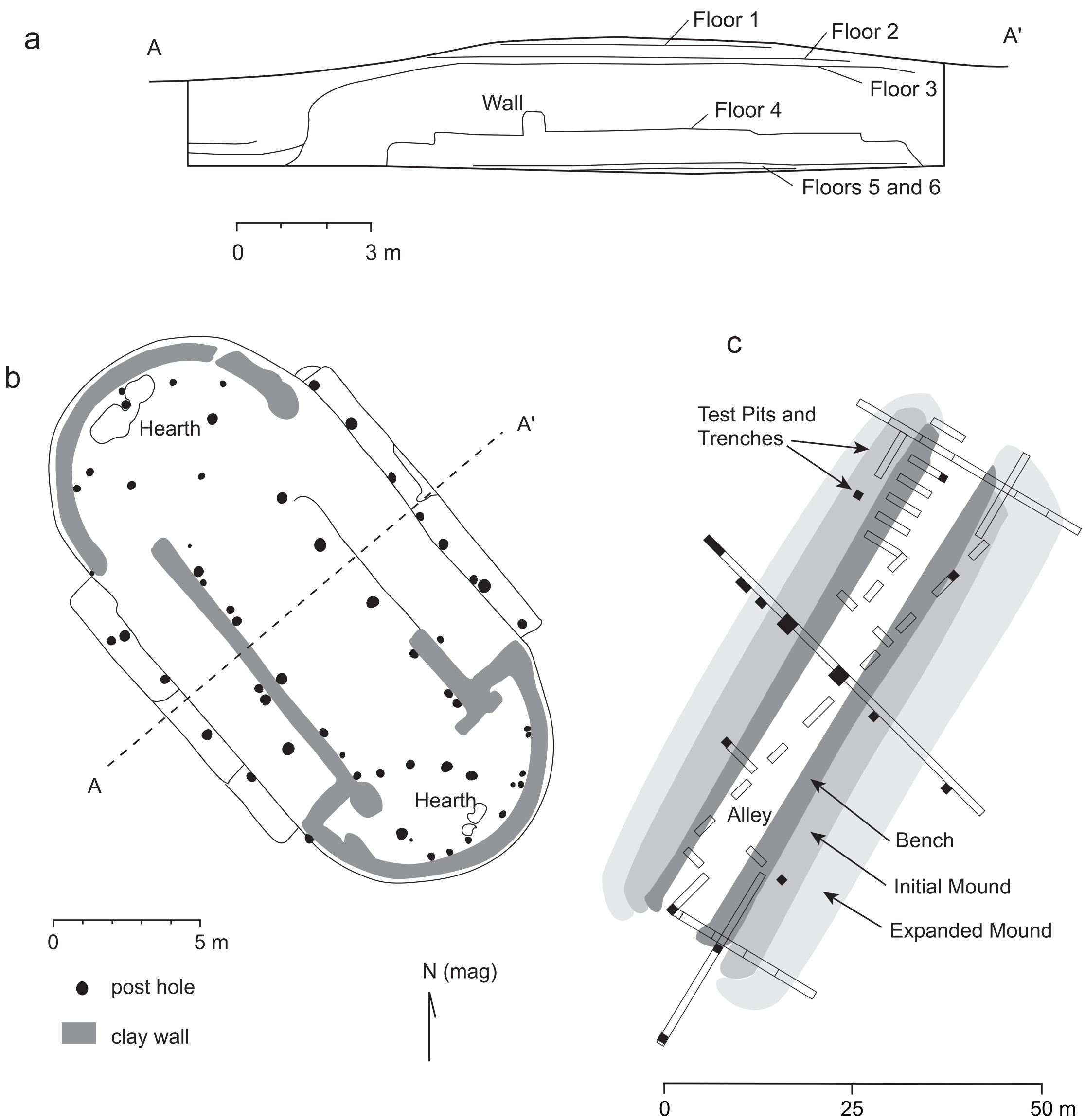


Figure 1.7. The chief's residence and ballcourt at Paso de la Amada: (a) simplified profile showing floors of successive structures at Mound 6; (b) plan of Structure 4 at Mound 6; (c) plan of ballcourt showing locations of excavations. *Redrawn by R. Lesure from Clark 1994a:Figure 79 and Blake 2011:Figures 5.2, 5.5, and 5.7.*

vations by Blake and Warren Hill in 1995 instead revealed that what today appears to be a single mound originated as two parallel, earthen platforms in the classic form of a Mesoamerican ballcourt. Erosion and plowing have erased surface traces of the two platforms. The Paso de la Amada ballcourt is the earliest currently known. Its prominence in the site and the massive labor investment it represents suggest that the ball game likely already had important religious and/or political implications at this time (Blake 2011; Hill 1999; Hill and Clark 2001; Hill et al. 1998).

The third discovery is identification of the site as a ceremonial center. This is actually a synthesis of a series of individual findings, beginning with the recognition that the scale of earthen construction at the site went considerably beyond platforms for individual residences. As we worked through implications of discovery of the ballcourt, we realized that the large Locona buildings were systematically aligned in relation to that facility. Clark (2004a) suggested that the Locona-era site was the result of an ambitious collective labor project with evidence of planning at a massive scale. He identified a large plaza in the southwestern sector of the site, associated with the ballcourt and the chief's residence, and suggested that some bajos (low-lying, seasonally inundated areas) were human constructions. In several works, he considers the possibility of a systematic unit of measure, the encoding of Mesoamerican sacred numbers, and the nature of large-scale planning (Clark 2004a, 2004b; Clark et al. 2010). Lesure (2011a) has explored the character of routinized activities in different settings and proposes that large, platform-top residences of the Locona phase were not simply places for occasional rituals. The daily life of the inhabitants of these buildings was ritualized in ways not evident at smaller residences.

Clark (2004a:65) envisions the ceremonial organization of Paso de la Amada as involving a plaza without a temple. Lesure (2011a) suggests, further, that a distinction between "public" and "private" buildings was absent in the Locona phase but developed over the course of the occupation, leading to construction of the site's first public buildings/temples in the Cherla phase (at Mounds 1 and 12). There is plenty of scope for discussion and debate on the ceremonial character of Paso de la Amada. The authors of this chapter do not agree on all particulars, but we all enthusiastically endorse the identification of the site as one of Mesoamerica's earliest known ceremonial centers.

INVESTIGATIONS REPORTED IN THIS VOLUME

Excavations reported here include trenches and extensive exposures in Mounds 1 and 12; trenches with small expansions in Mound 32, Mz-250, and Pit 32; multiple test pits in Mounds 13 and 21; single test pits in Mounds 10, 11, 13, and 14 and in four off-mound locations (Pits 29, 30, 31, and 33).

The original goal was to excavate several houses with associated midden deposits. Those would provide a basis for the study of residential differentiation and social inequality in an Initial Formative chiefdom. For a variety of reasons, we were less successful than we had hoped in recovering traces of actual structures. First, structural remains were preserved only where they had been covered with significant subsequent platform fill. Second, even when remains of structures (of perishable materials) were protected by platform fill, the direct superposition of a platform on a preexisting structure—spectacularly present at Mound 6—was not observed in either of the mounds subjected to significant extensive excavations. Third, we had not anticipated the frequency of significant earthen constructions and the large size of the platforms. Finally, in the absence of any stone for construction, platforms were built entirely of earth. In addition to the challenges posed by their large sizes, the recognition of platform deposits and their boundaries was by no means a trivial task.

Traces of several pole-and-thatch buildings are described in Chapters 3 and 4, but in terms of architecture, the main achievement of the excavations was documentation of the nature and extent of platform constructions. We also recovered midden deposits and other features associated with platform-top and ground-level residences. Contextual analysis of those features leads to a proposal on multi-dwelling residential groups discussed in Chapter 7.

Nearly 1.1 million artifacts from screened units were recovered in the excavations, mostly potsherds and obsidian flakes. This assemblage constitutes one of the largest extant collections of Initial Formative (pre-Olmec) material culture from any site in Mesoamerica. Although the dispersion of samples across the site is uneven in a variety of ways, the assemblage provides the basis for consideration of residential differentiation in household artifacts as a component of social inequality.

Highlights among the artifacts include an extraordinary ceramic statuette from Mound 32, including what might be the earliest case of eyes inlaid with obsidian mirrors. There is an important collection of personal ornaments in jadeite and other materials, including thousands of clay ear ornaments, mostly from a single mound. Subsistence evidence includes a large and diverse collection of identified faunal remains, with 148 genera in 95 families of crustaceans, fish, birds, amphibians, reptiles, and mammals.

Excavations at Mounds 6 and 7 have been discussed in numerous articles; final results will be reported in a future monograph. Other investigations at Paso de la Amada not described in this volume include tests and trenches in Mound 50 and smaller test excavations in Mounds 2 and 4. There are also the two long trenches from Mound 6 excavated by Clark in 1995. Trench 1 was particularly important, providing crucial evidence for Clark's interpretation of the site as a ceremonial center.

RESEARCH FOCI

The excavations and/or subsequent analyses have been organized around three broad research topics: the origins of social inequality, subsistence changes from Archaic to Formative times, and an effort to understand the specificity of social practices and the history of the site. The initial excavations were rather narrowly focused on the first of those topics; the other two became more salient during assessment of the results and analysis of the materials.

Residential Differentiation and the Origins of Social Inequality

Toward the end of the 1990 season, on a late afternoon visit to the site, Blake and Clark invited Lesure to consider dissertation research at Paso de la Amada. Specifically, they suggested a program of excavations in multiple mounds with the goal of recovering traces of non-elite houses (and associated middens) for comparison with the sequence of elite residences revealed in Mound 6 and the ones Blake at that point still anticipated finding in Mound 7.

The research presented in this volume was therefore originally formulated with reference to the sequence of structures revealed in Mound 6 and particularly to the major discovery of the 1990 season, Structure 6-4, with its well-preserved platform, porches, and walls or benches in clay (Figure 1.7b). Compared to similarly impressive constructions at other Mesoamerican sites, that building was notably early. Dating to approximately 1650 BC, it was definitively pre-Olmec. Yet if it was a residence, as Blake (1991) was already interpreting the series of structures immediately above it, then it suggested a rapid ("precocious") emergence of social inequality in the Soconusco region, within a couple hundred years of the local transition to the Formative. The general research topic for Lesure's excavations was therefore the emergence of social inequality.

Clark and Blake (1994) contributed to theoretical debates about the emergence of inequality in a paper that was influential enough to be reproduced in two edited collections designed for classroom use (Preucel and Hodder 1996; Smith and Masson 2000). As an empirical case, that paper drew on finds from the 1985–1986 seasons in Mazatán. Blake and Clark (1999) and Clark (1994a, 2004a) further developed the model in later publications. The model, termed *morphogenetic* by Clark (1994a), sees the emergence of institutionalized and eventually hereditary inequality as an unanticipated outcome of political actors competing for prestige. Active prestige-seekers are assumed to exist in every society, and they are termed *aggrandizers*. These self-interested actors are simultaneously rational and culture-bound. Aggrandizers seek followers in order to outcompete other aggrandizers. The relationship between aggrandizer and follower is based on reciprocal benefits. Aggrandizers offer concrete benefits of various kinds to their followers. The latter have the power to switch allegiances, thereby generating pressure on aggrandizers to increase rewards—pressure that, in turn, generates a rising demand for deployable surpluses. Successful aggrandizers manage to give more than they receive and thus keep followers morally indebted to them. In rich environments capable of sustained pressure on resources, aggrandizers may be able to stack the deck in favor of their offspring such that the latter also become successful aggrandizers, thereby creating conditions for the institutionalization of inequality and the perception of rank as hereditary.

Aggrandizers seek power and influence; they are not typically trying to amass possessions for themselves. Further, it is clear that power and prestige can be constituted in a variety of ways (Blanton et al. 1996; Hayden 1995), with quite likely different outcomes in terms of differentiation in household artifact inventories.

Still, there is a basis for expecting that the degree of differentiation in residential architecture observed at Paso de la Amada by the Locona phase should be associated with differences in artifact assemblages. It is, after all, the Barra phase to which the aggrandizer model particularly applies, since the steadily expanding platform and continuity in placement of structures at Mound 6 during the Locona phase is interpreted as evidence of the emergence of hereditary inequality (Clark and Blake 1994:22). Other things being equal, one would expect the hereditary transmission of power and prestige to bring a relaxation of the pressure on aggrandizers to give things away.

Further, one would expect the spectrum of activities at residences of aggrandizers or chiefs to differ from those of typical houses, either quantitatively (the same activities but in different frequencies) or qualitatively (certain activities appearing exclusively in houses of leaders). Specifically, we would expect different levels of engagement in the activities that aggrandizers-cum-chiefs pursue to build and perpetuate their positions of authority and prestige (Clark and Blake 1994:21; Hayden 1995:51–60). Since leaders sponsor public activities, including feasts, one would expect higher frequencies of serving ware, decorated serving ware, and large preparation/service vessels at high-status residences (Clark 1991:17–22; Clark and Blake 1994:22; Hayden 1995:60–63). Leaders are also engaged in the acquisition, production, and circulation of valuables, which may include either exotic imported goods or locally made crafts requiring time and skill. They sponsor production of the latter and their involvement in long-distance contacts and exchanges gives them preferential access to the former (Friedman and Rowlands 1978). One can therefore look for differential distribution of imported goods and labor-intensive craft products—in our case, obsidian, greenstone ornaments, iron ore mirrors, stone bowls, hollow figurines, and sculpted effigy pots. Yet leaders may have given prestige goods to followers, evening out the distribution of those items. It is therefore also important to look for evidence of production of potential prestige objects. Finally, aggrandizers and chiefs may have had differential access to sacred knowledge, and they were likely officiants at communal rituals (Davis-Salazar 2007). We might therefore expect certain ritual objects to be present at leaders' houses and absent elsewhere.

Initial studies of the materials presented here (Lesure 1995, 2011a; Lesure and Blake 2002) found that, during the Locona and Ocós phases and thus during the steady expansion of the platform for the chief's residence at Mound 6, there was evidence of differences in household inventories only in the case of several rare ritual objects. It was in the Cherla phase—after the abandonment of Mound 6—that hints of economic differentiation appeared, specifically in access to imported goods.

In appropriate descriptive chapters, we note evidence relevant to the study of residential differentiation in household artifact inventories, as well as certain challenges posed by unevenness in the sample as a whole. Chapter 25 presents our conclusions on this topic.

Formative Subsistence and the Development of Agrarian Societies in Soconusco

The nature of the subsistence system in the Soconusco during the Initial and Early Formative periods has been a topic of interest for some time (Blake et al. 1992a, 1992b;

Clark 1981, 1994a:217–47; Davis 1975; Lowe 1967, 1975). It became a second important research focus for the Paso de la Amada work primarily because of the large sample of faunal remains recovered. Those have been under analysis at UCLA since 1996 (Lesure et al. 2009a; Steadman et al. 2003; Wake 2004a, 2004b).

In traditional understandings of ancient Mesoamerican culture-history, the Archaic (9000–1900 BC) is envisioned as an era of sparse occupation by nomadic hunter-gatherers and low-level food producers, while the subsequent Formative (1900 BC–AD 200) is understood as a period of rapid sociopolitical developments in sedentary villages. In this formulation, the transition from Archaic to Formative was a moment of far-reaching behavioral transformation involving the establishment of true sedentism, the adoption of pottery, a reorientation of subsistence toward maize agriculture, and the initiation of a "Neolithic" trajectory of demographic expansion. The strength of this as a general formulation for Mesoamerica has eroded significantly in recent years, with the quadruplet of sedentism–pottery–agriculture–population growth now often seen as associated more with the Middle Formative, from 1000 BC. In contrast, the Initial and Early Formative periods (1900–1000 BC) look transitional in the emergence of sedentism and agriculture (Arnold 1999; Blake et al. 1992a, 1992b; Clark et al. 2007; Killion 2013; Lesure and Wake 2011; Lesure et al. 2014a; Rosenswig 2006; Rosenswig et al. 2015; Smalley and Blake 2003; VanDerwarker 2006; Webster 2011).

Evidence from the Soconusco region has played an important role in recent claims that systems of subsistence and settlement during the second millennium BC were fundamentally different from patterns characteristic of later Mesoamerican civilizations. The transition from Archaic to Formative was marked by the appearance of pottery and the establishment of permanent villages in the Barra phase of 1900–1700 BC, making this area the location for some of the earliest sedentary, pottery-using villages in Mesoamerica (Clark and Blake 1994; Lowe 1977). Yet, the existing evidence on Initial Formative subsistence in the Soconusco does not add up in any simple way. Formative-era macrobotanical remains are dominated by maize from 1900 BC (Blake and Neff 2011; Feddema 1993). From 1700 BC the region witnessed a Neolithic-style demographic expansion (Pye et al. 2011:Table 10.1; see also, more generally Lesure et al. 2014a). Yet despite rapid Locona-phase population growth, pre-Formative (Archaic) practices of food preparation were abandoned only gradually over the course of the second millennium BC (Clark et al. 2007), and a pattern of seasonal mobility between permanent villages and estuary encampments persisted (Lesure 2009c:260–63; Lesure and Wake 2011). Finally, isotopic studies of human bone have been understood to show that maize was *not* a dietary staple until after 1000 BC (Blake et al. 1992a, 1992b; see also Ambrose and Norr 1992; Chisholm et al. 1993; Chisholm and Blake 2006; Clark et al. 2007; Rosenswig 2006; Rosenswig et al. 2015; Smalley and Blake 2003). A recent review of the isotopic evidence leaves the picture at the very least more complicated than previously understood (Blake 2015:145–48; Moreiras 2013).

Faunal resources of the estuary have been identified as an intensifiable natural resource that could have supported sedentism and social inequality without a crop staple (Blake et al. 1992a, 1992b; see also Clark 1994a:217–47; Clark and Blake 1994; Clark and Gosser 1995). However, we still know very little about the details of subsistence practices during the second millennium BC. Was the subsistence system essentially stable, or changing? If it was changing, what was the nature of the change? Was maize, even if not yet a staple, nevertheless becoming more important? Were there changes in the exploitation of wild resources?

The full era of interest for tracing the development of sedentary, agrarian societies in the Soconusco is the Late Archaic through Late Formative (Kennett et al. 2006). The occupation of Paso de la Amada constitutes a comparatively short segment of that span (1900–1300 BC), and the samples of domestic refuse reported here date primarily to the period 1700–1300 BC, just 400 years. Yet this is an important era—the first several hundred years of settled, pottery-using villages—for which large samples of subsistence-related evidence are persistently scarce.

Relevant evidence reported in this volume and synthesized in Chapter 26 includes the pottery (Chapter 8), the grinding stones (Chapter 9), the faunal assemblage (Chapter 14), and the human bones (Chapter 24). We tried to recover botanical remains but were largely unsuccessful because of preservation conditions at the site (Chapter 13).

The Social Archaeology of Initial and Early Formative Soconusco

Our initial efforts to synthesize data from Mazatán at length—the dissertations of Clark (1994a) and Lesure (1995)—took the morphogenetic or other general models of the emergence of social inequality as points of departure and the Soconusco as a test case. In the last 20 years, our interests have expanded. It no longer appears that presentation of the excavations at Paso de la Amada should be organized as the testing of a general model (or even multiple models). At the very least, what sort of model we should test is less clear, because that choice now seems to depend a great deal on the specific nature of institutional arrangements at the site and their history over the course of occupation. It is these last topics that now appear to require the most urgent attention. What is needed is a rich social archaeology of Paso de la Amada (and early Soconusco), with attention to the specificity of beliefs, practices, and institutional arrangements and their transformations over time. Yet, because this is merely the first of multiple monographs in preparation concerning work of the project, it is hardly the place for any general synthesis on these topics. Presented in Chapter 27 is, instead, Lesure's attempt to explore the implications of research described in this volume for understanding the specificity of social practices and the history of the site. Topics considered include the basic unit of production and reproduction, the nature and social use of valuables, the differential ritualization of ordinary activities, and the relation between the Initial Olmec style and the decline of Paso de la Amada.

Organization of the Volume

This book is organized into six parts. Completing Part I is Chapter 2, an overview of methods with an emphasis on the samples of domestic refuse studied in subsequent chapters. Part II includes descriptions of the excavations (Chapters 3 through 6) and a lengthy synthesis (Chapter 7) that addresses aspects of site organization, including the possibility of multi-dwelling residential groups, interpreted as multifamily households. Part III provides basic artifact descriptions and analyses (Chapters 8 through 18), including a synthesis of selected topics in Chapter 19.

Part IV includes three specialized analyses of pottery: a seriation of refuse deposits, an analysis of food residues identified in the matrix of potsherds, and a search for evidence that high-status individuals were innovators based on a micro-stylistic analysis of beveled-rim bowls (Chapters 20 to 22). Part V includes a catalog of burials (Chapter 23) and a physical-anthropological study of the human skeletons (Chapter 24). Part VI consists of three synthetic essays, one on each of the general research topics: the emergence of inequality, changes in subsistence, and the history of social practices at the site.

Table 2.1. Overview of investigations at Paso de la Amada, 1985–1997

Mound Number or Off-Mound Locale	Significant Areal Exposure	Significant Trenching	Small Soundings	Publication Plans
Largest Mounds				
6	1985–86, 1990, 1993	1995	1985	future volume
7		1995	1990	future volume
Other Mounds				
1	1992			Chapter 3
2			1995	future volume
4			1993	future volume
5		1993		future volume
10			1990	Chapter 6
11			1990	Chapter 6
12	1992, 1993	1992	1990	Chapter 4
13			1990, 1993	Chapter 6
14			1993	Chapter 6
15			1997	Chapter 6
21			1992	Chapter 6
32		1997	1992	Chapter 5
50		1995		future volume
Off-Mound Areas				
Vicinity of Mounds 6–7		1995	1985, 1990	future volume
Vicinity of Mound 14			1990	Chapter 6[a]
Vicinity of Mound 1	1992	1992	1992	Chapters 3 and 6[b]
Mz-250		1997	1991	Chapter 6[c]

[a] Pit 29.
[b] Pits 31, 32, and 33. The Pit 32 excavation was considerably expanded.
[c] The 1997 work is described here.

CHAPTER 2

Overview of Excavations, Formation Processes, and Refuse Samples

Richard G. Lesure and Michael Blake

THIS CHAPTER PROVIDES background information on nomenclature and methods. We begin with an overview of the excavations and a general account of field procedures and provenience nomenclature. Discussion then turns to the samples of domestic refuse selected for social analysis. The refuse samples are grouped into alternative sets ("study samples") designed to meet the requirements of different sorts of analyses. Discussion of individual contexts is left to the description of the excavations in Chapters 3 through 6. Here, we consider certain general themes, the outcomes of which undergird the social analyses of subsequent chapters. Topics addressed are unevenness in temporal and spatial coverage, the types of deposits that yielded samples, and the degree to which the refuse therefrom conforms to the expected characteristics of "secondary refuse." We discuss how artifact density and degree of trampling could affect social analysis and compare two approaches to the standardization of artifact frequencies (by volume excavated and weight of associated sherds). Standardization of artifact frequencies by weight of associated sherds is the primary method relied on in this book.

OVERVIEW OF EXCAVATIONS AT PASO DE LA AMADA

In the Soconusco region, Paso de la Amada is the most extensively excavated site of the second millennium BC. Jorge Fausto Ceja Tenorio conducted the first excavations in 1974 (Ceja Tenorio 1985). His 23 test pits, mostly soundings of 1.5 x 1.5 m or 2 x 2 m, focused on Mounds 1 through 5 and several off-mound locations. Work under the aegis of the Mazatán Early Formative Project, directed by John Clark and Michael Blake, began in 1985 and continued through 1997.

Table 2.1 summarizes investigations by season and by the extent of excavation. Three mounds have been the subject of work involving significant areal exposure (excavation blocks of at least 25 m²). Of those, Mounds 1 and 12 are reported in this volume (Chapters 3 and 4, respectively), while Mound 6 will be reported in a future monograph. (In the meantime, see Blake 1991, 2011; Blake and Clark 1999; Blake et al. 2006; Clark 1994a, 2004a.) The off-mound excavation associated with Pit 32 included a block exposure of 25 m² (Chapter 6). Significant trenching (involving continuous exposures of at least 10 m) has been undertaken in nine locations. In addition to the Mound 12 and the Pit 32 excavations (mentioned already for their significant areal exposures), trenching at Mound 32 and at the off-mound location Mz-250 is reported here (Chapters 5 and 6, respectively). Trenches not reported in this volume include those at Mounds 6 and 7 as well as between those mounds (Blake 2011; Blake et al. 2006; Clark 2004a; Hill 1999; Hill et al. 1998). Clark's investigations at Mounds 5 and 50 (Clark 1994a:138–40; Gosser 1994) will likewise be reported in a future monograph. Mounds 10, 11, 13, 14, 15, and 21 were all explored with limited soundings, reported here in Chapter 6; tests in Mounds 2 and 4 will be reported elsewhere. Off-mound soundings in the vicinity of Mounds 6 and 14 (Pits 29 and 30) and to the south of Mound 1 (Pits 31, 32, and 33, with Pit 32 considerably extended by trenching and areal exposure) are described in Chapters 3 and 6.

EXCAVATION NOMENCLATURE

Several systems for designating excavation units have been employed. Ceja Tenorio (1985) excavated test pits, which he numbered sequentially irrespective of where they were located. Test Pits 1 through 3 were in Mound 1, while Test Pits 15 through 19 were in Mound 5, and so on. In 1990 a second system was initiated. In this system, test units were numbered sequentially, starting from 1, in each new mound investigated. Thus Michael Ryan excavated Mound 7 Test Pits 1, 2, and 3, while Lesure excavated Mound 12 Test Pit 1. At the same time, we retained Ceja's sequential numeration for isolated off-mound tests, excavating Test Pits 27, 28, 29, and 30. In this volume, test pits are referred to simply as pits, sometimes abbreviated as P. Thus P29 is Test Pit 29 and Md. 12 P5 is Test Pit 5 at Mound 12. Trenches at Mounds 12 and 32 were numbered and divided into lettered sections. Md. 12 T1E is Section E of Trench 1 at Mound 12, while Md. 32 T4F is Section F of Trench 4 at Mound 32. For the large, horizontal exposures at Mounds 1, 6, and 12, a grid of 2 x 2 m units was established on each mound. Rows along one axis were designated by letters, rows along the other axis by numbers. Each grid unit can thus be uniquely described by a letter and number combination, such as Unit E4, G7, and so forth. (See Figures 3.3 and 4.2.)

Discovery of midden deposits in the off-mound Test Pit 32 prompted a gradual expansion of this test to 12 adjacent units covering 36.5 m^2. The adjacent units were labeled with letters and sometimes numbers: Unit 32A, Unit 32B2, etc. (See Figure 6.10.) That excavation as a whole will be referred to as the Pit 32 excavation. The other off-mound location that saw significant excavation will be referred to as Mz-250. It was originally identified as a small site adjacent to Paso de la Amada, with the site code Mz-250 (Clark 1994a:163). Clark (2004a:Figure 2.5a) now includes this area as part of "greater Paso de la Amada." The 11 units excavated in 1997 were numbered 1 through 11 in the order in which they were opened (Figure 6.16). The excavation as a whole is referred to with the original site designation, Mz-250, though we treat it as part of Paso de la Amada.

EXCAVATION PROCEDURES

Excavations followed one of two basic methods, one for stratigraphic investigations, the other for extensive exposures. *Stratigraphic investigations* were small test pits (generally 1 x 2 m) or trenches (generally in sections of 1 x 2 or 1 x 3 m) excavated in arbitrary 20 cm *levels* and usually screened top to bottom through a 5 mm mesh. Levels were sometimes excavated to conform to natural stratigraphy if stratigraphic changes were identified during excavation. For the *extensive excavations*, a grid of 2 x 2 m units was laid out over the surface of the mound. Excavation proceeded by natural stratigraphic units. Excessively deep natural units were sometimes subdivided arbitrarily for more refined stratigraphic control. Units thus defined stratigraphically and/or arbitrarily were referred to as *lots*, and each was given a unique number. Lots had no preassigned size or shape but rather were defined by the excavator in accordance with each new stratigraphic situation encountered. In abbreviated provenience designations, lots or levels are preceded by a slash. Thus Md. 12 P5/13 refers to Level 13 of Test Pit 5, Mound 12, while Md. 12 E4/15 refers to Lot 15 in Grid Unit E4 at Mound 12

Since both arbitrary and natural criteria were used in defining levels (in the stratigraphic investigations) and lots (in the extensive exposures), these two forms of provenience designations sometimes resembled each other. Levels, however, were always defined solely within individual test pits or trenches. As a result, levels with the same number in different test units are not necessarily correlated. Lots, in the 1992–1993 excavations at Mounds 1 and 12, were not confined to the boundaries of individual excavation units but were defined within each excavation locale as a whole. Samples from the same lot number but different grid units are therefore from the same stratigraphic deposit. In 1997, during excavations of Mound 32 and Mz-250, a new system was introduced: lots were uniquely designated proveniences. See Chapter 5 for further discussion of that system and how it differs from that used in 1992–1993.

A single, arbitrary, primary datum was established for each mound or off-mound excavation locale. The datum was generally 10 to 20 cm above the highest ground in each locale so that all depths could be expressed in centimeters below datum (cm bd). We used line levels and string to set up datum stakes near each excavation unit based on this primary datum. Beginning and ending depths for each lot or level, as well as depths of features or significant artifacts, were measured by line levels from these datum stakes.

Stratigraphic excavations were generally screened top to bottom through a 5 mm mesh. Selected units of the extensive excavations (and some of the trench sections at Mound 32) were not screened. Unscreened lots included deposits of slope wash or platform construction. All culturally significant lots, including occupation surfaces, floors, post holes, features, and midden deposits, were screened. All materials remaining in the screen, including ceramics, obsidian, jade, magnetite, bone, ground stone, fire-cracked rock, pumice fragments, burnt daub, and even pebbles, were retained for analysis in the laboratory.

Burials, floors, structures, and post holes were numbered separately. Units that did not fall into one of those categories but that appeared to have cultural significance were labeled *feature*. The term *floor* was used to designate all living surfaces identified in the excavations, regardless of whether those were structure floors or simply patio or activity areas. We numbered cultural units of each class sequentially either within the site as a whole (burials) or within each mound or off-mound excavation locale (floors,

Table 2.2. Levels of ceramic analysis of materials

Level of Ceramic Analysis	Criteria That Define Level	Total Rims	Total Sherds	Total Weight of Sherds	Percentage of Full Set of Samples Chosen for Study in This Book (by weight)
A	Rim sherds individually analyzed; notes on body sherds	8962	120,860	1031.6	28%
B	Counts of rim sherds by type and detailed form classification; abbreviated notes on body sherds	9980	158,007	1060.5	15%
C	Counts of rim sherds by type and simplified form classification	23,198	352,111	2487.5	46%
D	Overall count and weight of sherds	–	87,908	655.5	11%
E	Weight of sherds only	–	98,995 (estimated)	594.0	1%

post holes, and features). The remains of perishable buildings were numbered in reverse chronological order in each excavation locale (for example, Structure 1 is later than Structure 2). In this volume, we refer to structures either by their full formal designation (for example, Mound 6 Structure 4) or in abbreviated form, with the mound number, a hyphen, and the structure number (Mound 6 Structure 4 becomes Structure 6-4, and Mound 1 Structure 2 becomes Structure 1-2).

From 1990 through 1993, when we assigned numbers to features in the field, we usually did not also assign them lot or level numbers if they were removed as single units. Large or complicated features, however, were divided into multiple lots or levels. Thus Mound 12 Feature 19, a trash pit, was removed as a single unit and therefore does not also have any associated lot number, whereas Mound 12 Feature 2, a complex trash- and sediment-filled ditch, is divided into Lots 12, 13, 15, 19, and 22 where it appears in Units E3 and E4. The lack of a lot or level number associated with some features proved annoying as we worked with the data, and in the 1997 excavations all features were assigned at least one lot number (see Chapter 5).

One of the original goals of the small-mound excavations was to expose and excavate Early Formative house floors. We were not as successful at finding appropriate deposits as we had originally hoped. See Chapter 3 for discussion of a deposit designated Floor 1A/1B at Mound 1, now thought to be a wall remnant and exterior occupation surface associated with Structure 1-2. See Chapter 4 for discussion of a series of hardened surfaces at Mound 12, including Floor 2, compared to the floor of Structure 6-4 in Blake et al. (2006).

Post holes were identified in multiple surfaces at Mounds 1 and 12. Each was completely excavated and screened before excavations proceeded. Post holes were easy to identify and excavate when they contained fill that was radically different in color or texture from the stratum they penetrated. Post holes in Mound 1 tended to fall into this category. Other post holes, especially those in Mound 12, were more difficult to follow: the fill was only subtly different in color or texture from the surrounding matrix.

Most features were completely excavated upon identification. We took 2- to 4-liter sediment samples from trash-filled pits and midden deposits for flotation. Human burials were exposed using ice picks and paintbrushes. Bone preservation was fair to very poor. In several instances we applied a solution of Duco cement and acetone to the bones before removal in an attempt to keep them intact.

Basic processing of the cultural materials was carried out concurrent with the excavations in a field laboratory. Artemio Villatoro of the New World Archaeological Foundation (NWAF) supervised the washing, sorting by material type, counting, and weighing of all materials. After the ceramics from each lot had been counted and weighed, they were sorted again to identify all rims, diagnostic body sherds, and slipped body sherds. Unslipped, non-diagnostic body sherds were then typically discarded. As of 2019, materials are still curated at the NWAF laboratory in San Cristóbal de Las Casas, Chiapas.

ARTIFACT ANALYSES

Analysis of the materials took place between 1990 and 2017. Study of pottery was advanced to different levels for different proveniences. The levels are identified in Table 2.2. Level A involved the most detailed analyses of pottery. Rim sherds were individually recorded, including variables such as rim diameter and wall thickness. In addition, notes were recorded on significant body sherds (bases, decoration, vessel supports, etc.). Level B involved classification of rim sherds to type and form, the latter using the detailed set of codes presented in Chapter 8 (see Figure 8.1). Level C involved classification of rim sherds to type and an abbreviated set of form codes. Level D involved simply counting and weighing the sherds. The intent was for all units to be analyzed at least to Level D. However, the sherds from some units of the platform fill at Mound 1 were weighed but not counted. Level E is used to designate analysis that was restricted to weighing of sherds.

In Table 2.2 the total sample of sherds recovered is broken down according to level of analysis. At levels below A, the full dataset is larger than the value listed because it includes also the levels above. For example, the full Level C dataset includes 42,140 rims (= 8,962 + 9,980 + 23,198). The last column in the table is the percentage corresponding to a given level of analysis of the total weight of sherds chosen for analysis as refuse. (Those percentages pertain to the Expanded Study Sample, defined below.) At every level, more sherds were analyzed than are included among the refuse samples.

Missing data affect the analysis of some proveniences. Errors in the initial processing of artifacts from Mound 1 in the field laboratory led to loss of provenience information for 15 proveniences, mostly from the platform fill. Lab procedures were subsequently improved, and we did not encounter this problem again. None of the affected proveniences is included among the refuse samples used for analysis. Other instances of missing data involve specific classes of information from particular units. From several of the test pit excavations in 1990, we are missing some information, most distressingly the counts and weights of sherds from Test Pit 29, which yielded one of our Cherla refuse samples. (An estimate of the original weight of sherds from Level 6 and Feature 1 of Pit 29 has been used in analyses for this volume; see the discussion of that excavation in Chapter 6.) We appear to be missing a page from the record of fire-cracked rock and daub from Mound 1. Lots 9 and 10 from various grid units are affected. Stone tool data of various kinds are likewise missing from a few provenience units. Information on animal bone is uneven because of differential preservation and incomplete study of the collection. In the analyses in this volume, these instances of missing data are taken into consideration where possible and relevant, on a case-by-case basis.

CHRONOLOGICAL CLASSIFICATION

Refuse units considered here were classified according to the existing Initial and Early Formative chronology for the Mazatán zone (Blake et al. 1995; Clark and Cheetham 2005; Clark personal communication). The phases are identified in Figure 1.4 and a seriation of refuse samples is discussed in Chapter 20. There are four principal phases involved: Barra (1900–1700 BC), Locona (1700–1500 BC), Ocós (1500–1400 BC), and Cherla (1400–1300 BC). Paso de la Amada appears to have been abandoned by the Cuadros phase (1300–1200 BC). There was ephemeral occupation in the Jocotal phase (1200–1000 BC), but none of the refuse samples considered in this volume dates later than the Cherla phase.

No Barra-phase refuse deposits were discovered in the excavations reported in this volume. In addition to refuse samples identified as Locona, Ocós, and Cherla, certain units were identified as Early Locona (perhaps 1700 to 1650 BC) and others as Late Locona (perhaps 1500 or 1450 to 1400 BC).

ACCURACY IN THE EXCAVATION OF DEPOSITS

A constant concern during the excavations was the effort to trace boundaries of deposits accurately in order to retrieve clean samples of the cultural materials they contained. Our success varied according to characteristics of the deposit, and it was sometimes difficult to trace strata as we came down on them in extensive excavations, even when we had the profiles of tests pits or trenches as guides. The surfaces underlying the platforms in Mounds 1, 12, and 32 were identifiable in profile and generally traceable as we came down on them in the extensive excavations, though we did have some problems in a few units of Mounds 1 and 12. Pits penetrating into sterile substrata were generally identifiable from above based on color and/or texture of the matrix and the high density of artifacts. Their lower boundaries were also clear. Examples include Features 8 and 15 at Mound 1 and Features 2, 10, and 19 at Mound 12. Cherla-phase pits that penetrated into Locona/Ocós deposits were more of a challenge. Color and texture distinctions were difficult to follow or nonexistent, and we traced the boundaries of the pits mainly by noting changes in the density of artifacts. Examples include Feature 2 in Mound 11, Feature 1 in Test 29, and Feature 8 at Mound 32. Despite these challenges encountered during excavation, a more significant factor in the identification of appropriate samples for chronological and social analysis is mixing of materials in the original deposits. A background admixture of earlier and sometimes later materials was common in most deposits. The relatively unconsolidated nature of the sediments at the site and substantial earthen movement by the inhabitants yielded admixtures of earlier materials. Root action and the burrowing activities of rodents yielded admixture of both earlier and later materials.

THE REFUSE SAMPLES AND THE STUDY SAMPLES

From 1,066 individual screened proveniences, 531 were identified as yielding samples of domestic refuse that was (relatively) unmixed chronologically or otherwise of interest for analyses. Based on stratigraphic criteria, the 531 original proveniences were consolidated into the 225 Initial Refuse Samples. For the analysis of rare materials, those were further consolidated into 55 Lumped Refuse Samples. Appendix A lists original minimal proveniences with refuse sample designations and other basic information. Data Record 2.1 (available online) is an analyzable spreadsheet with the slightly pruned set of Initial Refuse

Samples used in analyses, particularly for Chapters 19 and 25. Data Record 2.2 is a table listing Lumped Refuse Samples by phase.

The criterion of most interest in selection of proveniences for inclusion among the refuse samples was the degree to which the artifacts they yielded constituted *secondary refuse* (items collected from their primary contexts of use, dumped in another location, and not subsequently disturbed) as opposed to *tertiary refuse* (items dumped in one location and subsequently reworked in various ways, potentially including removal to a new location). (See Rosenswig 2009:16; Schiffer 1972). The distinction between tertiary and secondary refuse is a fuzzy one, best envisioned as a continuum in which the question is the degree to which a set of artifacts approximates the ideal of secondary refuse or instead strays toward the mixed, worked-over character of tertiary refuse (Lesure 2014:11).

Refuse samples deemed to be reasonable approximations of secondary refuse and therefore classified to phase totaled 165. An additional 60 samples from more mixed but nevertheless interesting contexts are included in some analyses of this volume. Those include materials from the Locona platform and the underlying ground surface in Mound 32 (Locona mixed with Barra), the ground surface underlying the platform at Mound 12 (Ocós and some Cherla, referred to as Md12-IV), and the ground surface under the platform at Mound 1 (Ocós and Cherla with some Locona, referred to as Md1-V).

The Initial Refuse Samples are labeled with a four-digit number followed by a letter (see Data Record 2.1). The first two digits correspond to the mound in which the sample is located—01 for Mound 1, 32 for Mound 32, and so forth. The first two digits for off-mound deposits are simply 00. The second two digits are identification numbers for each sample. Within each mound excavation, each sample was assigned a unique identification number. Thus Sample 0103 is the third sample from Mound 1, 1203 is the third sample from Mound 12, and so forth. In some instances, effort was made to assign sample codes in accordance with stratigraphy. In other cases, however, that was not feasible or practical, and in general the two-digit sample code should be treated as an arbitrary cataloging device. Thus the fact that Sample 1267 comes after 1251 and before 1272 has no spatial, stratigraphic, or chronological significance for understanding Sample 1267 other than that all three derive from Mound 12. Each sample label ends with a letter (A through E) that identifies the level of analysis of pottery from that unit (see Table 2.2).

The Lumped Refuse Samples are abbreviated mnemonics that note mound and other distinguishing information, such as phase (L = Locona, LL = Late Locona, O = Ocós, C = Cherla), unit number, or feature number (see Data Record 2.2).

The primary focus of artifact analyses in this volume is on materials recovered in the excavations described in Chapters 3 through 6. However, addressing some of the research questions posed in Chapter 1 necessitates consideration also of refuse from Mound 6, the long-lasting, high-status residence of the Locona and Ocós phases. For comparative purposes, we consider 13 refuse samples from Mound 6 in several of the chapters in this volume. The samples include materials from Locona and Ocós trash-filled pits excavated in 1993 and 1995 as well as a set of Locona samples analyzed by Clark and reported in his dissertation (Clark 1994a:Appendix 1). Clark's Samples AU040, AU044, AU087, AU088, AU094, AU095, AU096, AU097 have been relabeled according to the scheme used here as 0640C, 0644C, 0687C, 0688C, 0694C, 0695C, 0696C, 0697C, respectively.

The full set of refuse samples is diverse and in several ways uneven; the following sections will explore some of that unevenness. One important point is that, depending on the purpose of a given analysis, it may be desirable to select a narrower or wider range of samples. To facilitate that, several standard "study samples" that each include some portion of the full set of refuse samples are identified. Table 2.3 provides examples, broken down by phase, with details of the number of Initial Refuse Samples, the corresponding volume excavated, and the total weight of sherds recovered. The study samples are given names so that they can be easily referred to in subsequent chapters.

The Restricted Study Sample consists of those refuse samples that are assigned to a specific phase and for which pottery analysis reached Level A. This sample is used whenever characteristics of pots beyond type and form (particularly rim diameter) are of interest.

The Basic Study Sample consists of all refuse samples assigned to a specific phase, meaning they are relatively good approximations of secondary refuse. The difference from the Restricted Sample is that all levels of ceramic analysis (A–E) are included.

The Expanded Study Sample adds the interesting but chronologically mixed contexts mentioned above to the Basic Study Sample. In Table 2.3, those are placed in approximate stratigraphic position relative to the sets of samples with clear phase designations. However, it needs to be borne in mind that these placements are approximate, because the units in question are chronologically mixed. For that reason, they will not be lumped with samples with phase designations but always presented as separate rows or columns in analyses for which they are deemed appropriate. The Expanded Study Sample is used particularly in the study of rare items or in other instances when inclusion of as much data as possible is desirable. In Table 2.3, the Basic and Expanded Study Samples (with A–E pottery analysis) are identical in the rows classified to phase (Early Locona, Locona, etc.); the difference is that the Expanded Sample includes additional rows.

Finally in Table 2.3, the appropriate statistics for the samples from Mound 6 are included. Those can be added either to the Basic or the Expanded Study Sample as appropriate in a given analysis.

Table 2.3. Comparison of the restricted, basic, and extended study samples, distributed over time[a]

	Restricted Study Sample (A)			Basic Study Sample (A–E)			Expanded Study Sample (A–E)			Mound 6		
	#	Volume (m³)	Weight of Sherds (kg)	#	Volume (m³)	Weight of Sherds (kg)	#	Volume (m³)	Weight of Sherds (kg)	#	Volume (m³)	Weight of Sherds (kg)
Early Locona	1	1.3	11.1	2	2.2	12.7	2	2.2	12.7	3	4.2	24.8
Locona	11	23.1	163.0	20	28.7	178.8	20	28.7	178.8	13	67.5	121.7
Md32-surf							1	7.7	3.5			
Md32-plat							1	8.8	16.0			
Late Locona	13	12.6	254.3	26	17.6	342.8	26	17.6	342.8			
Ocós	13	11.6	281.2	47	30.3	654.5	47	30.3	654.5	3	0.9	78.4
Md12-IV							28	15.6	236.0			
Md1-V							27	17.2	111.3			
Md1(Str1-2)							1	3.2	47.4			
Cherla	12	7.7	257.9	74	51.7	2224.7	74	51.7	2224.7			
Totals	50	56.4	967.4	169	130.5	3413.4	227	183.0	3827.6	16	72.8	224.9

[a] Data provided are the number of individual samples (#), the total volume excavated, and the total weight of sherds. Corresponding statistics for samples from Mound 6, not reported in detail in this volume but used for comparative purposes in several of the later chapters, are also provided.

DISTRIBUTION OF REFUSE SAMPLES IN TIME AND SPACE

Table 2.3 shows the overall distribution of the study samples by phase. The sample of Early Locona refuse is quite small. It will often be considered together with Locona. Otherwise, there are reasonably large assemblages for each phase.

Unevenness emerges when the samples are split, in Table 2.4, by location (see particularly the "Area Exposed" and the "Total Number Samples" columns) and by both location and phase (in the central part of the table). As is evident from variation in area exposed, there were radical differences in the effort expended in different locations. The reason is that an important initial goal of the research was to recover architecture. The overall sample of refuse derives from significant investigations in four mounds (Mounds 1, 6, 12, and 32) and more limited excavations in other locations.

Another source of unevenness is that excavation yielded radically different finds from one mound to another. Extensive excavations in Mound 12 revealed sizable late Locona to Ocós middens. In Mound 1, the lower layers of the platform had been quarried from an elite midden of the Cherla phase, yielding a sample much larger than anything else available for that phase. The Mound 32 excavations were focused on documenting a Locona-phase platform. However, the Ocós-phase deposits at the mound yielded more extensive middens.

In terms of the distribution of samples across the site through time, it is useful to consider for a moment just the Locona, Ocós, and Cherla columns in Table 2.4. Although the overall sample of refuse is smallest for the Locona phase, the Locona assemblage is actually more evenly distributed, in more diverse locations, than the assemblages of subsequent phases. In terms of distribution, the Ocós assemblage is the most restricted, though we have sizable samples from three locations (Mounds 6, 12, and 32; note that the Mound 6 sample for the Ocós phase, though significantly smaller than that from Mound 12, is larger than any of the individual Locona-phase samples other than that from Mound 6 itself). For the Cherla phase, we again have additional locations represented (seven, compared to three for Ocós and nine for Locona). However, the distribution of the assemblages among locations is starkly unequal. In terms of sherd weight, 92 percent of the Cherla assemblage is from Mound 1.

The samples listed in other columns can be used to ameliorate some of the unevenness in the primary assemblages of Locona-Ocós-Cherla. Late Locona is often considered together with Locona in the analyses reported here. The Ocós-Cherla ground surface under the platform in Mound 1 may also be considered to address spatial unevenness for Ocós, while that from Mound 12 is of interest for consideration of Cherla.

PRESERVATION OF ORGANIC REMAINS

Organic remains recovered in the excavations include animal bone, shell, and carbonized seeds and plant parts—the

Table 2.4. Extended study sample, split by phase and excavation locale

Location	Area Exposed in m^2	Total Number Samples (total original proveniences)	Breakdown by Phase: Total Weight of Sherds (corresponding number of samples)							Animal Bone: Total NISP (samples) [density]
			Early Locona	Locona Platform and Surface	Locona	Late Locona	Ocós	Ocós-Cherla	Cherla	
Md. 1	182	100 (151)	11.1 (1)		8.5 (3)	26.7 (1)		158.7 (28)	2053.8 (67)	13138 (39) [534.7/m^3]
Md. 6		19	24.8 (3)		121.7 (13)		78.4 (3)			
Md. 11	2	1 (2)							29.1 (1)	
Md. 12	132	99 (203)	1.6 (1)		26.1 (7)	240.0 (20)	516.9 (41)	236.0 (30)		5918 (46) [141.9/m^3]
Md. 13	6	5 (12)			7.0 (2)	6.5 (1)			43.2 (2)	
Md. 14	4	1 (2)			35.1 (1)					82 (1) [64.1/m^3]
Md. 21	10	2 (13)			11.7 (2)					33 (1) [10.5/m^3]
Md. 32	89	8 (90)		19.5 (2)	24.6 (1)		137.6 (4)		11.0 (1)	398 (6) [23.6/m^3]
Mz-250	23.5	2 (39)			43.2 (2)					89 (2) [8.6/m^3]
P29	2	1 (2)							8.8 (1)	
P32	36.5	4 (18)			22.5 (1)	69.6 (3)				
Trench 1-B	-	1 (1)							41.3 (1)	356 (1) [1318.5/m^3]
Trench 1-T	-	1 (2)							37.6 (1)	
Totals	> 487.0	244 (535)[a]	37.5 (5)	19.5 (2)	300.5 (32)	342.8 (25)	732.9 (48)	394.7 (58)	2224.7 (74)	

[a] Mound 6 not included.

last extremely scarce (Chapter 13). Shell was badly deteriorated in all deposits. Animal bones were relatively common, but preservation varied considerably between deposits. The final column of Table 2.4 reports the total NISP of animal bone, with the number of analyzed samples in parentheses and the overall volumetric density of bone (NISP per cubic meter) in brackets.

DEPOSIT TYPES

Deposits of domestic refuse at Paso de la Amada derive from a variety of formation processes. Human activities included the construction of floors and platforms and the digging of pits and ditches of different sizes and shapes. Living surfaces and dwellings were swept clean, leaving behind little primary refuse. People did various things with sweepings from dwellings and patio areas. Trash was dumped in pits close to dwellings or scattered on the ground a few meters away. Often, refuse was taken farther to be deposited in extensive surface middens or dumped into seasonally flooded bajos. Large fragments of broken vessels were occasionally saved for possible reuse. Beside a deep pit under Mound 12 were several concentrations of large vessel fragments, apparently left in provisional discard.

Even the most undisturbed trash deposits—signaled by the presence of several partially or even completely reconstructable vessels—contained many tiny sherds, including some admixture from previous ceramic phases. The sandy, unconsolidated sediments of the site and earthmoving activities of the inhabitants made sweeping debris a heterogeneous mixture of recently discarded materials, materials that had been discarded and trampled for some time, and a few items that had been buried and dislocated by subsequent activities.

This section presents a classification of the different kinds of deposits selected for analysis of domestic refuse. We then look for variation among the samples that might be systematically related to the processes of formation of those deposit types.

Selection of Refuse Samples

Identification of appropriate deposits (those approaching the ideal of secondary refuse) involved an assessment of formation processes based on stratigraphy, the density and size of artifacts, and phase assignments of the ceramics. Stratigraphic observations allowed the identification of occupation surfaces, platforms, pits, erosional features, slope wash, and silted channels. Consideration of the density and size of artifacts allowed occupation surfaces to be distinguished from sheet middens. The contents of pits varied, indicating different depositional processes.

Artifact densities were compared based on the *volumetric density of sherds* (kilograms of sherds per m^3). A proxy for sherd size was obtained for each deposit by dividing the weight of sherds by the number of sherds, yielding *average sherd weight* (g/sherd). Where ceramic analysis reached Level A (Table 2.2), another assessment of sherd size was derived from the rim analysis. The *rim sherd completeness index* is the proportion of rim sherds that constitute 15 percent or more of the original mouth of the vessel, among rim sherds constituting 5 percent or more of the original (after Lesure et al. 2014b:176).

Classification of Deposits

Deposit types included occupation surfaces, trash pits, ditches, deep pits or wells, other trash concentrations, unbounded middens, redeposited middens, and ancient ground surfaces. Some samples from platform fill and other miscellaneous deposits are also considered.

Occupation Surfaces. Occupation surfaces were thin, well-defined lenses that were either structure floors or exterior activity areas. In contrast to the thicker, more mixed deposits classified as ancient ground surfaces (see below), occupation surfaces contained cultural materials of a single phase. Artifacts from occupation surfaces may include primary refuse. Densities of sherds are generally low, and average sherd weight is lower than for most other deposit types. Trampling has reduced sherd size so that there are few rims representing more than 15 percent of a vessel.

Trash-Filled Pits. Trash-filled pits (also called trash pits) were intrusive pits filled with varying concentrations of refuse and including in some cases the most undisturbed secondary refuse encountered in the excavations. Pit volumes ranged from 0.12 m^3 to more than 3.0 m^3 in cases in which much of the pit was excavated. Density of sherds was also variable, ranging from 8.3 to 153.0 kg/m^3, but was generally high in relation to other deposits, with a mean of 38.6 and a median of 25.2 kg/m^3. Average weight was 9.8 g/sherd, also relatively high. Smaller pits tended to yield assemblages with smaller average sherd sizes and few reconstructable sherds (0102A, 3201A). They were apparently filled with a finer fraction of sweeping debris than were larger pits.

In every pit, most rim sherds were small. Attempts to find conjoining sherds indicated that a large number of different vessels were represented. Trash pits, however, often contained a few large fragments of vessels broken not long before the pit was filled. Missing pieces may have been saved for reuse. Sometimes pits contained a single whole or very nearly whole vessel. Occasionally other bits of serendipitous evidence confirmed the undisturbed nature of the trash in these pits. In Sample 1215A dozens of gar scales were recovered, including several patches recovered in articulated position, as if fragments of skin had been tossed directly into the pit. In Sample 0604A there was a stack of unfired clay net weights.

It seems likely that deposition of trash in pits constituted a secondary use of these features, but the original purpose of pits is unknown. Storage is a possibility. Some may have been borrow pits. Most were fairly shallow and basin shaped. No real bell-shaped pits—so common in contemporary sites in highland Mesoamerica—were identified at Paso de la Amada, though Feature 2 at Mz-250 (Chapter 6) comes close. Given the poorly consolidated sediments at the site, bell-shaped pits would probably have collapsed. The small Feature 2 at Mz-250 must have been refilled soon after it was dug.

Ditches. Several ditch-like features were identified in the Locona and Ocós occupations at Mound 12. One (Feature 28) was a drainage ditch that led past Locona occupation surfaces toward a deep pit or nearby bajo. The other two ditch-like features, dated to late in the Locona phase, were larger and more irregular in shape. They may have been borrow pits instead of drainage ditches. Ditches filled with cultural materials and sediments more slowly than trash pits, as indicated by interdigitated layers of sand, silt, and dense pockets of refuse (see Figures 4.5 and 4.18). Sherd density and size are variable, as would be expected from such a depositional situation. While no complete vessels were identified in the ditches, large vessel fragments were relatively common.

Very Deep Pits or Wells. Two deep pits, likely dry season wells, were excavated—one at Mound 12 (Feature 11) and the other at Mz-250 (Feature 1). The former was larger and contained denser concentrations of cultural materials. The fill of both deep pits was variable, consisting of layers of nearly sterile sandy sediment and lenses of domestic refuse. Feature 11 at Mound 12 stood open for many years. Based on the stratigraphy of the refuse it contained, the pit filled up gradually between late Locona and the beginning of the Cherla phase. Feature 1 at Mz-250 was entirely Locona in date and, unlike the trash pit intrusive into it (Feature 2), contained relatively little cultural debris. The materials from Feature 1 are pooled in a single sample (0009A), whereas those of Mound 12 Feature 11 are considered in 14 refuse samples.

Toss Middens. Pits, ditches, and wells were all bounded middens dug into occupation surfaces. In other cases, refuse was deposited directly on occupation surfaces, where it built up gradually through time. Such deposits are termed *toss middens*. A particularly extensive toss midden of the Ocós phase was identified in Mound 12. It overlay two of the ditches discussed above. Most of the toss midden samples are drawn from this feature. There are also single samples from Mound 1 and Mound 32. Sherd density is variable but fairly high, with a mean of 27.6 kg/m^3, while sherd weight is low, with a mean of 8.4 g/sherd. The lower sherd weight in comparison to pit features makes sense given the greater likelihood of trampling in toss middens.

Trash Concentrations. Relatively common on occupation surfaces and ancient ground surfaces were small concentrations of domestic refuse, generally less than 1 m across and only a few centimeters thick. Some could be regarded as miniature toss middens. Others, particularly those around the edges of the deep pit (Feature 11) at Mound 12, appear to have been stacks of large vessel fragments in preliminary discard. The volumetric densities and average sherd sizes of trash concentrations are often very high compared to other deposits because several of these consisted of unusually large sherds packed into an unmeasurably small volume of deposit.

Uncertain Middens. In small test excavations, it was sometimes unclear whether concentrations of refuse were from pits or toss middens; those are labeled "uncertain middens."

Ancient Ground Surface. Platforms in Mounds 1 and 12 preserved Early Formative ground surfaces that had been relatively stable for some time, with sediments accreting gradually. The deposits in question contained a mixture of materials—Ocós with some Cherla in Mound 12 Zone IV and Ocós and Cherla with Locona in Mound 1 Zone V. Although these are interesting samples, the refuse they yielded was more tertiary than secondary.

Platform Fill: The Redeposited Midden of Zone IV at Mound 1. Sixty-six samples are drawn from a remarkable deposit in Mound 1 that appears to have been a dense Cherla midden scraped up and redeposited to form the lower part of the platform for Mound 1 Structure 1. Although normally platform fill was deemed unacceptable for analysis because of its mixed (tertiary) character, the particular characteristics of Zone IV at Mound 1 suggested that the sediment had been quarried from a midden in the vicinity of the mound. First, the density of material was phenomenal. Both the mean and median sherd densities (43.8 and 40.9 kg/m^3, respectively) for the 66 samples from this deposit are higher than those for every other kind of deposit except trash concentrations. The parent deposit was clearly a remarkably dense midden. Average sherd sizes were higher than those of toss middens, but the completeness index (available only for five samples) is quite low. The fact that few rims represented 15 percent or more of a vessel is consistent with the tertiary character of the deposit. There is also Locona and Ocós admixture in the deposit; see Table 3.1 and associated discussion.

Other Cases of Platform Fill. Two other samples of probable platform fill, 1303B and 3202B, were also incorporated in the analysis. They date to the Locona phase. Sherds were scarce compared to Mound 1 Zone IV.

VARIATION BY DEPOSIT TYPE

When sherd statistics from the different types of deposits are compared, the results generally conform to expectations concerning the degree to which materials from different deposit types will constitute secondary refuse. Table 2.5 assembles relevant data, including volumetric density of sherds and the two proxies for sherd size introduced above: average sherd weight and rim sherd completeness index. Expectations for secondary refuse are high densities of sherds and large sherd sizes. Tertiary deposits should generally have smaller sherd sizes; there are no particular expectations for sherd density in such deposits. Our only possible primary deposits are occupation surfaces, for which we expect low densities and small sherds due to sweeping and trampling.

In the three parts of Table 2.5, the deposit types are organized according to initial expectations for primary to secondary to tertiary refuse. The occupation surfaces are the only deposits in which we expect possible primary refuse. Trash-filled pits seem most likely to contain relatively unmixed secondary refuse, while ever greater mixture and reworking is to be expected as one moves from ditches to deep pits to toss middens and so forth. The sample size (N) is the number of refuse samples (Expanded Study Sample in Parts A and B; Restricted Study Sample in Part C) corresponding to each deposit type. COV stands for coefficient of variation, calculated as the standard deviation divided by the mean. It provides a simple measure of the dispersion of values for each deposit type; it seems useful for comparing different deposit types and for comparing dispersion in individual deposit types to dispersion in the refuse samples as a set. (See row in italics toward the bottom of each table.) In addition to the line in which all refuse samples are considered, Tables 2.5A and 2.5B provide statistics for the original proveniences out of which the refuse samples were composed and for (screened) proveniences not chosen for the refuse study samples.

Data on density of sherds are presented in Table 2.5A, average sherd weight in Table 2.5B, and rim sherd completeness index in Table 2.5C. Note that the statistics presented in 2.5B are the medians and means of average sherd weight. In other words, an average sherd weight was calculated for each refuse sample (total weight of sherds, in grams, divided by total number of sherds), and then medians and means were calculated on those statistics, yielding the median average sherd weight. The N's are not necessarily the same in corresponding rows of the tables because of missing data.

The expectation in Table 2.5A is that the trash-filled pits and other midden deposits should have particularly high densities of sherds. This basic expectation is met. Note in the last two lines of the table that deposits select-

Table 2.5. Sherd statistics by deposit type

A. Volumetric Density of Sherds

Type of Deposit	N	Median Density (kg/m^3)	Mean Density (kg/m^3)	Standard Deviation	COV[a]	Range
occupation surface	9	5.7	12.0	12.8	1.01	2.7–41.0
trash-filled pit	15	25.2	38.6	37.3	0.97	8.3–153.0
ditch	14	15.9	17.3	8.5	0.49	3.3–31.2
very deep pit or well	14	16.0	19.7	15.8	0.80	2.1–71.0
toss midden	14	24.4	27.6	12.9	0.47	6.5–52.5
trash concentration	4	43.3	43.4	16.2	0.37	23.9–62.9
uncertain midden	10	22.3	23.8	27.5	1.12	1.9–95.5
ancient ground surface	59	9.5	11.2	7.7	0.69	0.4–36.4
platform fill (Md. 1 Zone IV)	66	40.9	43.8	13.3	0.30	18.1–84.7
platform fill (Md. 13 and 32)	2	1.8	1.8	0		1.8–1.8
All refuse samples	*232*	*19.4*	*25.1*	*22.0*	*0.88*	*0.0–153.0*
Proveniences chosen as samples	*475*	*14.8*	*22.7*	*36.7*	*1.62*	*0.0–652.5*
Proveniences not chosen	*498*	*5.6*	*9.0*	*11.6*	*1.29*	*0.0–138.0*

B. Average Sherd Weight

Type of Deposit	N	Median Sherd Weight (g)	Mean Sherd Weight (g)	Standard Deviation	COV[a]	Range
occupation surface	9	6.9	7.0	0.8	0.11	6.0–8.2
trash-filled pit	15	8.6	9.6	3.3	0.34	5.8–18.6
ditch	14	8.2	8.5	1.3	0.15	6.6–11.7
very deep pit or well	15	9.4	9.8	2.4	0.24	6.5–15.5
toss midden	14	7.6	7.6	1.0	0.13	5.7–9.3
trash concentration	11	13.0	23.7	20.9	0.88	8.5–73.3
uncertain midden	10	7.7	8.5	2.7	0.32	6.1–15.1
ancient ground surface	21	8.2	8.5	2.3	0.27	5.6–13.7
platform fill (Md. 1 Zone IV)	44	8.4	8.4	1.0	0.12	6.7–10.4
platform fill (Md. 13 and 32)	2	7.3	7.3	0.6	0.08	6.9–7.7
All refuse samples	*219*	*7.8*	*8.7*	*5.9*	*0.67*	*4.0–73.3*
Proveniences chosen as samples	*464*	*7.6*	*8.9*	*5.6*	*0.63*	*2.4–73.3*
Proveniences not chosen	*419*	*6.8*	*8.1*	*6.4*	*0.79*	*0.6–82.0*

[a] COV = coefficient of variation (SD/mean).

ed as refuse samples were, overall, more densely packed with sherds than those not chosen. Of the different deposit types, occupation surfaces had particularly low densities and all the different types of middens (trash-filled pits through uncertain middens in the table) had high densities. The somewhat lower values for the ditches and very deep pits also make sense given the significant amounts of in-washed sediments in those units. Many of the COVs for individual deposits are lower than that for the entire set of samples, suggesting that the classification of deposit types does introduce order into variation in sherd density. However, there are exceptions. Sherd densities in occupation surfaces, trash-filled pits, and uncertain middens are more dispersed than for the collection as a whole, suggesting variation in the details of formation processes. Finally, it is worth noting that our lack of any particular expectation for the sherd density of platform fill is borne out even among the limited proportion of excavated platform pro-

C. Rim Sherd Completeness Index

Type of Deposit	N	Median Completeness Index	Mean Completeness Index	Standard Deviation	COV[a]	Range
occupation surface	4	0.04	0.04	0.052	1.04	0.0–0.12
trash-filled pit	14	0.08	0.09	0.055	0.61	0.03–0.21
ditch	5	0.10	0.10	0.026	0.26	0.60–0.13
very deep pit or well	8	0.06	0.05	0.032	0.67	0.00–0.10
toss midden	5	0.05	0.04	0.018	0.41	0.02–0.06
trash concentration	1	0.38	0.38			
uncertain midden	6	0.04	0.05	0.052	1.04	0.0–0.12
ancient ground surface	4	0.01	0.02	0.019		0.0–0.04
platform fill (Md. 1 Zone IV)	5	0.02	0.03	0.027	1.04	0.0–0.07
All refuse samples	*57*	*0.06*	*0.064*	*0.064*	*1.00*	*0.0–0.38*

[a] COV = coefficient of variation (SD/mean).

veniences selected for inclusion among the refuse study samples: the Mound 1 platform had extraordinarily high sherd densities, while those of the Mounds 13 and 32 platforms were extraordinarily low. The latter may be related to the phase of deposition; see Chapter 5 for discussion.

Tables 2.5B and 2.5C provide different ways of assessing sherd size and therefore give an indication of trampling or reworking of deposits. The expectation here is that sherd size in occupation surfaces will be low and that it will be high in middens that involve deposition in pits (trash-filled pits, ditches, and very deep pits), somewhat less in toss middens, and even lower in trampled and reworked deposits such as ancient ground surfaces and platform fills. Those expectations are met in full in Table 2.5C, where sherd size is assessed using the rim sherd completeness index. The only possible quibble there is that the occupation surfaces perhaps have slightly larger values than one might expect relative to ancient ground surfaces and the Mound 1 platform.

The average sherd weights, presented in Table 2.5B, also conform to expectations, though less definitively. The problem is that variation is subtle, even when, in the last two lines of the table, refuse sample proveniences are compared to those not chosen. The relatively high values in ancient ground surfaces and in the Mound 1 platform seem somewhat above expected. The high average sherd weight in the latter case likely signals the relatively direct derivation of this fill from a large deposit of secondary refuse. The tertiary character of the deposit is evidenced less by the average sherd weight than by the low values for rim sherd completeness (Table 2.5C) and, more generally, the complete lack of the occasional large, reconstructable fragments of vessels found in many middens. The low values of the coefficient of variation for individual deposits in comparison to all samples considered together in Table 2.5B suggest that grouping by deposit type does make some sense of variation in average sherd weight. (See descriptions of deposit types for discussion of the case of trash concentrations.)

The overall pattern revealed in Tables 2.5A–2.5C is that there is systematic variation between deposit types in the degree to which they match the character of secondary refuse. That variation broadly accords with expectations for the different types of deposits. The question is: To what extent will that variation affect the analysis of social differentiation at Paso de la Amada? The next section begins to answer that question.

VARIATION BY PHASE AND DEPOSIT TYPE

Table 2.6 provides an overview of how two of the statistics considered in the previous section (density of sherds and average sherd weight) vary across deposit type and phase (in the Expanded Study Sample). Tables 2.6A and 2.6B match the corresponding parts of Table 2.5. The values are the means (of density or average sherd weight) for the samples that fall in each specific cell of deposit type and phase. The two bottom rows provide the overall mean for each phase across all deposit types and, for comparison, the overall median.

Because the basic pattern for rim sherd completeness index matches so closely that revealed in consideration of average sherd weight, the third table here is something different. Table 2.6C provides the percentage distribution of the total weight of sherds for a given phase across deposit types; the entries in each column therefore add to 100 percent. The bottom row in the table is the percentage of total sherd weight from each phase that derives from "middens" (in the table, the rows from "trash-filled pit" through

Table 2.6. Sherd statistics by phase across deposit types (A and B) and percentage distribution of sample for each phase across deposit types (C)

A. Mean Volumetric Density of Sherds (kg sherds/m^3)

Type of Deposit	Early Locona	Locona Platform/Surface	Locona	Late Locona	Ocós	Ocós-Cherla	Cherla
occupation surface			5.3	17.4			
trash-filled pit	8.3		31.2	28.5	48.8		52.2
ditch			6.0	17.3	21.1		
very deep pit or well			2.1	27.2	15.8	15.4	
toss midden					26.3		44.5
trash concentration					43.4		
uncertain midden	1.9		16.1	29.1	95.5		27.6
ancient ground surface		0.4	2.1		16.0	11.5	
platform fill (Md. 1 Zone IV)							43.9
platform fill (Md. 13 and 32)		1.8	1.8				
misc.			2.6			4.5	
All deposits, mean	*5.7*	*1.1*	*6.8*	*23.1*	*31.4*	*11.4*	*43.9*
All deposits, median	*5.1*	*1.2*	*4.8*	*19.9*	*23.2*	*8.7*	*40.4*

B. Mean Average Sherd Weight (g/sherd)

Type of Deposit	Early Locona	Locona Platform/Surface	Locona	Late Locona	Ocós	Ocós-Cherla	Cherla
occupation surface			6.6	7.4			
trash-filled pit	6.6		12.3	10.6	8.4		8.5
ditch			10.2	8.4	8.0		
very deep pit or well			12.8	10.7	9.1	6.5	
toss midden					7.7		6.7
trash concentration				25.8	23.5		
uncertain midden	7.0		10.1	8.2	8.4		7.4
ancient ground surface		6.1	8.3		8.2	7.2	
platform fill (Md. 1 Zone IV)							8.4
platform fill (Md. 13 and 32)		6.9	7.7				
misc.					4.0	6.6	
All deposits, mean	*6.8*	*6.5*	*9.1*	*9.8*	*11.6*	*7.1*	*8.3*
All deposits, median	*6.8*	*6.5*	*7.8*	*8.3*	*8.5*	*6.9*	*8.5*

"uncertain midden") and thus from deposits that are generally most consistent with the characteristics of secondary refuse.

Let us first consider some aspects of Table 2.6C and then return to 2.6A and 2.6B. What Table 2.6C most clearly reveals is the strong effects of our selection for inclusion in the Basic Study Sample (see the columns classified to phase) of deposits that closely approximate secondary refuse and our inclusion in the Expanded Study Sample (the columns labeled "Locona Platform/Surface" and "Ocós-Cherla") of additional samples from more mixed deposits. The Early Locona, Locona, Late Locona, and Ocós study samples derive overwhelmingly from middens and therefore from deposits most likely to approach the ideal of secondary refuse. Of the Basic Study Sample, only the Cherla assemblage has a low percentage of midden deposits. Still, most of that sample is from a deposit of platform fill in Mound 1 that, despite Locona and Ocós admixture, never-

C. Percentage Distribution of Total Sherd Weight for Each Phase, Split by Deposit Type

Type of Deposit	Early Locona	Locona Platform/Surface	Locona	Late Locona	Ocós	Ocós-Cherla	Cherla
occupation surface			10.2	7.1			
trash-filled pit	87.6		29.5	28.0	15.5		4.7
ditch			4.9	32.2	16.2		
very deep pit or well			10.3	27.0	11.7	1.8	
toss midden					46.5		0.3
trash concentration				< 0.1	6.5		
uncertain midden	12.4		35.9	5.6	0.4		3.0
ancient ground surface		17.8	4.8		3.2	85.5	
platform fill (Md. 1 Zone IV)							91.9
platform fill (Md. 13 and 32)		82.2	3.8				
misc.			2.2		< 0.1	12.7	
Percentage in "middens"	*100*	*0*	*81*	*93*	*97*	*2*	*8*

theless has characteristics that compare favorably with the ideal of secondary refuse (see "platform fill (Mound 1 Zone V)" in Table 2.5A and 2.5B). The other two columns are mainly from tertiary deposits, quite mixed in the case of the "Ocós-Cherla" column and with very low artifact densities in the case of the "Locona Platform/Surface" column.

Let us consider next Table 2.6B, which examines average sherd weight. Mean average sherd weight for all deposits rises from a low in Early Locona to a high in Ocós and descends again in the Cherla phase. The large sherds in trash concentrations, which make up 6.5 percent of the total Ocós sample by weight (see Table 2.6C), clearly affect the Ocós mean. Median average sherd weight is more stable from Locona to Cherla. It is only the two earliest samples, Early Locona and the Locona platform/surface (at Mound 32), that yielded particularly small sherds. Both of those are also small assemblages. Overall, differential trampling of deposits does not appear to present an insurmountable challenge for the project of comparing refuse deposits from different phases. In an effort to offset effects from differential trampling, standardization by sherd weight rather than number of sherds will be used in this volume.

Finally, consider Table 2.6A, which examines density of sherds. The data here raise more complex challenges. Again, the earliest two columns are somewhat distinct from those that follow, with low sherd densities. The extremely low sherd density in the Locona platform and underlying surface at Mound 32 was one of the reasons those materials were not included in the Basic Study Sample. Another observation is that the Locona sample, which is diverse in terms of deposit type, is also diverse in volumetric density of sherds. Trash-filled pits are close in density to pits from later eras, but for other deposit types our Locona features were less dense.

The most important observation to be made in Table 2.6A is that, when all deposits are examined together, volumetric density rises steadily from Early Locona to Locona to Late Locona to Ocós to Cherla. The same pattern holds whether we examine mean or median densities. Sherds were, on average, more than six times more densely packed in our Cherla deposits than in our Locona deposits. If sherd density can be taken as an indication of overall artifact density, then this pattern poses challenges to comparisons standardized by volume. Let us suppose, for example, that we found 12 widgets in our Locona deposits and 24 in our Cherla deposits. Standardizing by volume, we would find stability (the volume of Cherla deposits excavated being approximately twice that of Locona). But if we consider that sherds in general were six times as dense in Cherla as in Locona, then there would be reason to expect Cherla finds to have been not two but 12 times those of Locona. In other words, if we were to standardize comparisons by volumetric density, we would in this case find *stability*, whereas if we were to take into consideration the overall density of sherds, we would have reason to argue for a *decline* in the use of widgets between Locona and Cherla.

Although exploratory analyses have generally considered standardization by *both* volume excavated and associated weight of sherds, most of the reported results use the latter method of standardization. However, that is not a foolproof solution to the problems encountered with standardization by volume. Two issues need consideration. The basic argument behind standardization by weight of sherds is that this value should provide a rough proxy for the number of original pots that controls for differential

Table 2.7. Average vessel weight in each phase based on summed rim portions and total weight of sherds recovered

	Mean of Average Pot Weight (kg)	Standard Deviation	N	Minimum (kg)	Maximum (kg)	Median (kg)
Early Locona	3.78		1			3.78
Locona	2.41	0.86	11	0.72	3.76	2.36
Late Locona	2.44	0.85	13	0.24	3.90	2.38
Ocós	2.53	0.49	13	1.48	3.65	2.53
Cherla	2.44	0.30	12	1.91	3.00	2.46
All phases	2.48	0.65	52	0.24	3.90	2.45

degrees of fragmentation. However, there were formal changes in pottery over the course of the occupation. (See Chapter 8.) It needs to be emphasized that changes in vessel form between the three phases of central concern in this volume (Locona, Ocós, and Cherla) were less than between Barra and Locona on the one hand or Cherla and Cuadros on the other. Indeed, the three are close enough in the formal sense that Ceja Tenorio (1985), following Coe (1961), identified them as a single phase (Ocós); much of what Coe referred to as Ocós is now, in our usage, Locona (Blake et al. 1995). Still, the first potential problem with standardization by weight of sherds is that formal changes in pots might have resulted in changes in the average weight of pots, thus introducing a confounding factor into the analysis.

That possibility is examined in Table 2.7. Rim sherd analysis at Level A included an estimate of the proportion of a complete vessel mouth represented by each sherd. An estimate of the total equivalent number of vessels represented by all rims in the deposit was obtained by summing the proportions for all rim sherds. We then estimated the average vessel weight for each sample by dividing the total weight of sherds by the estimate of the total equivalent number of vessels represented by the rims. In Table 2.7, the samples are split by phase, and the median, mean, and standard deviation of the average vessel weight are provided. The results suggest that there was no change in average vessel weight through time. (The single Early Locona sample is aberrant, but within the range of variation of later samples.) Thus, when frequencies of ornaments, figurines, and so forth from different phases are standardized by weight of sherds, it is reasonable to treat those values as a comparison of the rate of discard of such items relative to the rate of discard of pots.

A second potential problem with standardization by sherd weight is the possibility that there were changes in the numbers and kinds of pottery vessels in use, leading to variability in the rate of discard of pots. Standardization by weight of sherds, in other words, assumes that the production of sherds was stable across the phases. However, there is reason to think that this was not the case. Clark and Gosser (1995) draw attention to the changing relative proportions of vessel forms in Early Formative Mazatán, in particular the steady increase in the ratio of plain tecomates to bowls. Their inference is that when pottery was first introduced in the Barra phase, it replaced only a narrow range of the existing spectrum of container technology (thought to have included baskets and gourds). Pottery was first used for serving rather than cooking and storage. It was only beginning in the Locona phase that ceramic vessels began to be used for a wider range of functions. The issue here is a methodological one. If people began to apply ceramic technology to a greater variety of activities involving containers, then we would expect them to have generated more broken pottery. Thus the pattern of increasing density of sherds registered in the bottom two rows of Table 2.6A might arguably have social causes rather than being essentially coincidental in the sense that the Cherla deposits we excavated *happened* to be more densely packed with artifacts than the Locona deposits we discovered.

The issue of whether increasing sherd density was in origin social (later households discarded pots at a higher rate) or coincidental (the later deposits we excavated just happened to be more densely packed with artifacts than the earlier deposits) proves a difficult nut to crack. Table 2.8 assembles relevant data. To anticipate our conclusions, it appears most likely that *both* of the postulated factors are involved.

To address the problem, Table 2.8A draws on the detailed ceramic analysis of the Restricted Study Sample, particularly the measures of rim proportion (estimated for every rim sherd analyzed). What we have done in Table 2.8A is added up these proportions for three basic vessel forms (unslipped tecomates, open bowls, and slipped tecomates) and divided by the corresponding volume of deposit. The result is the equivalent number of complete vessel mouths (represented by rim sherds from many different pots) per cubic meter. In each case, after those values, we provide the proportional change for each phase if the Early Locona value is treated as 1.0. Since the Early Locona sample is small, we provide a similar statistic treating the Locona value as 1.0. The latter seems more reliable given the larger

Table 2.8. Changing volumetric densities of unslipped tecomates, open bowls, and slipped tecomates based on summed rim proportion: (A) entire Restricted Study Sample; (B) trash-filled pits only. (See text for discussion.)

A. Entire Restricted Study Sample

Phase	Volume (m^3)	Unslipped Tecomates			Open Bowls			Slipped Tecomates		
		Complete Vessel Mouths per m^3	Proportion of Early Locona Value	Proportion of Locona Value	Complete Vessel Mouths per m^3	Proportion of Early Locona Value	Proportion of Locona Value	Complete Vessel Mouths per m^3	Proportion of Early Locona Value	Proportion of Locona Value
Early Locona	1.3	0.10	1.0		0.51	1.0		1.06	1.0	
Locona	23.1	0.61	5.9	1.0	1.55	3.1	1.0	0.87	0.8	1.0
Late Locona	12.7	1.83	17.6	3.0	2.86	5.6	1.8	1.26	1.2	1.4
Ocós	11.6	3.81	36.5	6.2	4.83	9.5	3.1	1.45	1.4	1.7
Cherla	7.7	3.75	36.0	6.1	5.88	11.6	3.8	1.14	1.1	1.3

B. Trash-Filled Pits Only

Phase	Volume (m^3)	Unslipped Tecomates		Open Bowls		Slipped Tecomates	
		Complete Vessel Mouths per m^3	Proportion of Locona Value	Complete Vessel Mouths per m^3	Proportion of Locona Value	Complete Vessel Mouths per m^3	Proportion of Locona Value
Early Locona	1.3	0.10		0.51		1.06	
Locona	2.2	1.64	1.0	4.16	1.0	1.99	1.0
Late Locona	2.5	4.22	2.6	6.38	1.5	1.82	0.9
Ocós[a]	4.4	2.64	1.6	2.71	0.7	0.96	0.5
Cherla	2.4	3.68	2.2	5.22	1.3	1.12	0.6

[a] Includes Basureros 1 and 4 from Mound 6, the two Ocós pits from that mound for which volume excavated is available.

Locona sample size, but in Table 2.8A both actually reveal the same pattern.

The first thing to note is the sharp increase in both unslipped tecomates and open bowls from Locona (or Early Locona) to Ocós and/or Cherla. The measures of proportional change are helpful because they reveal that the proportional increase in volumetric density of unslipped tecomates is with every step *higher* than that of open bowls. Thus greater numbers of unslipped tecomates relative to open bowls were entering the deposits with each successive phase, consistent with the social process postulated by Clark and Gosser (1995)—namely, a gradually expanding usage for this vessel form. A similar expansion in usage of open bowls is certainly a possibility, but it seems less likely. Thus maybe the proportional change in open bowls tracks the *circumstantial* differences between deposits being compared while the differential between that and the proportional change in unslipped tecomates tracks social changes in the use of tecomates.

In other words, maybe both of the postulated processes have affected the data. That seems likely when we turn to slipped tecomates, at the far right in the table. As a percentage of the vessel assemblage, slipped tecomates decline over time, and our general impression from the ceramic sorting table is that this vessel form became steadily less important during the occupation of Paso de la Amada. Nevertheless, slipped tecomates register an overall *increase* in density from Locona to Cherla, albeit a decidedly less dramatic increase than for the two other vessel forms. Our suspicion is that use of slipped tecomates was declining, but because of the circumstantial process postulated here (denser packing in our later deposits), slipped tecomates register higher densities in Ocós and Cherla deposits than in Locona.

If there were two processes operating, it would be helpful to hold one constant in order to examine the other. That can at least be approximated by considering a single deposit type, trash-filled pits. It will be noticed in Table 2.6A that while the Locona samples are low in sherd density compared to later phases for most deposit types, the density of sherds in Locona trash-filled pits is at least in the ballpark of those from subsequent phases. Thus in Table 2.8B we present the same analysis as in 2.8A, but now only trash-filled pits are considered. The idea is that we have to a significant degree factored out coincidental variation in order to look for evidence of our postulated social process. The downside of is that sample size becomes small and we seem to encounter an increased level of noise (evidenced by uninterpretable fluctuations between phases).

There are three points to be made about the analyses in Table 2.8B compared to those of 2.8A. First, it is gratifying to see a decrease in the density of slipped tecomates between Locona-Late Locona and Ocós-Cherla; that certainly corresponds to our overall sense of the collection. Second, it is noteworthy that the Cherla-phase value for open bowls is practically unchanged in relation to Locona, and the Ocós value is actually lower. Certainly, the level of noise is now high, but it does appear that we have largely factored out the coincidental process of greater packing of artifacts in the later deposits to reveal stability in the discard of open bowls. The third issue is the unslipped tecomates. Noise is again a factor, but there is a distinct upward trend. Unlike for open bowls, it does not seem reasonable to argue for stability here when we consider the proportional change from Locona through Cherla. (Early Locona is not considered because the relative stability of density that holds from Locona through Cherla does not apply to the Early Locona sample, as will be noted in Table 2.6A.) Having factored out the coincidental process of differential artifact packing, we do indeed glimpse the postulated social process of a rising rate of discard of unslipped utilitarian tecomates.

The methodological upshot of the discussion in this section is that neither standardization by deposit density nor standardization by weight of associated sherds is, by itself, a solution to the challenges of comparison posed by the refuse samples from Paso de la Amada. For that reason, both methods of standardization have been used in the preparatory analyses for this volume and sometimes also in the final presentation. It is helpful to keep in mind the biases introduced by each method. Standardization by volume will tend to produce upward trends, since it is not accounting for the coincidental process of more densely packed artifacts. Standardization by weight of sherds will tend to produce downward trends, since it overcorrects for the coincidental process by failing to factor out the increased rate of deposition of unslipped tecomates over time. An alternative would be standardization against the summed rim proportion of open bowls. That may more or less factor out the coincidental process of differential packing of artifacts. That is used only rarely, however, because in general it seems preferable to standardize using less heavily manipulated data.

CONCLUSIONS

The overall message of this chapter is that we have, first, a robust set of samples of domestic refuse for tracing *general diachronic patterns*. Our coverage is best from Locona to Cherla, a period of approximately 400 years. The Early Locona sample is quite small, and it is often preferable to include it with Locona. Second, for studies of *synchronic social differentiation*, the unevenness of the samples becomes more of a problem. The Locona sample is attractive because of the numerous locations sampled, though the size of the samples is an issue. In the Ocós phase, we have large samples from a few areas. For Cherla, we again have a greater diversity of locations represented, but the grossly unequal distribution of samples among those poses problems.

PART II
THE EXCAVATIONS

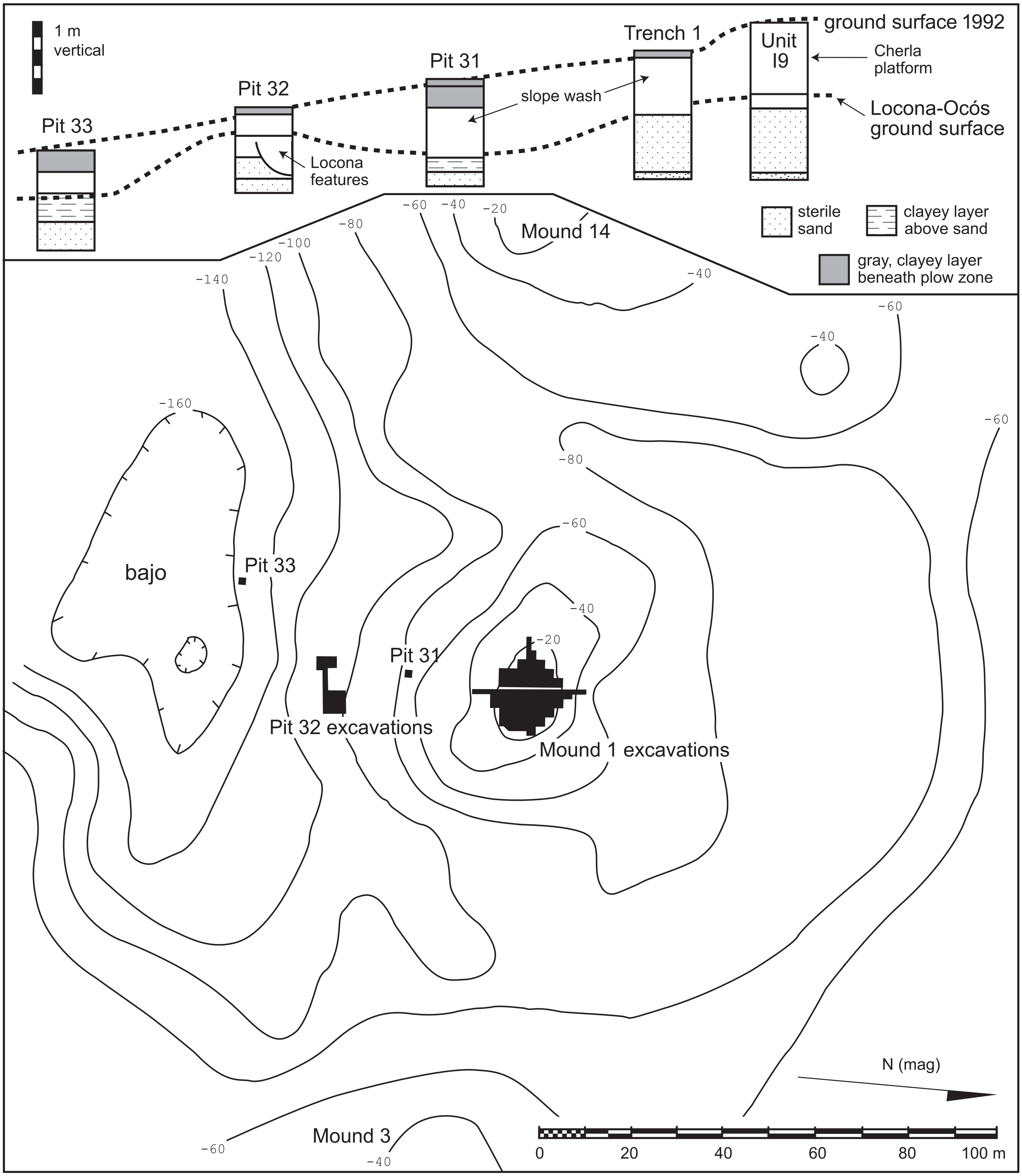


Figure 3.1. Contour map of the vicinity of Mound 1, showing location of excavations there and in test pits to the south of the mound. Contour interval 20 cm. At top is a simplified rendering of the stratigraphy observed at Mound 1 and in the three test pits. Horizontally, they are not scale; the vertical scale is shown at upper left. *Topographic base map by Ronald Lowe. Figure constructed by R. Lesure and project staff. Other illustrations in this chapter by R. Lesure, Katelyn Jo Bishop, and project staff unless otherwise indicated.*

CHAPTER 3

Mound 1

Richard G. Lesure

MOUND 1 IS A low elevation about 20 m in diameter in the south-central zone of Paso de la Amada. In 1992 it rose about 0.5 m above the surrounding, gently undulating ground. Ceja Tenorio (1985:22) thought it might be part of a group of Ocós mounds surrounding a plaza and put his first three tests here, looking for evidence of either habitation or ceremonial functions. No plaza was apparent in 1992. Artifact densities in Ceja's three soundings (Test Pits 1, 2, and 3) were phenomenal compared to those in his other tests. Materials recovered appeared domestic and included polished iron ore mirrors and numerous figurines and ceramic ear ornaments. The spectacular nature of the Mound 1 assemblage provided the basis for Clark and Lee's (1984) argument concerning Ocós-phase status differences at the site. With the subsequent division of Ocós into three phases (Locona, Ocós, and Cherla), Clark reexamined Ceja's Mound 1 materials and assigned much of them to the Cherla phase. He drew my attention to the mound as a possible Cherla-phase counterpart to the large Locona-Ocós "chief's house" in Mound 6.

The original goals of the 1992 excavations were to define the architectural history of the mound, to identify remains of what we hoped would be one or more high-status residences, and to recover samples of associated domestic debris. A strategy of extensive excavation involved opening up essentially the entire mound at once. Seven weeks of excavations established the basic depositional history of the mound, but the architectural remains recovered were fragmentary. The mound itself proved to be the result of a single Cherla-phase construction, of which only the basal platform remained. This earthen platform was of impressive dimensions: more than 1 m high and either square or round, with a horizontal dimension of roughly 20 m. Remains of the structure or structures that stood atop the platform have been plowed away. Beneath the platform were at least three partially preserved structures and associated features. Areal exposure of the sub-platform Cherla occupation was 182 m^2, while exposure of the Locona-Ocós occupation beneath was 75 m^2. In comparison to the effort expended in the excavations, the recovery of architectural remains and associated deposits of secondary refuse was modest. However, the fill of the platform appears to have been quarried from a Cherla-phase elite midden. Despite an admixture of earlier material in this tertiary deposit, the screened sample from this redeposited Cherla midden has proven rich in information.

THE SETTING OF THE MOUND

The mound is located on a low ridge in the southern portion of the site (Figure 3.1; see also Figure 1.6). To the south, the ground slopes gently down into a seasonally flooded oxbow that forms the boundary of the site. We explored this southern slope with three test units: Pits 31, 32, and 33. Of those, Pit 32, located 40 m south from the summit of Mound 1, cut into a late Locona midden; the amplification of those excavations is described in Chapter 6.

At the top of Figure 3.1 are schematic renderings of the stratigraphy of the three test units and of Mound 1 itself. The shading of the strata is simplified to emphasize: (1) the presence or absence of an organic-rich clayey layer at the top of the profile, (2) the level at which sterile sand ap-

Figure 3.2. Excavations in progress in the platform fill at Mound 1. Looking south, with Unit H7 in the center left foreground and Unit I6 in the center right foreground. In the middle of the photo, excavation of Lots 9 and 10 is in progress in Unit I9. The three deeply excavated pits in a row beyond are Ceja's original test units. To the right, excavations are in progress in Unit L11. The locations of the soundings to the south of the mound can be made out from the three corresponding heaps of backdirt. Moving south from Mound 1, there is first the light-colored backdirt from Test Pit 31, then the extensive piles of dirt generated by the Pit 32 excavations (with Tomás Pérez at work drawing profiles). Finally, farther to the south and to the right in the photo, is the backdirt from Test Pit 33.

peared, and (3) the presence or absence of a clayey deposit toward the bottom of the profile.

The organic-rich layers at the tops of the profiles indicate recent ground surface stability and advanced soil formation. Such a layer was absent on Mound 1 itself because of damage caused by plowing, which has gradually lowered the height of the mound. Surficial gray, clayey layers are thickest in lower-lying areas (such as seasonally flooded bajos) that have undergone long-term accumulation of sediment in a low-energy depositional environment. The thick surface layer in Pit 33 is thus not a surprise, but it is interesting that a similar layer is thicker in Pit 31 than in Pit 32 even though the former is farther upslope.

The cultural strata throughout this area are underlain by a river deposit of fine yellow-brown sand. At least at Mound 1, that deposit is in turn underlain by a deposit of coarser gray sand. The sterile sand appeared at a higher elevation at Mound 1 than in the test pits, indicating that the low rise on which the Cherla platform was constructed is a natural feature, probably a remnant levee of the Coatán River. The similarities between Pits 31 and 33 at the top of the profile were mirrored lower down as well. In both cases, there was a clayey layer above sterile sand. Initial Formative artifact deposition started just above the clayey layer in Pit 31 and within the clayey deposit in Pit 33. (Note that designation of a deposit as "sterile" and its deposition as "pre-occupation" is always a judgment call at the site, since, due to considerable rodent activity and the loose, unconsolidated character of the sandy substrata, some sherds have worked their way into pre-occupation deposits.) In Test Pit 32, trash-filled Locona pit features appeared 25–40 cm below the modern ground surface.

The stratigraphic evidence at the top of Figure 3.1 indicates that the contours of the ground surface in the vicinity of Mound 1 were more complex at the time of initial Formative settlement than they are today—and, in terms of elevation differences, more dramatic. The proposed Locona-phase ground surface is shown. Locona settlement at both Mound 1 and Pit 32 was located on naturally elevated ground. The surface at the location of Pit 31, in contrast, was low enough in elevation to remain muddy in the rainy season. Both there and at Pit 33, a gradual accumulation of clay was already under way by the era of earliest human settlement at the site. During the second millennium BC, sediments at least 50 cm thick accumulated in the area of Pit 31, with a modest density of Locona-Ocós artifacts. The most likely cause was slope wash from the adjacent inhabited areas rather than purposeful filling.

Just before platform construction at Mound 1 during the Cherla phase, the surface contours in this part of the site had been somewhat evened out in the course of several centuries of occupation. That process has continued to the present day, with the result that the original undulating natural topography is now an unbroken gentle slope from Mound 1 down into the bajo that forms the southern margin of the site.

EXCAVATION PROCEDURES

I directed the excavations at Mound 1 with a crew of between 12 and 20 workmen from the *ejido* of Buenos Aires from late April to early June 1992. Artemio Villatoro assisted in the excavations, and Tomás Pérez excavated Trenches 2 and 3 at the mound and Test Pits 31, 32, and 33 to the south. John Clark occasionally dropped by to question our assumptions and dig out post holes.

We first located Ceja's three test pits, emptied his backfill, and redrew the stratigraphy of each test. Subtle traces of what appeared to be an Early Formative floor (now understood as a likely wall remnant of Structure 1-2 and a patchy exterior occupation surface) appeared in the profiles of Tests Pits 2 and 3. The surface on which the "floor" rested appeared also in Test Pit 1. A large area was opened (Figure 3.2) to expose this surface but also to investigate the possibility of other surfaces in the upper meter of deposit. Only by shaving carefully down over a large area, I reasoned, could we establish with confidence whether this deposit resulted from a gradual accumulation of living surfaces, a single episode of fill, or some combination of these. Digging in such a large area maximized the chances of finding fragmentary patches of burnt floor, trash pits, burials, or other features that would indicate the presence of any otherwise poorly preserved occupation surfaces. However, the excavation was also expensive and time-consuming; in retrospect, I put too much faith in the assumption that the depositional history of Mound 1 would be similar to that of Mound 6, with a series of neatly superimposed buildings.

The grid of 2 x 2 m units followed the orientation of Ceja's units (Figure 3.3). Rows on the north-to-south axis were numbered, while rows on the east-to-west axis were lettered. Unit A1, the northeastern corner of the grid, was located well off the mound. Ceja's Test Pits 1, 2, and 3 corresponded to Units I14, I12, and I10, respectively. Between Rows I and J, we left a balk of 50 cm. This strip was left completely out of the grid system, which thus breaks at the western edge of Row I and begins again 50 cm to the west with Row J. We initially opened 38 units beyond Ceja's three, oriented symmetrically around Unit I10 (Ceja's Test Pit 3), the summit of the mound. This total of 41 units covered almost the entire mound as identifiable from the surface. Over the course of the excavations, part or all of 13 additional units were excavated, though work in several of these consisted merely of the removal of the plow zone in an initial search for any remnant architectural features atop the platform.

The excavation procedure in the platform fill consisted of shaving down the deposit in arbitrary lots, usually 10 cm deep after Lots 1 and 2. In general, each lot was removed in all units and the entire expanse was inspected for evidence of features or floors before the next lot was opened. Because no evidence of such floors or features appeared in profile in the upper meter of Ceja's three tests, suggesting that all this zone likely consisted of platform fill, I decided to screen a random 50 percent sample of the 38 original units. A small child determined which units would be screened by drawing 19 unit numbers from a hat without replacement. The following units were selected to be screened top to bottom: F9, F11, G10, H8, H10, H12, I6, I7, I8, I11, I13, J7, J9, J12, K8, K10, L9, L10, and L11. Though it does not form part of the random sample, Unit I9 was also screened.

This basic sampling scheme was maintained until excavations reached the first identifiable structural remains (Structure 1-2) and the associated occupation surface, whereupon we began screening in all units. Excavation was by lots, which were allowed to cross between excavation units. Lots 1 through 12 correspond to the upper portion of the deposits, screened in 50 percent of the units through a 5 mm mesh. Lot 13 was assigned but never excavated. Lots 14 through 16 were unscreened lots toward the edges of the Structure 1-1 platform. Lots 17 through 27 represent deposits associated with and below Structure 1-2, screened in all units. The exterior occupation surface and wall remnants of Structure 1-2 were excavated as a separate "floor" deposit outside the lot system, as were Features 1 through 15, Burial 8, and numerous post holes. Floors, features, and post holes were always screened.

Three trenches were excavated at the edges of the mound to further investigate the stratigraphy and to search for the edges of the Structure 1-1 platform. Excavation in the trenches was by arbitrary levels rather than lots; see Chapter 2 for discussion. Trench 1 was 1 m wide and extended 4 m south from the southern edge of Unit I14. Five levels were excavated, the first two unscreened. Trenches 2 and 3 extended to the north from Unit I6 and to the west from Unit M10, respectively. Each was 1 m wide and 3 m long, screened top to bottom.

STRATIGRAPHY

A detailed inspection of the walls of Ceja's Test Pits 1 through 3 revealed somewhat more complex stratigraphy

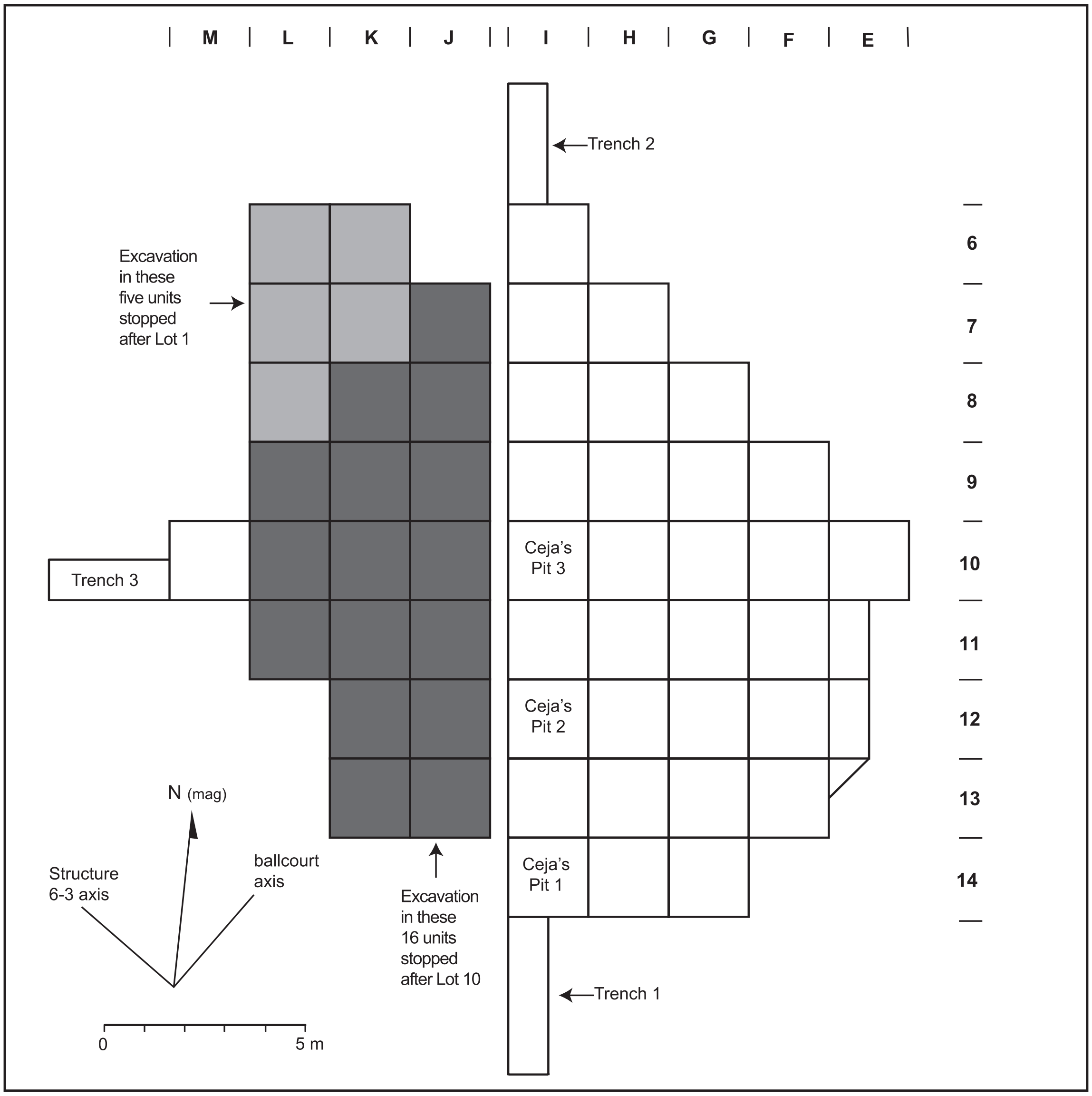


Figure 3.3. The grid system and units excavated at Mound 1.

than that pictured in his report (Ceja Tenorio 1985:25). My Zone IV seems to correspond to Ceja's third layer. My Zones V, VI, and VII are all part of Ceja's fourth layer. The most important observation to be made in comparing the 1992 profiles to those of Ceja is that the mound had lost significant height to plowing in the 20 years since Ceja's excavations—as much as 40 cm.

The basic stratigraphy of the mound is best described with reference to the 25 m long north–south profile through the center (Figure 3.4) and to a series of units illustrated in Figures 3.5, 3.9, and 3.10. In all, seven "zones" were distinguished and labeled with Roman numerals, terminology for stratigraphic synthesis that I learned as an undergraduate from Scotty MacNeish and use here in tribute. There are in addition several subdivisions of Zones I and III that appeared in the stratigraphic trenches. The zones can be grouped into four sets. First, there was Zone I, the plow zone, which extended across the entire excavation. A second set, consisting of Zones II, III, and IV, was the fill of the Structure 1-1 platform. Third was the occupation layer underlying the platform (Zone V). Finally, there were pre-occupation deposits of river-lain sand, Zones VI and VII.

The Center of the Mound: Units I10 and I11

Ceja placed Test Pit 3 precisely at the center of the mound. The stratigraphy of the western wall of that and adjacent units is shown in Figures 3.5 and 3.6. Immediately beneath the plow zone, Zone I (Lot 1), was a homogeneous, yellowish-brown layer of fine sandy silt, Zone III (10YR5/3,

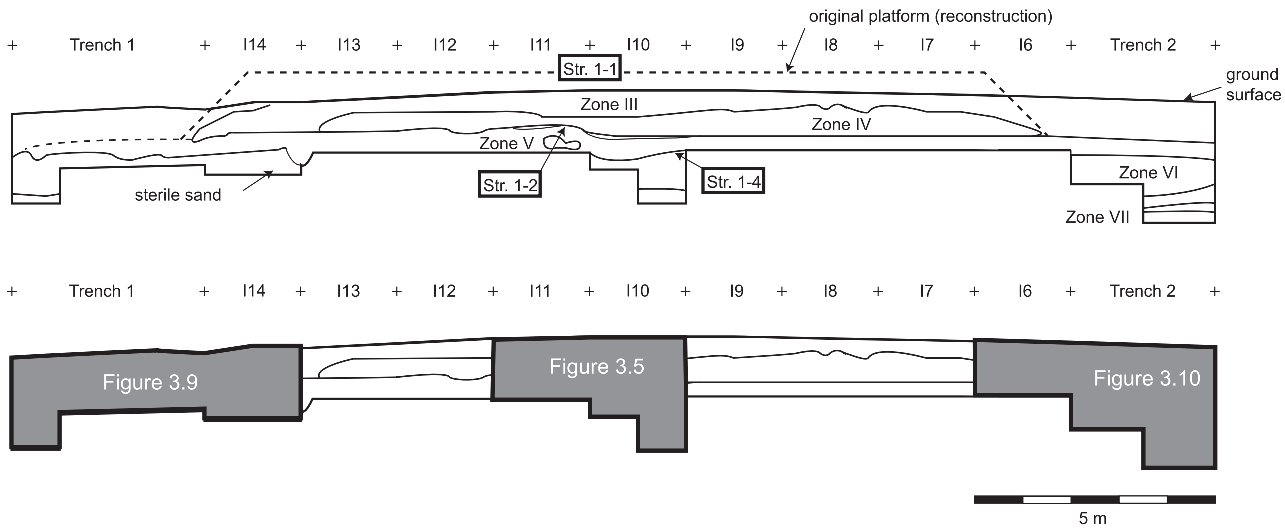


Figure 3.4. Profile through the Mound 1 excavations. Top: generalized profile from Trench 1 through Trench 2, looking west. Bottom: locations of detailed versions shown in subsequent figures in this chapter.

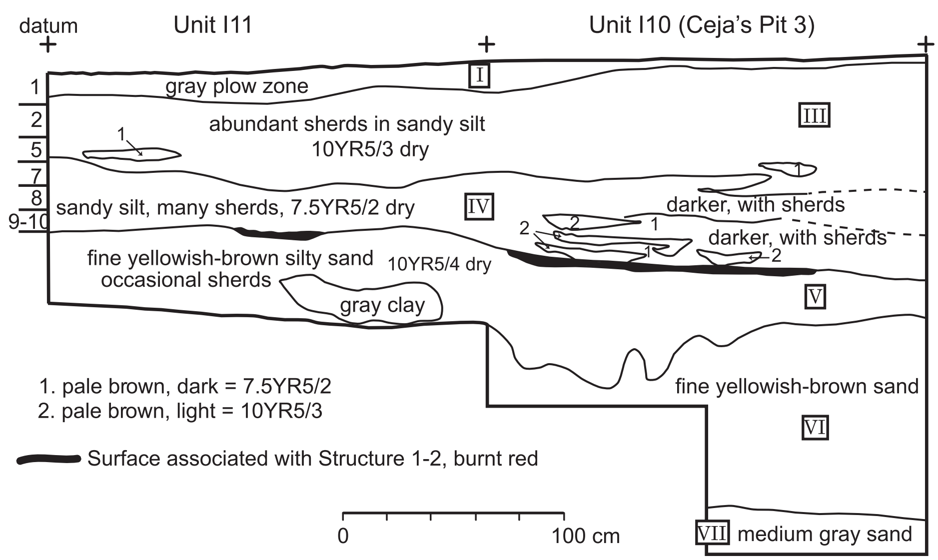


Figure 3.5. Western profile of Unit I11 and Ceja's Pit 3, Mound 1. Roman numerals identify zones discussed in the text.

dry). This layer was consistently present across much of the excavation. Similarly homogeneous layers with similar color and texture occur in other excavations at the site. Some derive from slope wash, whereas others represent artificial fill in platforms of the Ocós or Cherla phases. During those phases, platforms seem to have been constructed with earth quarried from layers of accumulated slope wash.

In the case of Mound 1, the homogeneous yellow-brown layer, 40–60 cm thick, was platform fill, laid down in a single depositional event. Cultural material in Zone III (Lots 2, 3, 5, and 6 and, in a few units, part of Lot 7) consisted of mixed domestic artifacts of the Locona, Ocós, and Cherla phases. Densities of artifacts were high, with abundant animal bone. Sherds were relatively small, with few conjoining pieces in any given level. Other finds included fragments of ceramic ear ornaments, polished iron ore mirrors, and small jade beads and pendants. There were some fragments of human bone in the deposit, including a vague concentration of bones scattered across 16 m^2 in Lot 5 (Feature 1), apparently bone from a single burial transported with the fill.

Figure 3.6. Western profile of Ceja's Pit 3 (to the left) and Unit I9 (to the right), Mound 1.

Underlying Zone III in the units pictured in Figure 3.5 (and in much of the rest of the mound as well) was Zone IV. Lots 8 through 12 were all part of Zone IV. Lot 7 was usually completely within this zone, but toward the edges of the mound it was transitional between Zones III and IV. This layer was on the whole somewhat darker in color than Zone III (7.5YR5/2, dry), with a similar texture. It varied between 40 and 60 cm thick. Unlike Zone III, Zone IV was internally stratified, consisting of lenses of slightly varying sandy sediments ranging from pale brown (7.5YR5/2) to moderate yellowish brown (10YR5/3). These lenses were not floors or occupation surfaces; they were far too patchy, with no one lens extending far in any direction, and there were no post holes or other cultural features associated with the lenses either at the top of this zone or within it.

Cultural material was even more abundant in Zone IV than in Zone III—sherd densities topped 60 kg/m^3 in some units—but was otherwise similar. Sherds were generally small, with few refits possible in any given unit. Finds included abundant animal bone, obsidian chips, fragments of grinding stones, and fire-cracked rock. There were greenstone and iron ore ornaments and hundreds of fragments of ceramic ear ornaments. Although there is admixture of Locona and Ocós material, the ceramics indicate that the primary origin of this material was a Cherla-phase refuse deposit.

Table 3.1 provides identification to type of analyzed rim sherds in zones of fill in the platform. Lot 11, the lowermost layer of fill, is also provided separately. (Not all units of Zone III were analyzed). Types are grouped according to their most likely phase assignments. However, it should be noted that the use of some types crossed phase boundaries. The table provides two estimates of the percentage of Cherla sherds by zone. I treat Zone III as approximately 60 percent Cherla and Zone IV as about 75 percent Cherla.

Zone IV represents a Cherla midden quarried and redeposited as fill. The lighter-colored lenses within the zone appeared similar in color and texture to Zone V, the underlying, pre-platform occupation surface under the mound. A plausible scenario would thus be that Zone IV was composed of sediments quarried from the vicinity of the mound itself.

Zone V was the pre-platform occupation surface. It consisted of fine yellowish-brown silty sand and was 20 to 40 cm thick. Architectural and other features appeared on the surface of, within, and just below this zone. Traces of Structures 1-2 and 1-4 are indicated in profile in Figure 3.4. Underlying V was Zone VI, a pre-occupation deposit of fine yellowish-brown sand. Zone VI, up to 100 cm thick, overlay a coarser gray sand, Zone VII. The first few levels of Zone VI had been disturbed by rodent activity and contained some Formative cultural material; VI and VII, however, represent pre-occupation river deposits.

Zone II

Zone II was a yellowish deposit identified only along the southeastern edge of the excavation. It appeared immedi-

Table 3.1. Rim sherds in analyzed units of zones of fill in the Mound 1 platform, grouped by most likely phase

Phase	Type	Zone II	Zone III	Zone IV	Lot 11
Probably Cherla					
Cherla	Aquiles Orange		20	176	31
	Bala Brown		1	67	67
	Bala White	6	141	1079	195
	Extranjero Black and White	4	4	96	12
	Kaolin			0	
	Mavi, unspecified	3	6	73	15
	Mavi Buff	11	79	644	89
	Mavi Red Rim	2	18	177	11
	Michis Buff	31	302	1910	287
	Paso Brown			1	
	Pino Black and White	29	321	2612	430
likely Cherla	White, Black-White		1	30	2
	Black-Gray-Brown	10	315	2015	321
Totals for Probably Cherla		*29%*	*51%*	*65%*	*66%*
Possibly Cherla					
Ocós or Cherla	Alba Gray			2	1
	Alba Red on White		1	10	1
	Paso Red	35	216	1068	192
Combined totals for Probably Cherla and Possibly Cherla		*39%*	*61%*	*73%*	*75%*
Ocós	Amada Brown-Black	1		17	5
	Mijo Black and White	1	3	23	
Locona or Ocós	Guijarra	1	2	23	4
	Michis Red Rim	89	310	1276	242
	Orange-Pink			1	1
	Papaya Orange	5	20	102	10
	Red	71	410	1323	124
Locona	Chilo Red	28	170	801	147
	Colona Brown	3	9	49	10
	Gallo Pink on Red			3	1
	Michis Specular Red Rim		1	9	
Barra	Cotan Red	2	2	7	3
	Monte Red on Buff			3	2
	Tusta Red			2	
non-diagnostic	Brown	5	72	308	45
	Coarse	21	64	506	110
	Michis, eroded	19	95	99	21
	Orange	2	34	205	35
	Miscellaneous unid. bichromes			2	1
	post–Early Formative		1		
	Red and Buff	0	2	4	
	Red or Red Rim tecomates	42	164	576	101
Totals, including non-diagnostics		421	2784	15,299	2514
Totals for calculation of percentages		332	2352	13,599	2201
unidentified rims		58	332	1392	
Grand totals		479	3116	16,691	

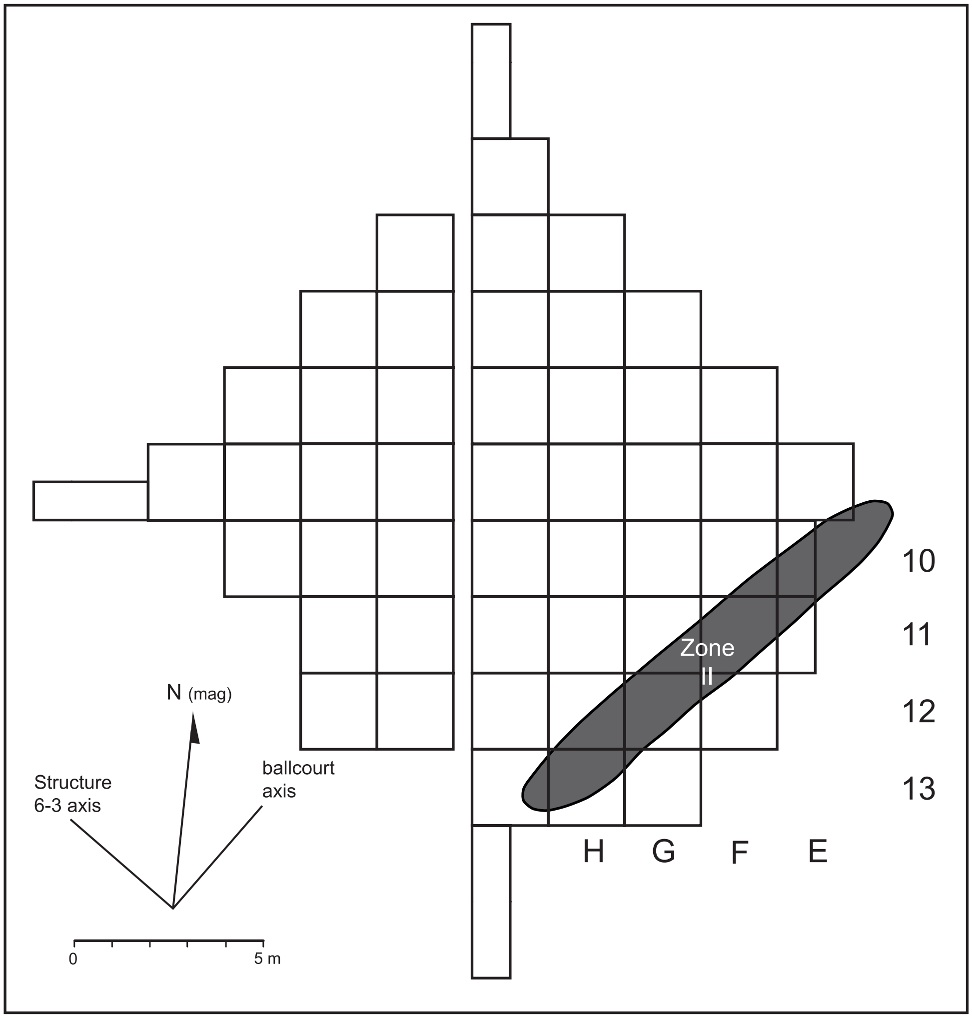


Figure 3.7. Plan of Zone II, Mound 1. Note approximate alignment with ballcourt axis.

ately beneath the plow zone in parts of Units E11, E12, F12, F13, G12, G13, G14, H13, and H14. Exposures in plan (Figure 3.7) and profile (Figure 3.8) indicate that this was a zone of fill containing numerous masses of yellow clay. More than the other fill deposits at Mound 1 (Zones III and IV), the structure of Zone II had the appearance of having formed from basket-loads of different sediments.

Zone II appeared at the edge of the excavations, and during our work it always seemed peripheral to the concerns of the moment. At first, it occurred only in Units H13 and G12 and in the eastern profile of I14 (Ceja's Pit 1). When additional units were opened up to the southeast of these, the pressing goal was exposure of Structure 1-2. Zone II was screened (as Lot 4) only in Unit H13. Sherds recovered are Locona-Ocós with some Cherla; there were no earspools. It thus appears that the source sediments for this deposit, as suggested already by the color and texture differences, were different from the Cherla midden that was the source for the bulk of the platform fill. In my field notes, I recorded ongoing uncertainty about whether Zone II was a layer atop Zones III and IV or an entire outer face of the platform. It appears actually to have been both. A lens of the yellow clay of Zone II was recorded immediately atop Zone V, the pre-platform ground surface, in unit G13. The eastern profile of Units E11 and E12 (Figure 3.8) crossed entirely through Zone II. To the upper left in the figure, the masses of yellow clay appear as a final cap to the platform, beside but also angled up over Zones III and IV.

Zone II is more intriguing in retrospect than it appeared during excavation. Its orientation matched that of the underlying Structure 1-2, an issue discussed further below.

Trench 1 and Unit I14

Trench 1, extending 4 m to the south of Unit I14 (Ceja's Test Pit 1), was excavated in five levels, some of them defined arbitrarily and some using natural distinctions. Ex-

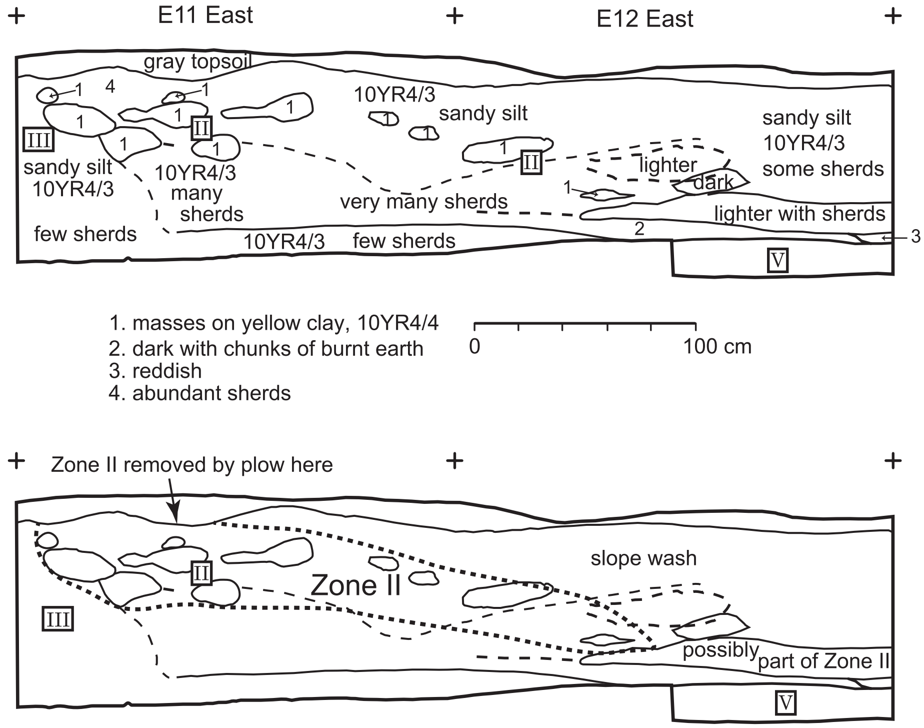


Figure 3.8. Eastern profile of Units E11 and E12, Mound 1, showing Zone II extending up across Zone III. The bottom drawing is the same as that above, with interpretations of the strata. The masses of yellow clay (labeled 1 in the top drawing) suggest basket-loads of fill and are characteristic of Zone II.

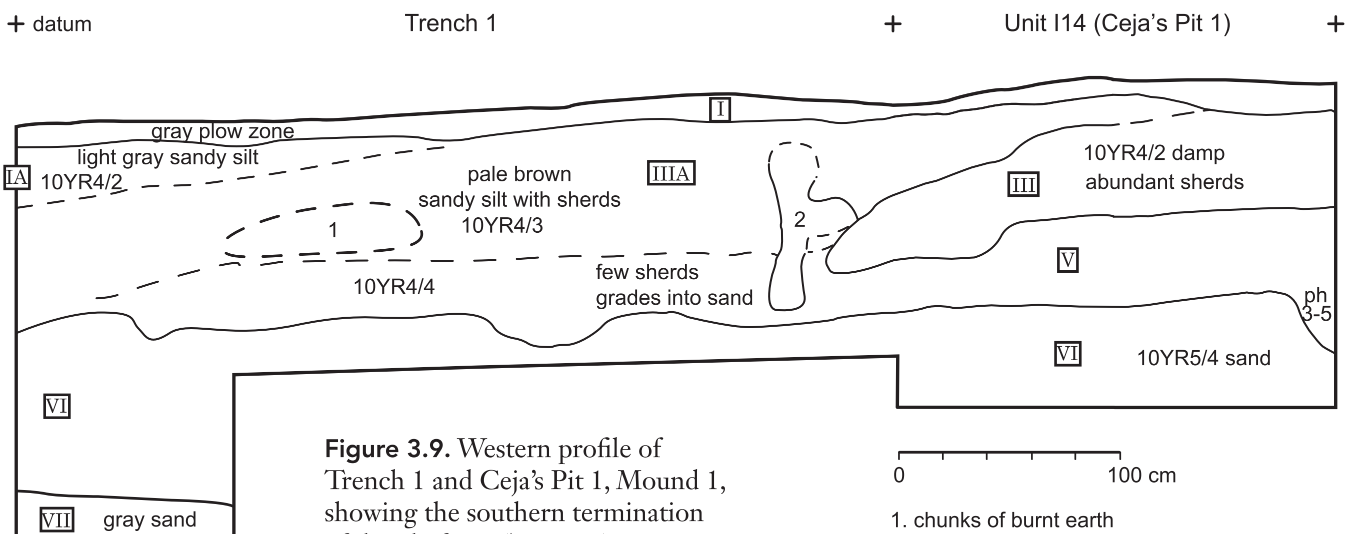


Figure 3.9. Western profile of Trench 1 and Ceja's Pit 1, Mound 1, showing the southern termination of the platform (Zone III).

cavations initially followed the slope of the ground surface, with Level 1 corresponding to 0 to 40 cm below surface, and Level 2 corresponding to 40 to 75 cm below surface. Both these first two levels were unscreened but contained mixed materials dating to the Locona, Ocós, and Cherla phases.

Level 1 cut through Zone I, the plow zone, and entered, in the southern part of the trench, Zone IA, a light gray silt (Figure 3.9, far left). Zone IA was a humic layer indicating a stable ground surface not subject to plow damage. It is equivalent to the surficial gray clayey layers identified in Test Pits 31, 32, and 33; such a layer was missing from the mound itself, as discussed above and indicated in Figure 3.1. Beneath Zone IA was Zone IIIA, a homogeneous, pale brown, fine sandy silt, similar to Zone III in color and texture and probably derived from a gradual accumulation of slope wash from the platform. In this trench, the southern termination of Zone III at the boundary between I14 and Trench 1 clearly marked the edge of the Structure 1-1 platform. To the south of that, the upper surface of Zone V was diffuse and difficult to define either during excavation or subsequently in profile; at the southernmost end of the unit, the distinction between Zones IIIA and V disappeared altogether. Instead of the clear transition to the Locona-Cherla occupation surface that we found under the platform, there was a gradation from the browner, siltier matrix of Zone IIIA to the yellower, sandier matrix of Zone V. The diffuse transition in Trench 1 is likely due to lack of the protective overburden here to one side of the platform. Zone IIIA accumulated gradually above Zone V as sediment washed off the platform. Root action blurred the distinction between these layers.

At 75 cm below surface in Trench 1, we began screening as we descended in Level 3 looking for the surface of Zone V. Unable to identify the surface precisely, we ended the level after entering well enough into Zone V that the change to a yellower, sandier matrix was clearly visible. We then removed what remained of Zone V as Level 4 and descended to the surface of Zone VI, the pure yellow sand. At the bottom of Level 4 we identified a small Locona trash pit, Feature 8, intrusive into the underlying sterile substratum. After removal of the feature we screened one more level (5), which contained little cultural material. An unscreened, meter-wide test at the extreme southern end of the trench verified that Zone VI was culturally sterile and identified the surface of the gray sand, Zone VII, at a depth of 220 to 225 cm bd.

Trench 2 and Unit I6

Trench 2 extended 3 m north of Unit I6 and was excavated in arbitrary 20 cm, screened levels (Figure 3.10). Level 1 removed the plow zone and, in the northern portion of the trench, a gray layer similar to Zone IA of Trench 1 (not registered in the profile). As argued for Trench 1, this gray lens indicates recent stability in the ground surface here just to the north of the mound. Beneath Zones I and IA was a homogeneous, brown, fine, silty sand that varied between 70 and 80 cm thick and contained abundant cultural material (Levels 2, 3, and 4). Sherd densities of 34 to 43 kg/m^2 are similar to those we found within Platform 3 itself and distinguish this deposit from Zone IIIA, the slope wash to the south of the mound, in which the density of cultural material was less.

This off-mound deposit to the north, Zone IIIB, is not a midden associated with the occupation of the Structure 1-1 platform. Average sherd weights of 7.1 to 7.8 g are similar to what we find in fill or slope wash deposits, and chronological mixing is greater than in the platform proper. Level 2 was mixed Locona and Ocós, and Level 3 was mainly Locona-Ocós with some Cherla. It is only with Level 4 that the Cherla presence rose to a level similar to what we observed within the platform.

Zone IIIB is undoubtedly a tertiary deposit, but it is not clear if it represents slope wash from the surface of the platform or an initial layer of slope wash (Level 4) followed by a subsequent addition to the platform (Levels 2 and 3). In retrospect, we did not extend the trench far enough from the mound to develop a fully convincing case one way or the other. However, I am confident that the northern edge of the platform as initially constructed was somewhere in Unit I6, either at the clear termination of Zone IV or somewhat farther north along the line that marks a sloping deposit of dense sherds, marked in Figure 3.10.

In Level 5 we entered Zone V, a yellowish-brown, fine, silty sand with well-preserved cultural material dating to the Cherla and Ocós phases. This was the Locona-Cherla occupation surface. The abundance of cultural materials fell off sharply in Levels 6 and 7, predominantly Ocós and Locona, respectively. In Level 7 we entered the sand that underlies the cultural deposits, Zone VI. This zone had been heavily disturbed by rodents, and we continued to find a few sherds in Levels 8, 9, and 10. We hit a medium gray sand at 200 to 220 cm bd in a test in the northern portion of the unit, but this layer proved to be only 20 to 30 cm thick, giving over to a yellowish-brown sandy silt and then to gray sand once again at a depth of 260 cm bd, indicating that the alluvial substratum composing the low ridge on which Mound 1 was constructed is itself stratigraphically complex.

Trench 3 and Unit M10

Trench 3 extended 3 m to the west of Unit M10 and was excavated in arbitrary, screened levels of 20 cm (Figure 3.11). Level 1 cut through the plow zone, Zone I, into the by-now-familiar homogeneous brown, fine, sandy silt beneath. We identified no gray layer (Zone IA) beneath the plow zone in this trench. Levels 2, 3, and 4 descended through the homogeneous sandy layer, Zone IIIC. Toward the bottom of Level 4 was the beginning of a transition to the sandier, yellower occupation surface, Zone V. In Level 5 we entered the substratum of fine yellow sand (Zone VI) in the southern part of the trench. As in Trench 1, the surface of Zone V could not be readily distinguished here, which would suggest gradual slope wash as the cause of deposition. However, as in Trench 2, the cultural contents of Levels 2 through 4 were mainly Locona-Ocós. It is again not clear whether this zone accumulated through slope wash (which I consider most likely) or included a subsequent extension to the original platform. Note in Figure 3.11 (top) how the westward termination of Zone IV appeared in profile in Unit M10, marking the edge of the original platform for Structure 1-1.

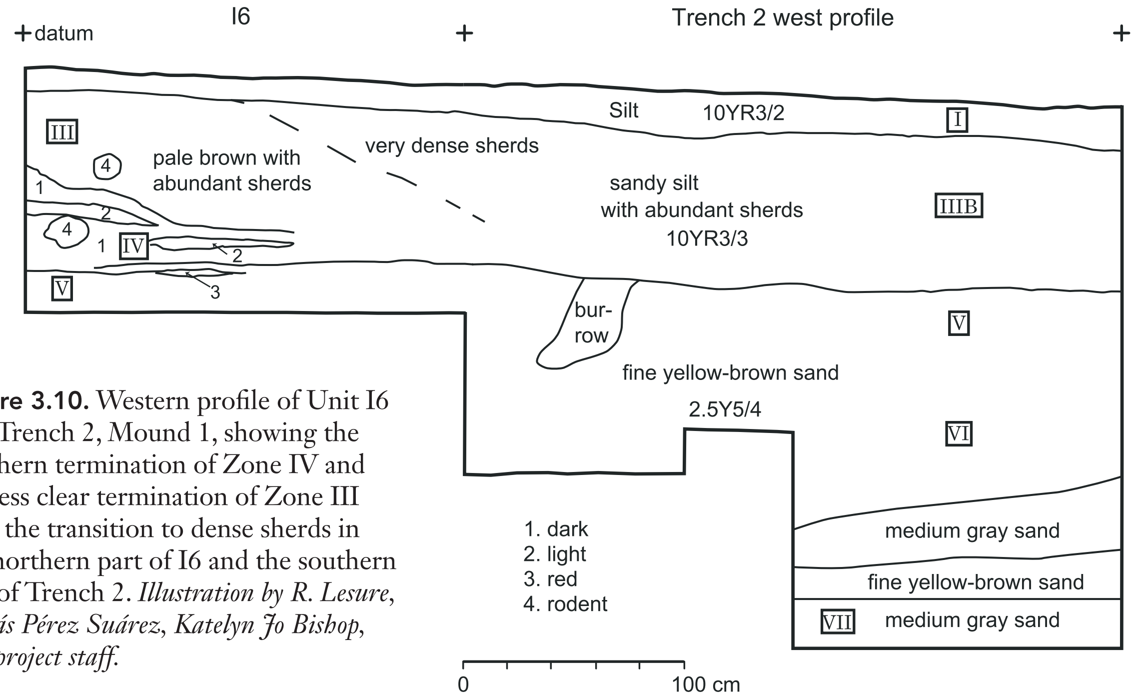


Figure 3.10. Western profile of Unit I6 and Trench 2, Mound 1, showing the northern termination of Zone IV and the less clear termination of Zone III with the transition to dense sherds in the northern part of I6 and the southern end of Trench 2. *Illustration by R. Lesure, Tomás Pérez Suárez, Katelyn Jo Bishop, and project staff.*

Intruding into Zone VI from Zone V was a large pit, Feature 10 (Level 7 and part of Level 6). The pit contained Barra and Locona sherds and represents an early Locona deposit. Level 8, outside of and beneath this feature, was practically devoid of cultural material. Interestingly, we found in this level (around 170 to 180 cm bd) the transition to the medium gray sand of Zone VII, somewhat higher than the level at which we identified this zone toward the east in Unit I11 and Trenches 1 and 3, again emphasizing the complexity of the natural, river-lain deposits beneath the Formative occupation layers.

Although I never got around to placing a fourth trench to the east of the mound, there is evidence that the platform terminated at the eastern edge of the mound as it did to the south, west, and probably north. First, there is the yellow fill of Zone II (Lot 4), which seems to have formed a southeastern boundary to the platform. Second, the profile of Unit E10 shows the same sort of termination to Zone IV that appeared in Units I14, I6, and M10 as confirmed by Trenches 1, 2, and 3, respectively.

OVERVIEW OF THE FEATURES

Zone V contained most of the features identified at Mound 1. It seems to have accumulated gradually over a span of approximately 300 years, from early Locona to Cherla times. Cultural materials within this layer of 20–40 cm were mixed. In some of the units in which the layer was removed in multiple lots, there was a hint of cultural stratigraphy, with more Cherla above and more Locona below, but in other units, that was not the case. Traces of several structures appeared within or on the upper surface of Zone V. Structures were numbered in the order of discovery, from the ground surface down, following the practice introduced for Mound 6 by Blake (1991). Undiscovered features may lie in Zone V on the western side of the excavations; time and money constraints forced me to close the excavations with only the eastern half taken down to the sterile substratum, except for Trench 3 and Unit M10 in the extreme western edge of the exposure.

Features not in Zone V included the Structure 1-1 platform and a few possible post hole remnants on the summit of the mound. Additionally, the whole of Zone IV was a dense concentration of redeposited refuse that merits separate attention. In the following sections, structures and associated features are presented in chronological order.

THE LOCONA OCCUPATION

The earliest features in Mound 1 appeared toward the bottom of Zone V and were most clearly identified where they cut down into Zone VI, the sterile substratum. Features that appeared at the surface of Zone VI are shown in Figure 3.12. In the center of the excavation were fragmentary remains of two structures (1-4 and 1-5), evidenced by several poorly preserved patches of floor and a number of post holes (Figure 3.13). Near the structures were three pits, Features 8, 10, and 15, all of which contained Locona-phase domestic refuse. Generally, this suite of features suggests a series of small, non-platform Locona residences with associated refuse-filled storage pits. However, the pits date to different eras within the Locona phase. Feature 10 was Early Locona; Feature 15 Late Locona.

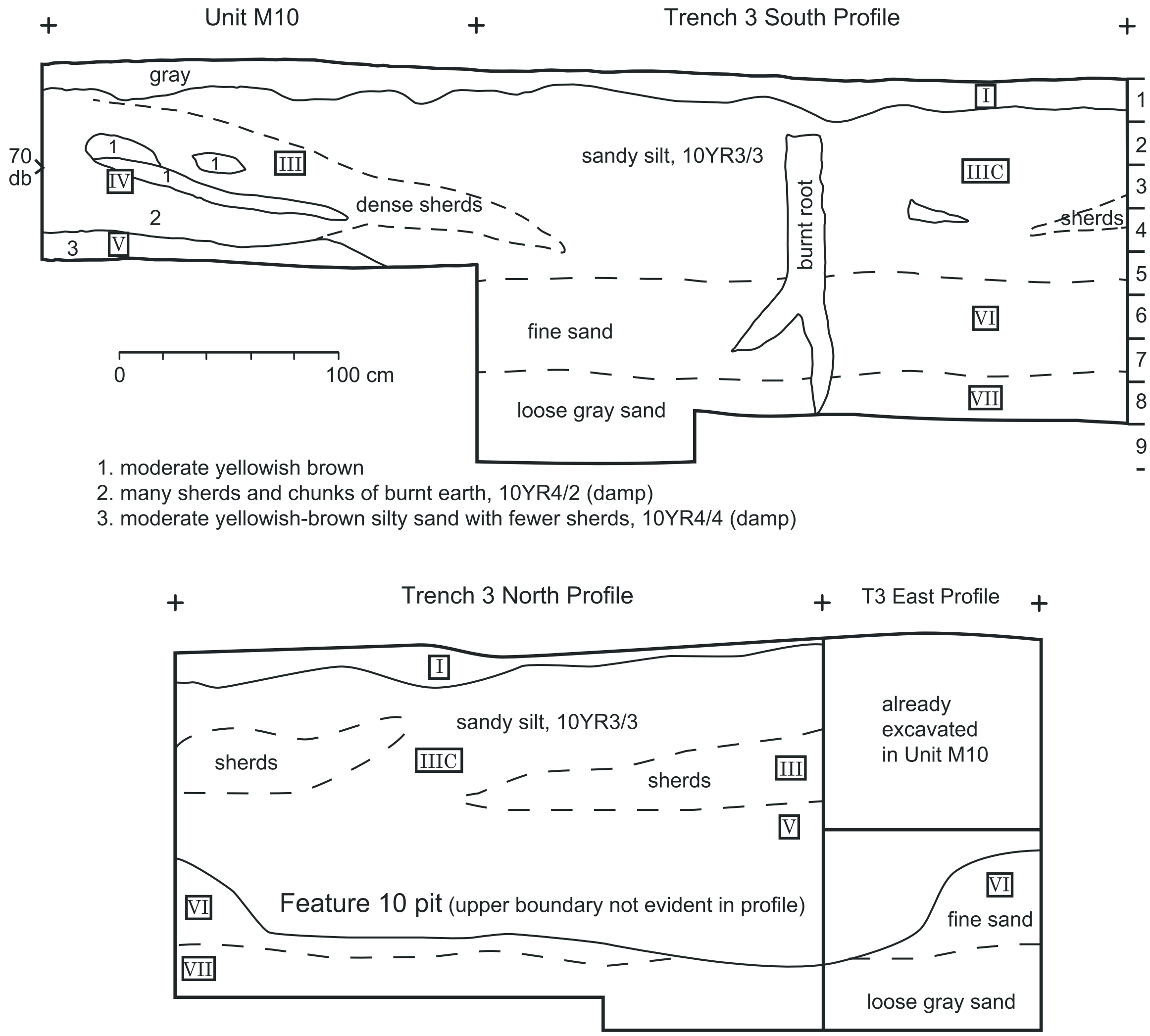


Figure 3.11. Profiles of Unit M10 and Trench 3, Mound 1. Top: southern profile, showing the western termination of Zones III and IV. In this area, the sloping deposit of dense sherds extending into the eastern end of Trench 3 appears to mark the end of Zone III and the transition to the slope wash of Zone IIIC. Bottom: north and east profiles of Trench 3, showing particularly the lower boundary of the Feature 10 pit. *Illustration by R. Lesure, Tomás Pérez Suárez, Katelyn Jo Bishop, and project staff.*

Structures 1-4 and 1-5

In Units I11 and H11, several thin, hardened, black patches appeared on the surface of Zone VI, indicating a poorly preserved floor in this area. These patches of floor were preserved because they underlay Lot 21, a 4 x 2 m deposit of clayey fill that appeared in Units H11, H12, and I11.

A number of post holes appeared either directly adjacent to patches of floor or associated with the surface of Zone VI in general. Six of these post holes had been filled with the gray clay of Lot 21. Of these six post holes, only three actually underlay Lot 21. The rest appeared a short distance to the east under the yellow-brown silty sand of Zone V.

All other post holes identified in the surface of Zone VI had a matrix indistinguishable from Zone V, a yellowish-brown silty sand. This observation raises something of a challenge for interpretation since some of these post holes may have intruded from some distance above the surface at which we found them, showing up only when we got down to the yellow sand of Zone V.

Two post holes with a yellowish-brown fill appeared underneath Lot 21 in Unit I11. Since these would have been identifiable in the gray clay of Lot 21 had they penetrated down from above that lot, they can be considered securely sealed by the Lot 21 fill. It seems reasonable to suppose, in addition, that they also predate the post holes that were filled with gray clay when Lot 21 was laid down, for had they been open at that time they would surely have been filled with gray clay as well. These two post holes are

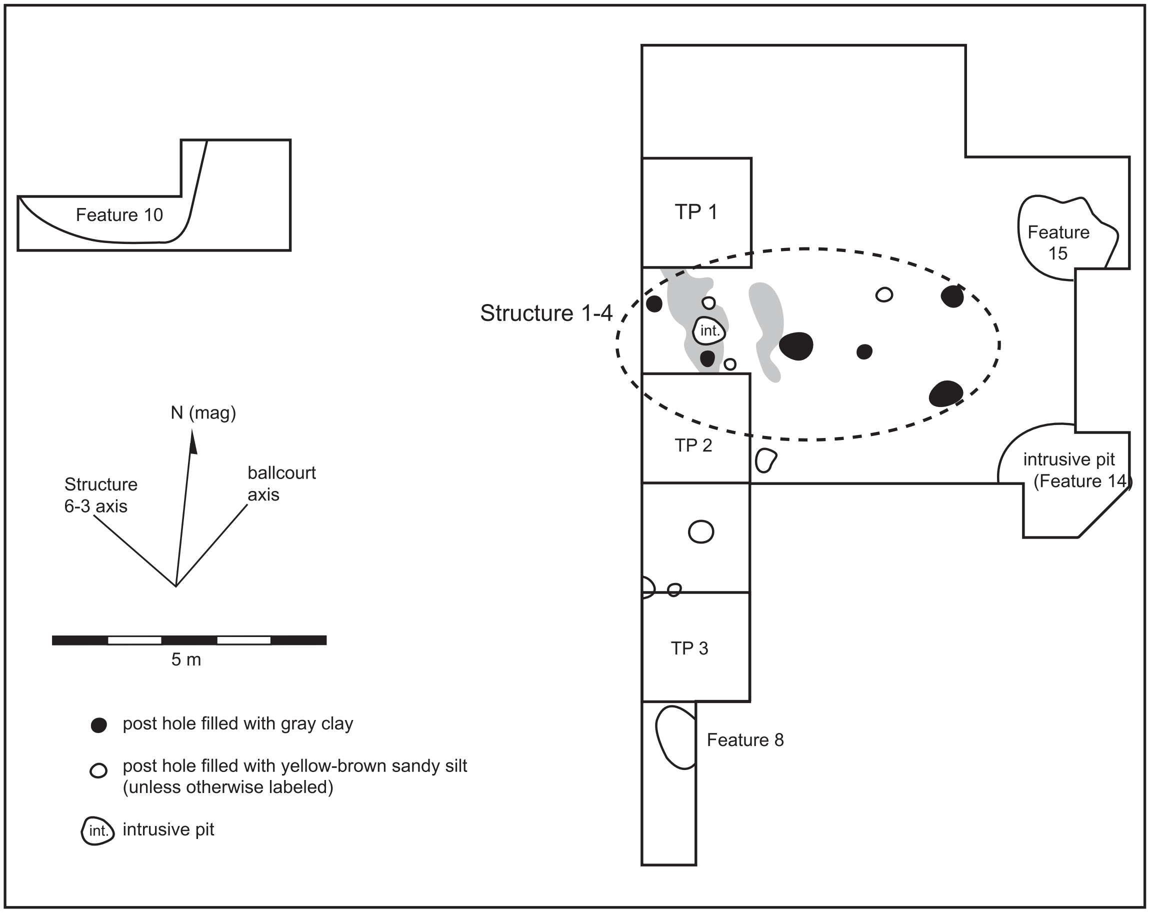


Figure 3.12. Plan of Structure 1-4 and associated Locona features, Mound 1.

therefore evidence for a Structure 1-5, the earliest identified in the Mound 1 excavations. The size or orientation of this structure is unknown. Some of the post holes of uncertain origin might also correspond to this structure. The structure likely dated to the Locona phase.

Structure 1-4 overlay Structure 1-5 and was represented by the poorly preserved fragments of floor and the six post holes that were filled with gray clay. These post holes contained little in the way of cultural material. What was there was predominantly Locona, with some possible Ocós sherds. Lot 21 contained Locona and Ocós sherds, with a few Cherla sherds. This was most likely an Ocós-phase deposit of fill, the scant Cherla material having come down to this level in root holes or rodent burrows.

The most probable reconstruction of the floor plan of Structure 1-4 is indicated in Figure 3.12. The structure was small, about 7 by 3.5 m, with an interior row of three post holes. The center post (Feature 13) was much larger and deeper than any of the others. There were several more posts at the ends of the structure. Part of the structure was removed by Ceja's Test Pit 2, and it probably continued a little way beneath the balk and the unexcavated portion of Zone V to the west. Other post holes recovered at this level are an uninterpretable palimpsest.

Feature 10

The earliest identified feature at Mound 1, Feature 10 was a large pit that intruded from Zone V into the sterile sand of Zones VI and VII beneath (Figures 3.11 [bottom] and 3.12). The feature was identified during the excavation of Trench 3 only after much of it had been removed in Levels 6 and 7. Three provenience units corresponded exclusively to the feature: T3/7, T3/F.10, and M10/F.10.

The pit appears to have been about 3 m across and 50 cm deep. The excavated volume was 0.772 m^3; however, some of that represents the sterile substratum into which the pit was excavated. Sherd density was 9.5 kg/m^3, and average sherd weight was 6.4 g/sherd. Materials recovered from the pit included both Barra and Locona sherds. The largest vessel fragments, including a flattened-rim Tusta Red tecomate and a grooved Cotan Red tecomate, are typically Barra vessels, leading me to suggest that the fill of the pit may be secondary refuse and sweeping debris dating to early in the Locona phase, when some Barra forms were still in use. Other material in the pit included part of a rare human effigy tecomate, two more probable effigy vessel fragments, one round worked sherd disk, five solid figurine fragments, four metate fragments, one mortar

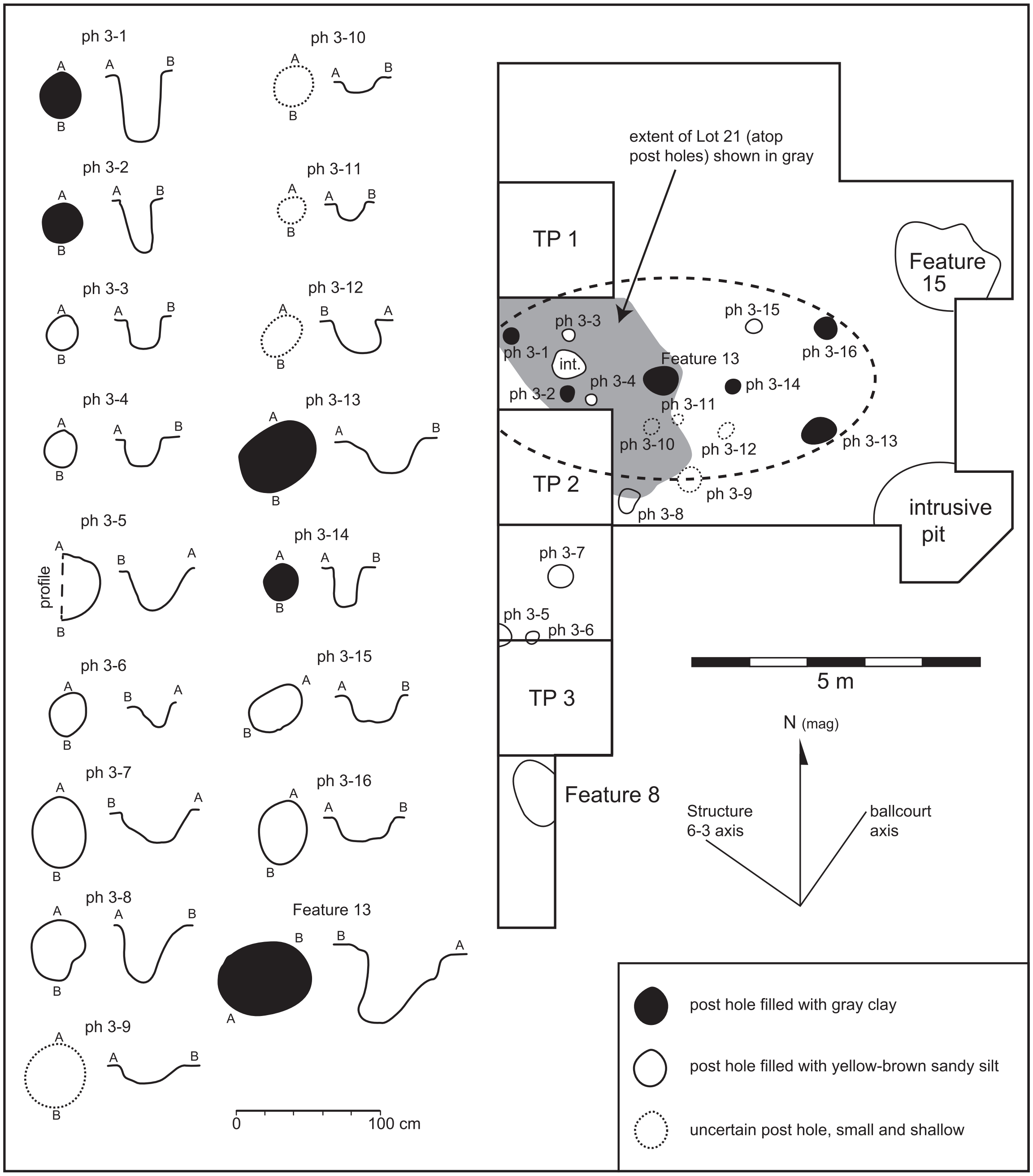


Figure 3.13. Post holes identified at the bottom of Zone V, Mound 1.

fragment, two mano fragments, numerous obsidian flakes, and a significant amount of fire-cracked rock and burnt daub.

Feature 8

Feature 8 was a small Locona pit intrusive into Zone VI from Zone V in Trench 1, where it appeared at the bottom of Level 4 (Figures 3.12, 3.14). The volume of the pit was 0.147 m^3, sherd density was 37.6 kg/m^3, and average sherd weight was 7.1 g. The fill of the pit was grayish, indicating a high organic content, and at the bottom of the pit was a dense concentration of badly preserved shell (probably the tiny clam *Amphichaena kindermanni*). Most of the sherds were small, with no large vessel fragments; the material was probably sweeping debris, except for the layer of shells at the very bottom, which was the discarded leftovers of a single meal. Other finds included one conical clay bead, one rectangular worked sherd fragment, five solid figurine fragments, two fragments of effigy vessels, one fired roll of clay (possibly an inadvertently fired coil), one fragment of unworked pumice, several fragments of burnt daub, and numerous obsidian flakes and fragments of fire-cracked rock.

Feature 15

Feature 15 was a large Locona pit about 150 cm in diameter and 40 cm deep that intruded into Zone VI from Zone V in Units E10 and F10 (Figures 3.12, 3.14). The volume of the pit was 0.548 m^3, with a sherd density of 48.7 kg/m^3 and an average sherd weight of 11.6 g. Contents included a complete Chilo Specular Red bowl broken into several pieces, half of another Chilo bowl, numerous fragments of a single Michis Red Rim tecomate, and other large sherds along with numerous small ones. Other materials recovered included 12 solid figurine fragments (including a head), two hollow figurine fragments, two effigy vessel fragments, one fragment of a ceramic ear ornament, four cylindrical net weights, one highly polished handle from a ceramic spoon or spatula, numerous obsidian flakes, and several fragments of grinding stones, fire-cracked rock, and burnt daub. Directly atop the upper surface of the fill of Feature 15 was the small hearth, Feature 16.

Feature 16

Feature 16 was a small hearth consisting of a patch of burnt earth still in situ. It directly overlay the dense trash of the fill of Feature 15. The hearth appeared as a doughnut-shaped ring of burnt earth, very hard and bright orange in color. Surrounding this ring was a ring of black-stained earth containing jumbled sherds and chunks of burnt earth. Within the hardened ring was sand that showed no evidence of burning. Given the lack of evidence of burning in its very center, the hearth appears to have been only partially preserved.

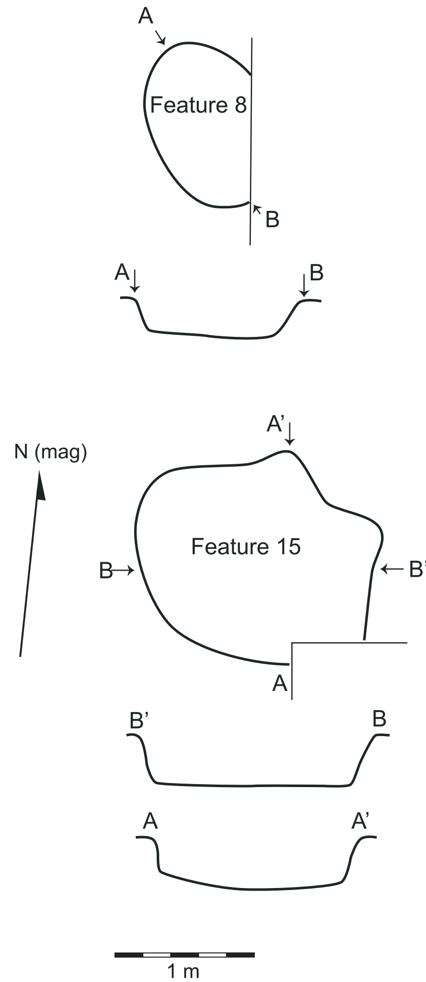


Figure 3.14. Plan and profiles of Features 8 and 15, Mound 1.

THE OCÓS AND INITIAL CHERLA OCCUPATIONS

Following the abandonment of Structure 1-4, additional small residences were probably built in the area of the excavations, but we did not identify any definite trace of them. The significant presence of Ocós sherds in Zone V suggests continued domestic occupation in this area.

The Abandonment of Structure 1-4: Lot 21

In the Ocós phase, Structure 1-4 was dismantled and partially covered over by the gray clay of Lot 21. The rest of the floor area was probably covered by simply raking the silty sand of Zone V over the structure floor. Apparently the posts of Structure 1-4 were removed, since the holes were filled with the gray clay before they began to weather or collapse. There was thus little to no time gap between the dismantling of the structure and the deposition of Lot 21 atop it.

I interpret this as an act of formal termination upon abandonment of the structure. Although it was certainly modest in relation to ritualized acts that could have been performed, it involved identification of a properly contrasting deposit, quarrying of the earth, and transport to the location of deposition. While there were probably multiple small Locona-Ocós structures under Mound 1, Structure 1-4 is the only one terminated in this formalized manner. Figure 3.13 shows Lot 21 superimposed over a plan of Structure 1-4.

No structural remains appeared on the surface of Lot 21. Lot 21 itself was covered by more of the homogeneous yellowish-brown silty sand of Zone V. It is possible that the deposition of Lot 21 was preparation for an Ocós-phase structure located to the west of our excavations. Post holes of uncertain origin identified at the surface of Zone VI could have been associated with such a structure.

Feature 14 and Burial 8

One of the features identified in the surface of Zone VI in Units E12 and F12 was a large pit, Feature 14, that contained mixed Locona, Ocós, and some Cherla sherds. In the northeastern part of the pit was Burial 8.

The origin and purpose of Feature 14 is something of a puzzle. Its contents were clearly chronologically mixed, indicating that it was not a secondary refuse deposit like Features 8, 10, and 15. Further, although it was first identified where it cut through Zone VI, the fact that it contained later material suggests that it intruded into Zone VI from above, somewhere within Zone V. We were (of course) frantically excavating it on the last day of the field season. The pit itself seems excessively large to have functioned solely as the burial pit for Burial 8.

Burial 8 (Figure 3.15; see also Chapter 23) was installed either in an unusually large grave or in a smaller but unidentifiable burial pit that intruded into a previously filled pit. The burial was of a single, articulated, adult female. She had been placed on her back and left side, with the head to the northwest, legs loosely flexed. The left arm was bent double with the hand under the chin, and the right arm was loosely bent with the hand resting on the chest. The burial had been partially disturbed by rodents, which accounts for the missing bones: the distal portion of the right arm and some vertebrae. Another rodent burrow went past the right knee and passed near or through the pelvic area.

No objects were directly associated with the burial; however, two large vessel fragments were recovered from just above the chest region, some 5 to 10 cm above the bone. These were removed prior to discovery of the burial. The absence of other similarly sized vessel fragments in Feature 14, their position just above the burial, and the fact that large vessel fragments have been found associated with other burials argue for considering these two partial vessels as offerings for Burial 8. One was a small, unslipped, effigy tecomate with a convex neck. Most of the effigy features and all of the rim were broken away. The other was a large rim sherd of a Michis Buff tecomate with an unslipped, burnished rim band and an orange wash on the scraped body. Both vessels are typically Cherla in style.

Because no burial pit outline was identified above Zone VI, the level from which Burial 8 intruded remains unclear. The burial could therefore date from before, during, or after occupation of the overlying Structure 1-2. While there is no conclusive evidence for or against any of these interpretations, I suspect that it dates from before the structure. Construction of the platform seems to have immediately followed the dismantling of Structure 1-2, leaving little time for the placement of a burial that was not part of the ritual associated with termination. The placement of Burial 8 with respect to the platform makes a termination-ritual scenario unlikely in this case. My reconstruction of Structure 1-2 itself precludes placement of the burial during the occupation of the structure, unless we postulate that the burial was placed under the wall. If the burial descended from a surface within Zone V, prior to construction of Structure 1-2, then its original depth of burial would have been 30–35 cm below ground surface, similar to the inferred original depths of the three burials discovered in the Pit 32 excavations.

THE CHERLA OCCUPATION PRIOR TO PLATFORM CONSTRUCTION

Structure 1-2 was constructed on the surface of Zone V, probably early in the Cherla phase. This was better built than Structure 1-4 and substantially larger. It may have been the focal structure for a multifamily household. Some 8 m to the north were traces of another structure, Structure 1-3.

Structure 1-2

The most striking feature of Structure 1-2 was a deposit composed of mixed chunks of clays of different colors. Identified as a floor ("Floor 1A") during excavation, it probably was actually the remnant of a wall or bench that bounded Structure 1-2 (Figure 3.16), comparable in some respects to the low wall of Structure 4 at Mound 6 (see Figure 1.7a–b). This wall remnant appeared just beneath the dense Cherla midden of Zone IV and stretched across our excavation from Unit J12 through the balk into Units I11 and H10. From there it began to arc toward the south in Unit G10 and ended in F10, only to pick up again 70 cm away in Unit F11 and terminate, after another 180 cm, in E11. The deposit was composed of a mixture of construction materials similar to that observed in the walls and floor of Structure 4 in Mound 6. The colored clays that composed the floor included moderate yellowish brown (10YR5/4 or 7.5YR5/6), weak brown (10YR3/3), very pale brown (10YR7/2), and chunks of burnt red earth (2.5YR5/6).

With two short breaks, the possible wall or bench remnant ran in a strip 100 to 130 cm wide. To the north of the wall, and associated with it, was a thin black stain, labeled "Floor 1B" during excavation. Generally beginning where remains of the wall left off, the black stain sloped down away from the wall, about 5 to 7 cm per meter (Figure 3.17). The slope of the surface beneath the platform is shown with 5 cm contour intervals in Figure 3.17. The wall remnants were generally the highest parts of the Zone V surface.

Only a small patch of dark staining was preserved to the south of the wall (in Units G10 and H10 in Figure 3.16). Here it was flat rather than sloping, supporting the interpretation of this area as the original interior of the structure. Small reddish patches in the black-stained surface indicated burnt areas that remained in situ. They were not formal hearths.

The ridge-like form of the wall remnant and the slope of the black-stained surface were puzzling until we identified the post holes associated with the structure (Figures 3.16, 3.18). A line of four large, deep post holes followed the southern edge of the wall from Unit K13 through Unit

Figure 3.15. Burial 8, Mound 1. *Photo by R. Lesure.*

H10 (Features 5, 9, 2, and 3). Two more post holes corresponded with the arc of the wall as it turned to the southeast (Features 7 and 12). A single post hole also appeared to the north of the wall in Unit J12 (Feature 6). Because this post hole was treated the same way as the other six at the abandonment of the structure, it was certainly open at that time and must have been part of the structure in some way. Perhaps it was part of an entranceway. The whole excavated surface of the two floors and the area surrounding them was carefully inspected for more posts, but only a scattering of small possible post holes appeared, contributing nothing significant to the plan of Structure 1-2 (Figure 3.18).

For the excavation of the wall remnant and associated surface, all 2 x 2 m units in which these deposits appeared were gridded in 50 x 50 cm blocks, and each block was assigned a section number as indicated in Figure 3.19. We screened each section separately when we removed the floor. The wall remnant was 5 cm thick, and removed as such, while the black stain was less than 1 cm thick on the surrounding surface. I decided, however, to remove a 5 cm depth here as well, reasoning that artifacts would have been trampled into its sandy matrix to that depth. In the southern part of the excavation, corresponding to the interior of the structure, no floor could be identified, but we excavated a 5 cm depth level of the surface (Lot 19) in Units G12, H13, and I13. Materials recovered from the deposits are chronologically mixed and in no way constitute an analyzable primary assemblage associated with the occupation of Structure 1-2. Lot 19 was particularly disturbed, with less

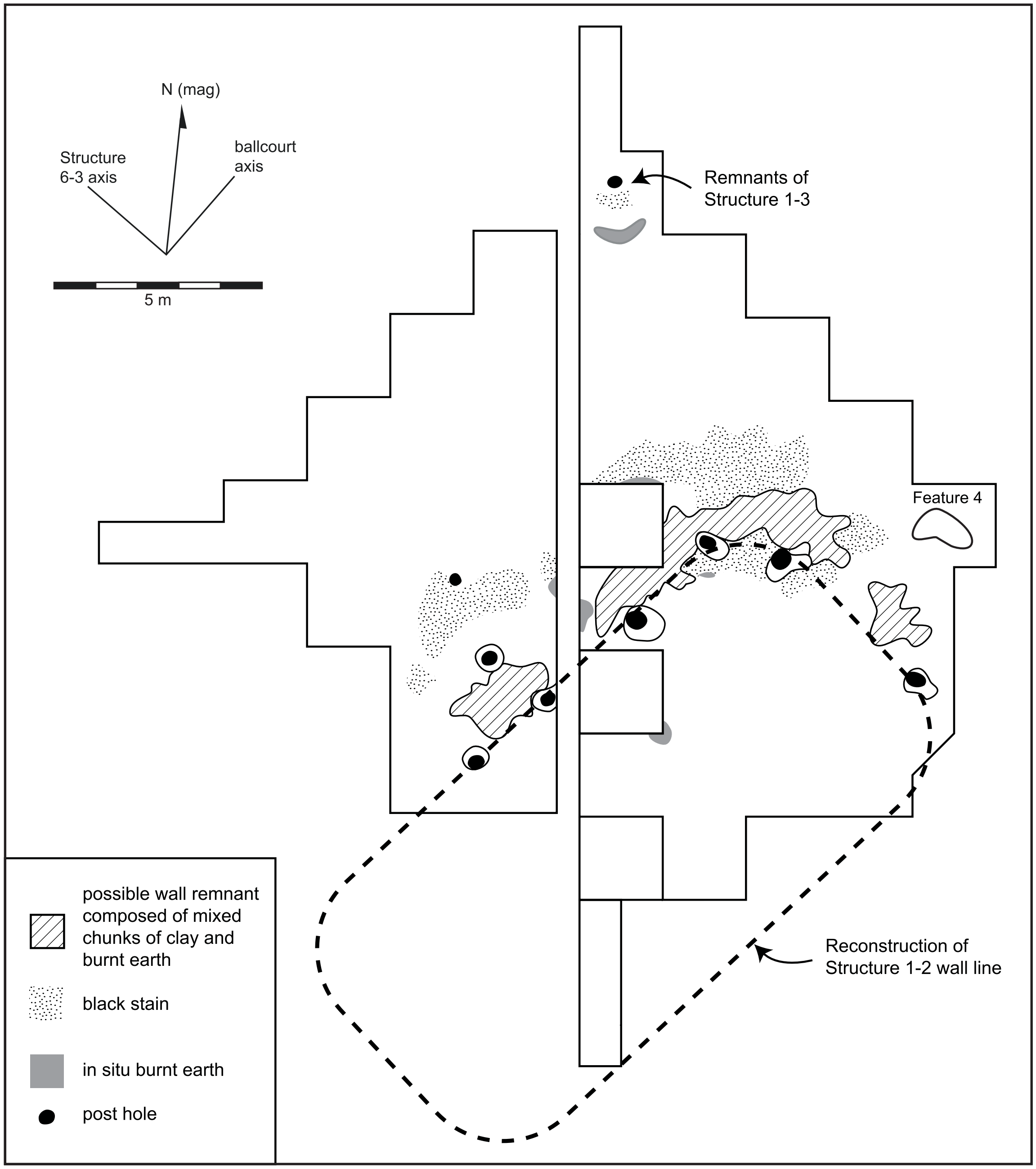


Figure 3.16. Plan of the remaining traces of Structures 1-2 and 1-3.

than 20 percent Cherla sherds; sherds from the wall deposit are about 25 percent Cherla. Sherds from the black-stained exterior surface, about 43 percent Cherla, may have a higher content of refuse trampled into the surface during use of the structure.

My interpretation of the traces of Structure 1-2 is that it was a large building supported by substantial, deeply set posts spaced at intervals of 2 to 4 m along its perimeter. The preserved remnant consisted of four post holes of a wall line running northeast–southwest and two post holes of a wall perpendicular to this, running northwest–southeast. Assuming symmetry—in particular that Features 7 and 12 formed one end of a rectangular or apsidal structure and that they were symmetrically placed with respect to the long walls and the centerline of the building—a minimum reconstruction is a structure 7 m wide and 10 m long, with four posts along each side spaced 2 to 3 m apart and two posts at each end spaced 4 m apart. If the structure actually followed the proportions of the series of at least four apsidal structures in Mound 6, which were generally twice as long as wide, then the dimensions would have been 7 x 14 m with six posts to a side. I consider this second possibility more likely. No center posts were located in our excavations.

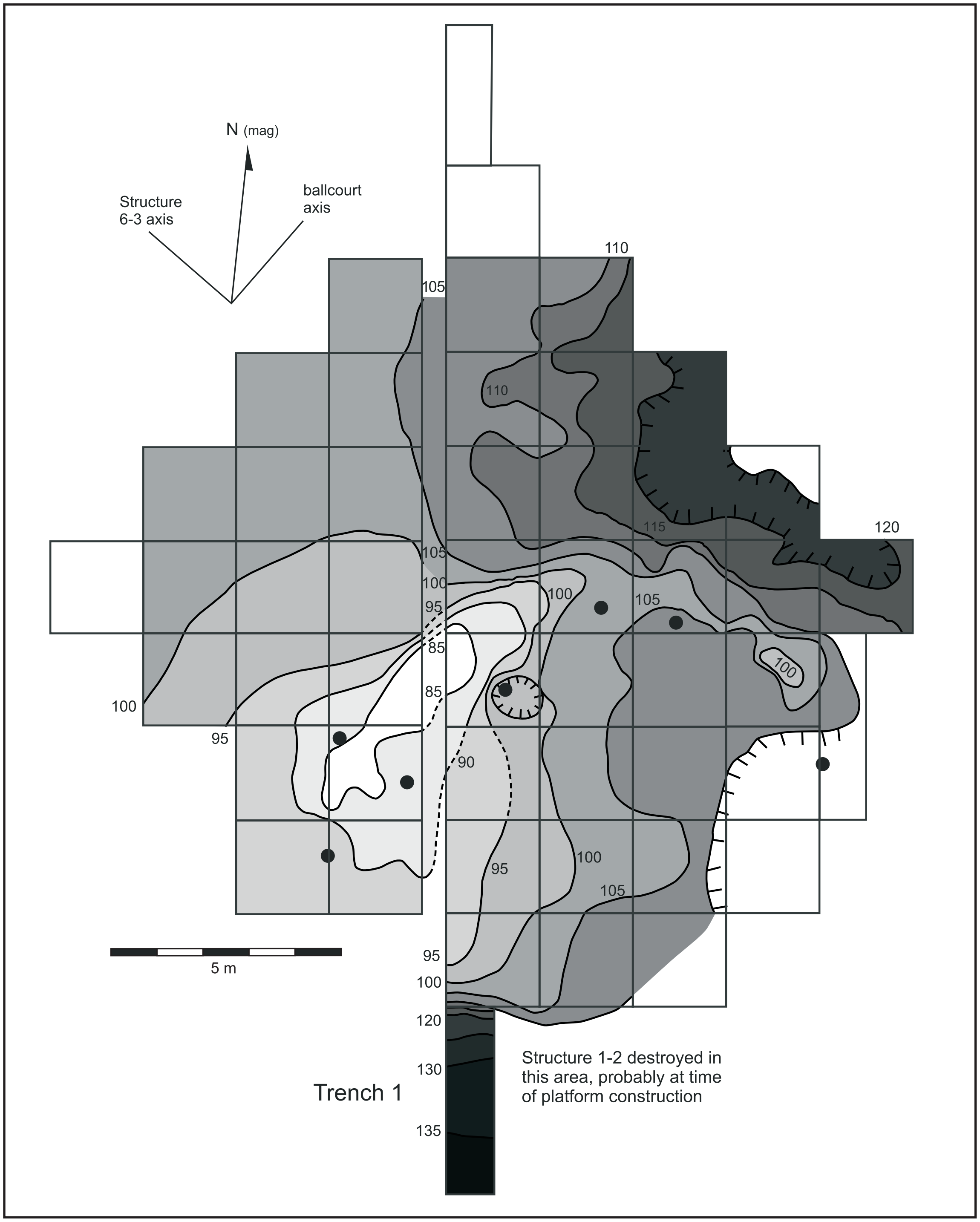


Figure 3.17. Contour plan of Structure 1-2, Mound 1, and the associated occupation surface immediately underlying the platform. Contour interval is 5 cm. High points are shown in lighter colors; numbers are depths beneath datum. Note the unevenness of the surface. The curve of the probable wall remnant comes out as generally higher than either the interior or exterior of the structure. Note as well the plunge of the surface as one moves south into Trench 1. Remains of the structure are probably missing in this area because they were dug away during construction of the platform.

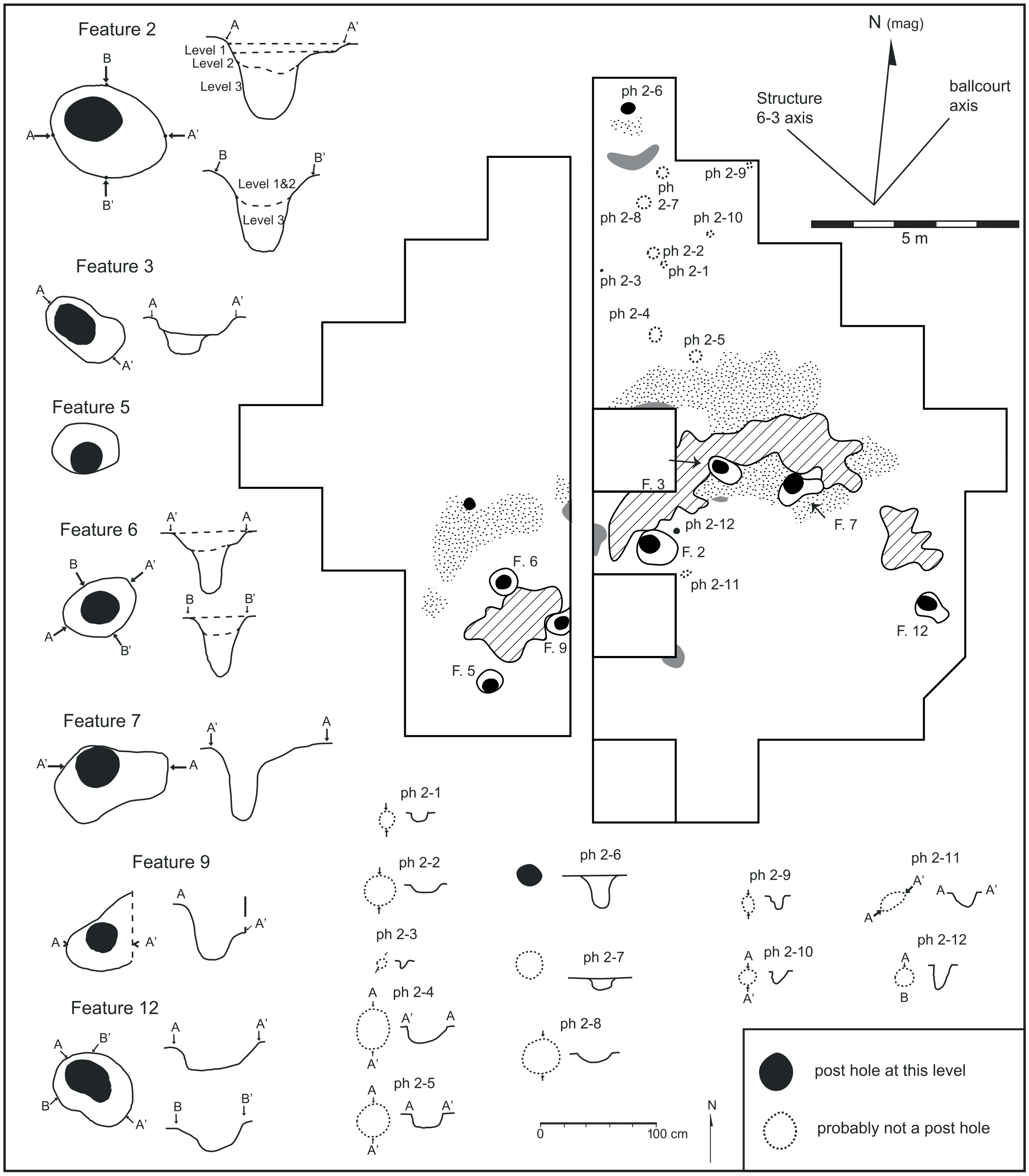


Figure 3.18. Post holes identified at the surface of Zone V, Mound 1, including those of Structures 1-2 and 1-3.

The structure was built on a surface that rose 10 cm above the surrounding ground surface, probably prepared by raking up earth from the surrounding surface of Zone V. The exterior patio surface sloping away from the structure was blackened by flecks of charcoal and organic matter. It may be that a ridge of clay followed the exterior perimeter of the structure, though I think it more likely that the extant ridge marks the remains of a wall or bench destroyed at the time of abandonment of the structure. The preserved post holes of Structure 1-2 (Features 2, 3, 5, 6, 7, 9, and 12) were partially filled with what appeared to be a mixture of earth from Zone V with chunks of sediment derived from destruction of the walls or benches.

When I opened the excavation in Mound 1, I expected any structures within the mound to be located directly under the mound itself, as was the case with the series of buildings in Mound 6. Structure 1-2 clearly did not follow the expected pattern; all possible reconstructions of the structure extend well to the south of the mound. What happened to the rest of the floor, post holes, and wall? Activities associated with the abandonment of Structure 1-2 (described below), together with the fact that the platform was not placed directly on top of the previous structure but instead off to the north, probably account for the missing portions of the structure. What we found of Structure 1-2 was the part that was protected by direct and immediate superimposition of the Structure 1-1 platform.

Structure 1-3

In Unit I6, at the surface of Zone V, fragmentary evidence of another structure (Structure 1-3) appeared under the very northern edge of the platform (Figure 3.16). The remains consisted of two small patches of black-stained floor and a single, very convincing post hole (ph 2-6 in Figure 3.18). Investigations to the north of Unit I6, in Trench 2, did not produce any identifiable continuation of this structure, but since this area is outside of the protective covering of Zone IV, any continuation of Structure 1-3 in this area would not have been preserved. The most that can be concluded about this very fragmentary evidence is the likelihood that there was at least one construction here close to Structure 1-2. Since the post hole is smaller in diameter than those of Structure 1-2, Structure 1-3 was likely a smaller residence or possibly an outbuilding.

Feature 4

A small concentration of Cherla-phase domestic refuse in Zone V of Unit E10 seems to have been a deposit of secondary refuse deriving from occupation of Structure 1-2. Artifacts recovered are characteristic of domestic trash. They included 22 fragments of ear ornaments, eight solid figurine fragments, one round worked sherd, one large worked sherd fragment, one cylindrical clay net weight, one sandstone abrader, three fragments of grinding stones, two fire-cracked rocks, 37 daub fragments, and numerous obsidian chips. There were no large vessel fragments or complete vessels.

The frequency of earspools was high in Feature 4 compared to the overlying fill: 114 earspools per cubic meter and 2.6 per kilogram of sherds, compared to medians in Zone IV of 50 and 1.1, respectively. Although no exotic ornaments of jade or magnetite were recovered in this feature, the high earspool content here immediately beside Structure 1-2 bolsters the argument linking the source midden of the Zone IV fill to the occupation of Structure 1-2, an issue discussed below.

THE CHERLA-PHASE PLATFORM

A large platform was built up over the northern portion of the dismantled Structure 1-2. I suspect that the platform supported a single building (Structure 1-1), but that is not certain. The platform was stratigraphically divided into Zones II, III, and IV, but there was no evidence of any

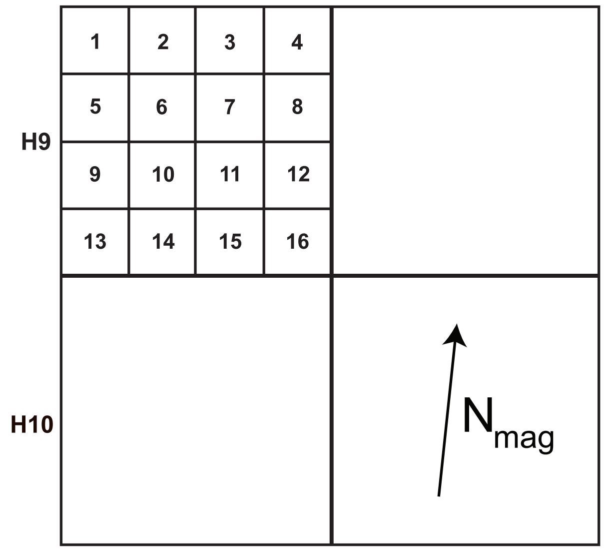


Figure 3.19. Section labeling scheme for "floor" excavation, Mound 1

intermediary constructions between Zone V and the upper surface of this platform, which had been destroyed by plowing.

Abandonment of Structures 1-2 and 1-3

Sometime during the Cherla phase, Structure 1-2 was abandoned. The inhabitants removed the large posts from the perimeter of the structure. To accomplish this they dug around each post, leaving large craters, about 20 cm deep, around the upper portion of each post hole (indicated in Figures 3.16 and 3.18). With the posts removed, all seven holes were filled about halfway with a yellowish-brown fine sandy silt mixed with hardened chunks of clay and burnt earth, explicable as a mixture of sediments from the wall remnant and from Zone V. The rest of each hole was filled with the same dense Cherla refuse quarried to create the lowest layer of platform fill (Zone IV).

I draw three conclusions from the treatment of the post holes at abandonment. First, the fact that all seven post holes were filled in the same way supports the hypothesis that they were all associated with the same structure and that they all had posts in them until the moment when the structure was dismantled. Second, the fact that the upper part of each post hole was filled with the same redeposited midden used to create the lowermost layer of the platform (Zone IV) suggests that platform construction quickly followed the dismantling of Structure 1-2. If the post holes had been left partway filled during the rainy season, for instance, we would have found evidence of in-washed sediments. It thus seems necessary to consider the dismantling of Structure 1-2 and the construction of Structure 1-1 as linked events close to each other in time. Finally, the two-layer fill, repeated for each post hole, suggests an element of formalism and perhaps ritual in the dismantling of Structure 1-2 and preparations for Structure 1-1. Given these suggestions of formalism in the abandonment of Structure 1-2, the placement of Structure 1-1, offset from 1-2, seems surprising.

The single post hole identified with Structure 1-3 was not filled in the distinctive manner of the Structure 1-2 post holes; nor is there anything specific that can be said about the abandonment of Structure 1-3 beyond the suggestion that this building was not terminated in any formalized way.

Structure 1-1

To create the platform for Structure 1-1 (Figure 3.20), more than 1.0 m of fill was deposited on top of the dismantled Structure 1-2. The original fill layer was probably at least 1.5 m thick, if the 40 cm lost to plowing between Ceja's excavations and those of 1992 are taken into account. Construction began with the deposition of Zone IV. This entire zone is quite homogeneous in terms of content. The presence of jade ornaments and iron ore mirrors, along with high densities of obsidian and earspools, indicates that the source was a large, high-status midden of the Cherla phase. Lenses resembling the sediment of Zone V in color and texture suggest that the source may have been in the vicinity. One distinct possibility, suggested by the rapid falloff of the surface of Zone V from Unit I14 into Trench 1 (Figure 3.17), in an area where the floor to Structure 1-2 should have continued, is that this area to the south of the mound was quarried for fill.

Construction continued with the deposition of Zone III. The color and texture of that deposit resembles the layers of Initial to Early Formative accumulation in Pit 31, raising the possibility that sediments from the natural depression between Mound 1 and the Pit 32 excavations could have been a source for the fill of Zone III. That scenario would fit least-effort expectations. The builders first obtained fill from areas close to the mound (yielding Zone IV) and then moved farther away (resulting in Zone III).

In terms of the relations between the platform and the recently abandoned Structure 1-2, Zone II, the southeastern face of the platform, is particularly interesting. This deposit was linear when exposed in plan, and it followed an alignment very close to that of the postulated axis of Structure 1-2 (Figure 3.20). If the Structure 1-1 platform was square (rather than circular), its orientation would have been similar to that of the earlier Structure 1-2.

There were, nevertheless, two definite points of distinction between Structure 1-1 and Structure 1-2. First, the platform for Structure 1-1 was offset from the dismantled Structure 1-2. Indeed, parts of the latter structure not directly under the platform may have been dug up and used as fill. Although Zone II followed the alignment of the preexisting structure, it also only partly overlapped it, extending considerably to the northeast. Thus any continuities here were limited. Second, the platform of Structure 1-1 was of an unprecedented shape. Approximately as long as it was wide, it must have been either circular or close to square in plan; I have generally assumed it was circular (e.g., Lesure 2011a:Figure 6.4), but a square shape would fit the linear appearance of Zone II. Either way, the shape of the platform was a significant departure from the shape of Structure 1-2 and from previous large structures and associated platforms at the site, such as those at Mounds 6 and 32.

The only traces of platform-top features were identified in the northwestern part of the excavations. The remnants of seven post holes appeared just beneath the plow zone (Figure 3.20e). They were quite distinct when we cut through them in profile, but they were hard to follow and in just 10–15 cm or so deep. These could be related to Structure 1-1; however, they could also be more recent features. Scraping down the rest of the excavation at this level, and removing the plow zone in several more units to the northwest, failed to turn up any more post holes or other evidence of a structure. Apparently, almost all the structural evidence had been destroyed by modern plowing.

The Cherla occupation appears to have been the last at Mound 1. Unlike at Mounds 12 and 32 (Chapters 4 and 5), we did not find any scatter of Jocotal sherds in upper layers at the mound. Further, we did not find any evidence of domestic debris associated with the use of Structure 1-1, either in Trenches 1 through 3 or in the extensive exposure of the platform itself. Structure 1-1, unlike Structure 1-2 but similar to Structure 12-1 (Chapter 4), may have been public rather than residential in function (see Chapter 7).

The Platform Fill: Implications for Cherla-Phase Residential Organization

Artifacts from the fill of the Structure 1-1 platform provide a valuable window on social life in the Cherla phase, despite the fact that they are from a tertiary deposit, dug up from its original location and redeposited as platform fill. The deposit seems to derive from a high-status midden. There were high densities of obsidian flakes and personal ornaments, including clay ear ornaments, greenstone beads and pendants, and small iron ore mirrors. Also present were potential household ritual objects in ceramic, including fragments of cylinder seals, spatulas, and hollow figurines. Further, the deposit was homogeneous in terms of the distribution of high-status items: units with higher densities of earspools were not more likely to yield imported ornaments than units with fewer earspools, and so forth.

Those characteristics hold particularly for Zone IV, where the concentration of Cherla materials was high. Zone III, although more chronologically mixed and with fewer earspools, was nevertheless still about 60 percent Cherla. Frequencies of obsidian, greenstone, iron ore,

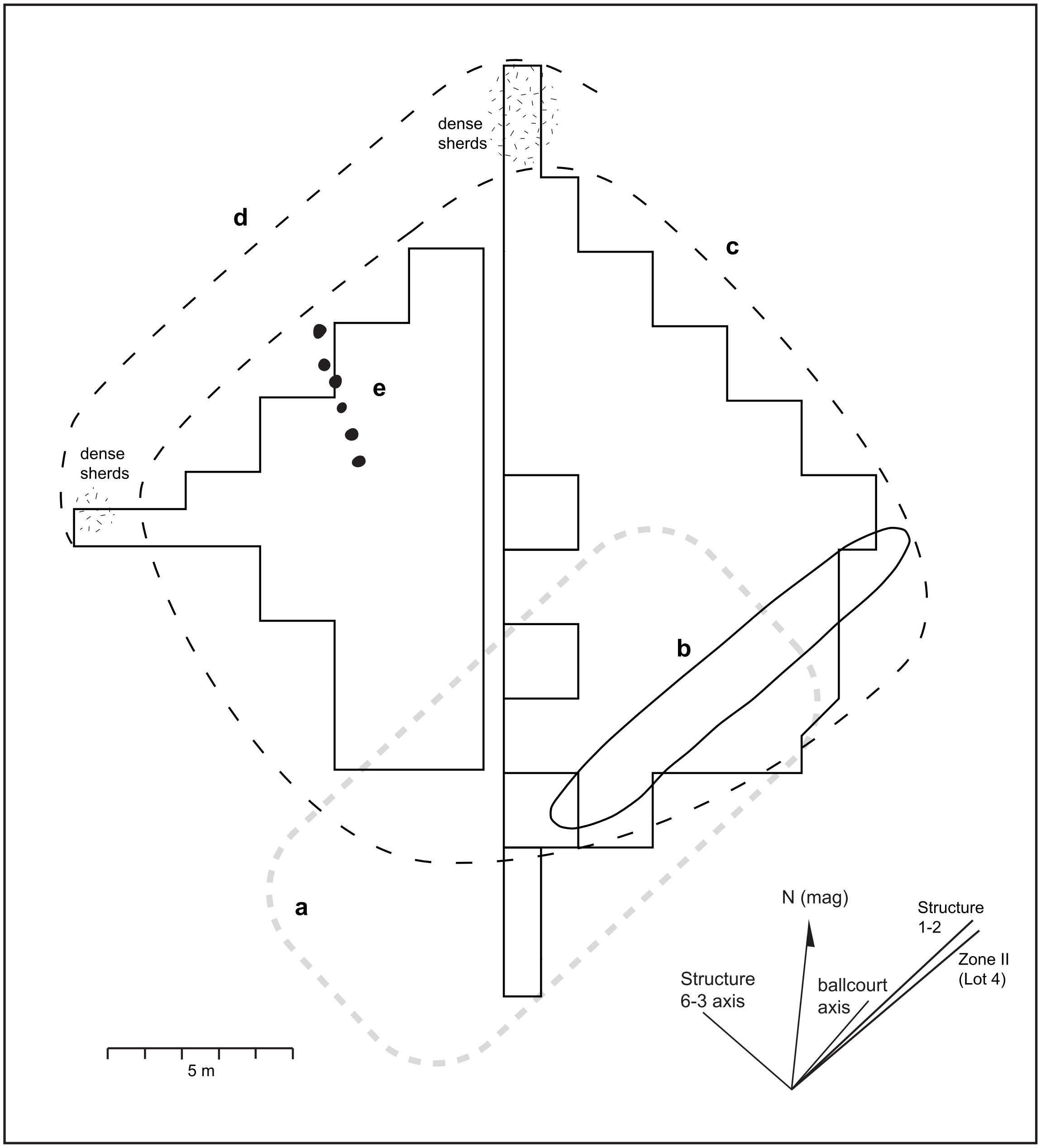


Figure 3.20. Plan of Structure 1-1: (a) location of Structure 1-2, dismantled prior to construction of platform; (b) plan of extent of Lot 4, part of the platform fill; (c) approximate boundaries of the Structure 1-1 platform; (d) possible later extension of platform; (e) possible post hole remnants discovered immediately below the plow zone.

spatulas, cylinder seals, and hollow figurines were comparable to those of Zone IV. Thus Zone III seems to have a substantial input from the same high-status Cherla-phase midden. If this reasoning is sound, then the source midden was quite large indeed.

What conclusions can be drawn concerning the people who generated the original midden? First, it seems likely that those people included the inhabitants of Structure 1-2. Supporting that is the similarity in cultural materials between the redeposited midden and Feature 4, the intact deposit of secondary refuse (with high frequencies of obsidian and ear ornaments). Further, according to the understanding developed above concerning the dismantling of Structure 1-2 and construction of the platform for Structure 1-1, the source material for the lowest layer of the platform (that is, the midden) was located immediately to the south and southeast of Structure 1-2—so close, in fact, that it becomes hard to envision circumstances in which the inhabitants of that structure would not be among the contributors.

Second, the inhabitants of this single structure are unlikely to have been the only contributors to the midden. We have the remains of a second building (Structure 1-3) also close to the midden. Based on the content and inferred original size of the midden, it is possible to estimate the number of people necessary to generate the required quantity of domestic garbage in which attributes associated with high status were homogenously distributed.

I previously used work in accumulations research (Varien and Mills 1997) to estimate the number of people necessary to generate the pottery accumulation at El Varal (Lesure 2009b:195–96). I adapt that same logic to the problem here, without repeating the full background of the argument. The equation for total population, based on an assumption of nuclear family households of four members, is

$$P = 4\,T_D L/tS_h$$

where P is the estimated population, T_D is the total number of artifacts discarded, L is the corresponding use life of the artifacts, t is the period of occupation, and S_h is the systemic number of artifacts. Varien and Mills (1997) compile comparative ethnographic information relevant to estimating L and S_h for ceramic vessels of different kinds.

A value of 50 years for t, the time elapsed during accumulation of the original Cherla midden, seems reasonable given that the Cherla phase lasted only 100 years, that we have subsequent platform construction still within the Cherla phase, and finally abandonment of the site itself by the end of the phase.

To estimate the number of broken pots in the midden, I used the estimate of 2.5 kg per pot derived in Chapter 2 (see Table 2.7). Considering only the original random sample of screened units and assuming that 75 percent of vessels in Zone IV and 60 percent in Zones I and III were Cherla, the estimated number of vessels is 576. Doubling that (because the original sample was 50 percent of the still-intact units) and correcting further (multiplying by 1.08 to account for the three pits excavated by Ceja) yields an estimate for P, the total number of broken vessels in the midden, of 1,245. This is a minimal estimate because we are assuming that the whole midden was incorporated into the platform.

Because of variation in L and S_h observed ethnographically among different vessel forms, I divided the estimated 1,245 vessels into tecomates and bowls, assuming 42 percent and 58 percent respectively based on the Cherla-phase assemblage from Paso de la Amada. Using median values for use life and systemic numbers from Varien and Mills (1997) for cooking pots and serving bowls, the calculations for tecomates and bowls yielded estimates of 34 to 44 people in the group that generated the elite Cherla midden. If systemic numbers of these vessels per nuclear family was closer to the 75 percent quartiles observed ethnographically—a possibility I consider likely—population estimates for the group would be 17 to 18 people, with ranges of 10 to 26 (based on tecomates) and 7 to 24 (based on bowls).

A group larger than a single nuclear family—probably 17 to 18 people and potentially 30 or more—contributed to the Cherla midden originally deposited in the vicinity of Structure 1-2 and later redeposited as platform fill for Structure 1-1. Since ritual and high-status items are homogeneously distributed in the fill, it seems reasonable to infer that the families involved shared high status and that they lived in the vicinity of Structure 1-2. I further propose that they formed a kin group residing in multiple adjacent dwellings and that Structure 1-2 served as the focal point of group activities, perhaps because it was the residence of the group leader. Obviously, all this is very much a hypothesis to be evaluated in future work at the site. For instance, ritualized, periodic destruction and replacement of household inventories would be inconsistent with the premises of the above calculations. I have assumed accidental breakage of the pots going into the original midden.

SUMMARY OF DEPOSITIONAL HISTORY AT MOUND 1

The first evidence of occupation of the low sandy elevation on which Mound 1 sits is Feature 10, a pit filled early in the Locona phase. Structure 1-5 may have been a small structure associated with this feature. Occupation of this area continued throughout the Locona phase with the deposition of two pits filled with Locona domestic refuse (Features 8 and 15), a hearth (Feature 16), and a small structure (Structure 1-4), the last a residence occupied into the Ocós phase. Upon abandonment, Structure 1-4 was terminated with some formalism. The post holes were filled with gray clay, and a deposit of gray clay was placed over part of the floor. There were likely more small structures in the area during the Ocós phase.

The next construction represented a significant departure from the preceding small-scale constructions. Structure 1-2 was built early in the Cherla phase. It had large, well-set posts and, around its perimeter, a deposit of clay, perhaps originally a wall or bench such as that observed in Structure 6-4 (see Figure 1.7b). Likely dimensions for Structure 1-2 are 7 x 14 m. Only a single small concentration of domestic trash (Feature 4) and the fragmentary remains of what was probably a smaller structure (Structure 1-3) were associated with Structure 1-2.

Structure 1-2 was dismantled during the Cherla phase. The posts were removed and several of the holes filled in the same sequence from two distinct sources of sediment, again suggesting a degree of formalism. However, most of the remains of Structure 1-2 were destroyed in the construction of a large earthen platform. The platform was offset from Structure 1-2, though a clay facing to the southeast (Zone II) followed the orientation of the earlier building. The platform originally stood at least 1 m and likely 1.5 m tall. It was either round or square, since its width is similar to its length (both around 20 m). The proposal here is that this was the basal platform for a large building. There is no evidence of domestic refuse associated with occupation of the platform-top building, though exposures off the platform were limited. The mound was abandoned by the end of the Cherla phase and never reoccupied.

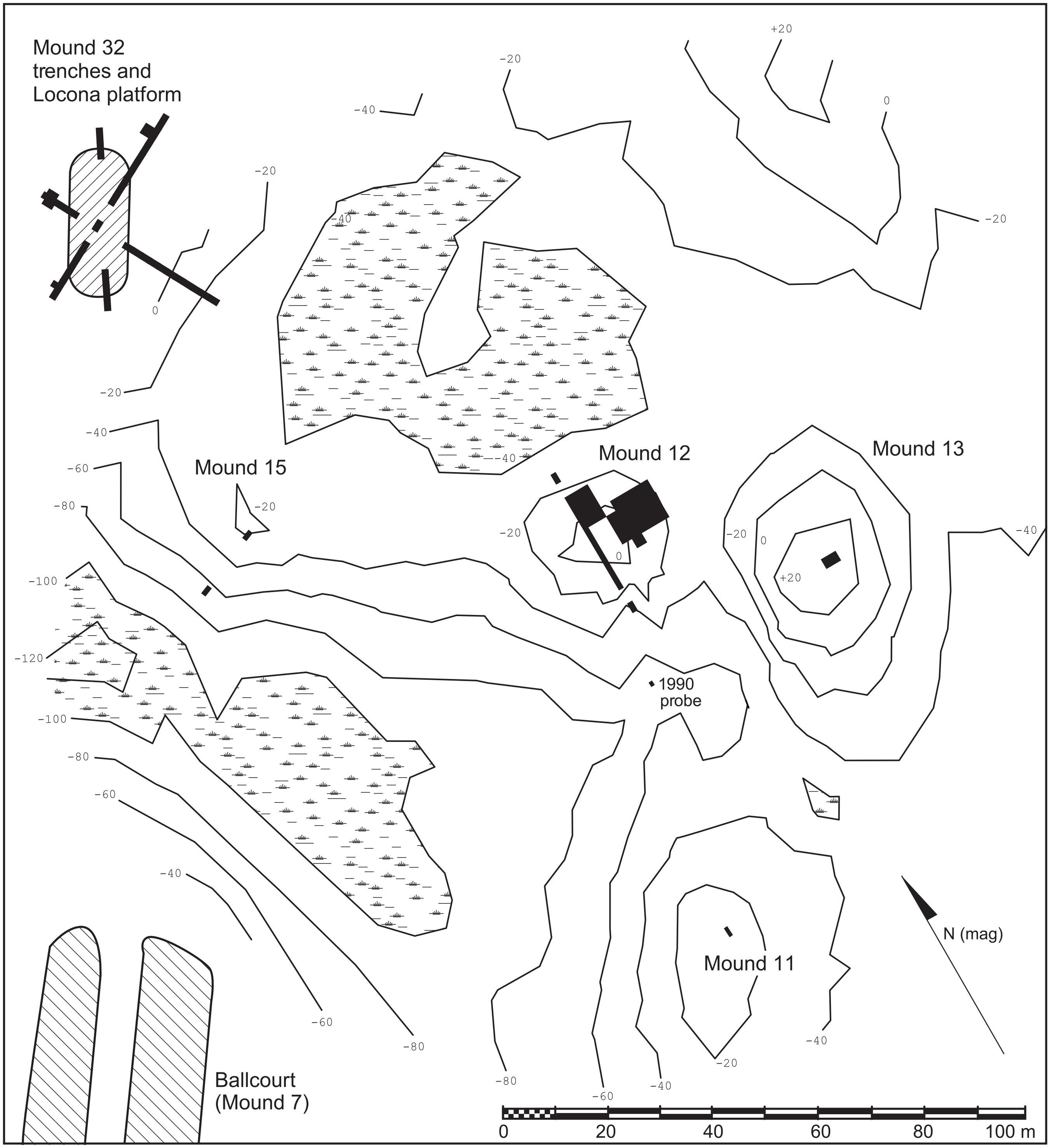


Figure 4.1. Mound 12 and vicinity, showing locations of excavations in Mounds 11, 12, 13, 15, and 32. Also shown are approximate locations of the Locona platform at Mound 32 and, in the lower left corner, part of the ballcourt. Contour interval 20 cm. *Topographic base map by Ronald Lowe. Figure constructed by R. Lesure and project staff.*

CHAPTER 4

Mound 12

Richard G. Lesure

MOUND 12, LOCATED approximately 250 m north of Mound 6, was identifiable in 1992 as a low, oval-shaped rise, 0.5 to 0.6 m high. It measured 20 to 22 m wide north–south and 26 to 28 m east–west. Excavations in Mound 12 were conducted during three seasons, in 1990, 1992, and 1993. In 1990 I excavated a single 1 x 2 m sounding (Test Pit 1) in the summit of the mound, revealing 2.4 m of cultural deposits. Finds included a buried organic layer with Ocós and Cherla sherds and, under this, a series of hardened sandy layers that we thought might be floors of low status residences of the Locona phase (Clark et al. 1990:86–88).

The goal in 1992 was to excavate one or more of those residences. Mound 12 was the last of the excavations I conducted that year. A strategy of investigation was developed in response to my experience at Mound 1, where the expenditure of resources seemed to outweigh the payback in architectural remains (Chapter 3). At Mound 12, excavations began with a trench and further test units, followed by a limited extensive excavation in 1992 and a larger one in 1993. In all, 132 m^2 were exposed by the end of the 1993 season.

Finds include Locona occupation surfaces with a palimpsest of post holes, extensive late Locona and Ocós middens, several burials, and a large Cherla-phase platform similar in scale to that recovered at Mound 1.

THE SETTING OF THE MOUND

Mound 12 is on a gentle elevation in the central zone of the site (Figure 4.1). About 30 m away is Mound 13, sampled with two small test units; 60 m in the other direction is Mound 15, also sampled with two units. Mounds 12 and 15 are bordered both to the northeast and southwest by lower-lying areas that were probably once flooded in the wet season. The bajo to the southwest is a remnant oxbow that curves around the northern edge of the ballcourt Mound 7. To the south across this bajo from Mound 12 is Mound 11, also tested in 1990.

In a pattern similar to that observed in the test excavations to the south of Mound 1 (Figure 3.1), surface contours in this area during the second millennium BC were more dramatic than the gentle differences in elevation of today. In 1990, while the initial test excavations were in progress, I excavated a small, unscreened probe just to the south of Mound 12, in the direction of Mound 11 (Figure 4.1). We stopped excavations at 1.1 m below the ground surface, still in a relatively recent deposit of dark gray clay. The results of this test unit suggest that the bajo between Mound 12 and Mound 7 was deeper than it is now and that occupation in the area of Mounds 12 and 13 was on a natural elevation, probably ancient overbank deposits of the Coatán River.

A final point is the evident complexity of the pre-occupation through Locona-phase deposits in this area. Mounds 12 and 13 are not far apart, but the predominant underlying natural substratum was different in the two cases: a fine yellow-brown sand at Mound 13 and a medium-to-coarse gray sand (loose and unconsolidated in the manner of beach sand) at Mound 12. It is worth recalling that, at Mound 1, a coarse gray sand (similar to that at Mound 12) appeared under a fine yellow-brown sand (similar to that at Mound 13). Unfortunately, we never found time to excavate deep enough in the sterile substratum of Mound

13 to see if a similar sequence was present there. However, in Unit K7 of the 1993 extensive excavations in Mound 12, we ended excavations in a sterile, fine, yellowish-brown sand under a thin layer of medium gray sand. The fine sand in that unit was more consolidated than the gray sand; it appears to have been the earlier of two natural depositional units at Mound 12.

EXCAVATION PROCEDURES

The 1990 excavations were conducted over three days at the end of March, the 1992 excavations during six weeks in November and December, and the 1993 excavations during eight weeks from February to early April, in each case with workmen from the *ejido* of Buenos Aires. Two methods were followed, one for the stratigraphic investigations of Trench 1 and Test Pits 1 to 5, the other for the areally extensive excavations (see Chapter 2). Stratigraphic investigations were small test units (1 x 2 m) or trenches (in sections of 1 x 3 m) excavated in arbitrary 20 cm levels. Extensive excavations followed a grid of 2 x 2 m units (Figure 4.2). During the 1992 season we excavated Units E2 through E4 and F2 through F4; in addition, we excavated the southern half of Units E1 and F1. In the 1993 season, the units excavated were G5 through G7, H4 through H8, I4 through I7, J4 through J7, and K4 through K7.

The extensive excavations proceeded by natural stratigraphic units. Excessively thick natural units were sometimes subdivided arbitrarily for more refined stratigraphic control. Units thus defined stratigraphically and/or arbitrarily were referred to as lots and each was given a unique number. During the 1992 season, Lots 1 through 24 were assigned; in the 1993 season we used lot numbers 25 through 52. Since extensive stratigraphic samples had already been obtained in the test units and trenches, not all lots of the extensive excavations were screened. Unscreened units included all those that had been stratigraphically determined to be part of episodes of platform construction. All culturally significant lots, including occupation surfaces, floors, post holes, features, and midden deposits, were screened through a 5 mm mesh. Soil samples were taken from features and midden deposits for flotation, and one floor, Floor 2, was sampled in 50 cm square units for recovery of micro-artifacts. In this last procedure, the methods employed were the same as those followed in the sampling of Floors 4 and 5 in Mound 6.

THE STRATIGRAPHY OF MOUND 12

In the stratigraphic profiles, seven basic zones (I–VII) were identified. There was significant variability between excavation units, particularly in Zone V, a complexly stratified series of deposits that nevertheless exhibited a consistent general character. To summarize the stratigraphy briefly, Zone I was the plow zone; Zones II and III derive from an artificial platform constructed in the Cherla phase; Zone IV is the pre-platform ground surface of the Ocós and initial Cherla phases; Zone V is the sandy, complexly stratified deposit of cultural features and occupational accumulation from the Locona to Cherla phases; Zone VI is the sterile substratum of unconsolidated, medium-to-coarse gray sand found in most excavation units; and Zone VII is the substratum of fine yellowish-brown sand that we reached only in Unit K7 (though it probably occurred also in K6 and J7).

The stratigraphic investigations of Mound 12 included Test Pit 1 (1990), Test Pits 2 through 4 (1992), Trench 1 sections A to F (1992), and Test Pit 5 (1993). The layout of these cuts and of the extensively excavated areas is shown in Figure 4.2.

In Trench 1 and Test Pit 1, a 20 m north–south stratigraphic profile of the mound was exposed (Figure 4.3). The trench was excavated in six sections, each 3 m long and 1 m wide, with three sections (TlA, TIB, TlC) to the north of Test Pit 1 and three sections (TlD, TlE, TlF) to the south. Sections TlA through TlD were excavated to sterile sand. Excavations in Section T1E were halted when, still in a late Locona midden deposit (Feature 11), we encountered the water table at a depth below surface of 4 m. Section TIF promised to go as deep as T1E, but time restraints forced us to halt the excavations after only eight levels. The stratigraphic coverage of Trench 1 was extended by two off-mound excavations, Test Pits 2 and 5. We excavated both to sterile sand, seven levels in Pit 2 and 13 levels in Pit 5. The resulting profile, 30 m long, reveals a complex depositional history.

The Platform (Zones II and III) and Pre-Platform Ground Surface (Zone IV)

The upper 80 cm or so of deposit within Mound 12 result from a single depositional event, the construction of a large earthen platform (Zones II and III). The platform fill was a brown fine sandy silt with abundant cultural material. The color and texture were fairly homogeneous from the top to the bottom; the differentiation of Zone III from Zone II may have been the result of post-depositional processes. There is no evidence of basket-loads of different sediments as observed in Mounds 6 and 32, or even the layered appearance of Zone IV at Mound 1. Nevertheless, several lines of evidence suggest that this homogeneous deposit was the result of a single depositional episode, the construction of an earthen platform.

First, there is the complete lack of cultural features within this deposit. We excavated 128 m^2 of this layer to its full depth of approximately 80 cm. During excavation of the deposit, no features such as floors, post holes, hearths, trash pits, or burials were identified. Further, careful recording of 95 m of excavation profiles in the deposit did not reveal any features missed during excavation. In contrast, numerous features appeared below Zone III, and several were also identified at the top of Zone II, immediately

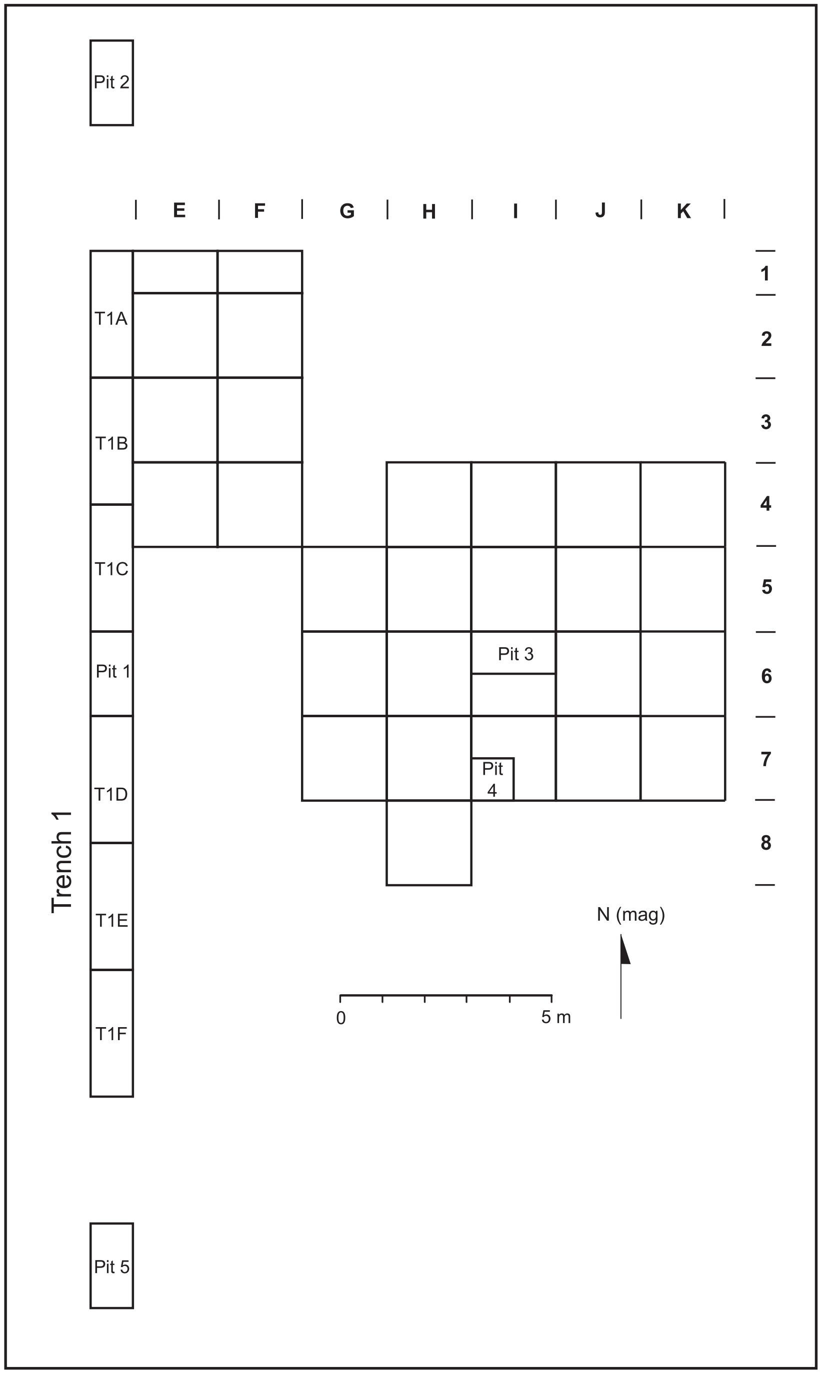


Figure 4.2. Units excavated at Mound 12. Pit 1 was excavated in 1990. Pits 2 through 5 were excavated in 1992, along with Trench 1 (in six lettered sections) and grid units beginning with E through F. Grid units beginning with G through K were excavated in 1993. *This and the remaining illustrations in this chapter by R. Lesure and project staff.*

beneath the plow zone. (These last features are described in discussion of the platform itself, toward the end of this chapter.)

Second, the cultural material recovered from the deposit includes a mixture of Locona, Ocós, and some Cherla ceramics. There is no internal cultural stratigraphy; rather, Locona, Ocós, and Cherla are mixed in all excavated levels.

Finally, the interpretation of Zones II–III as a platform is supported by the nature of the interface with Zone IV in Trench 1 and by the stratigraphy of off-mound Test Pits 2 and 5. Zone IV was a grayish layer with a sharp, clearly

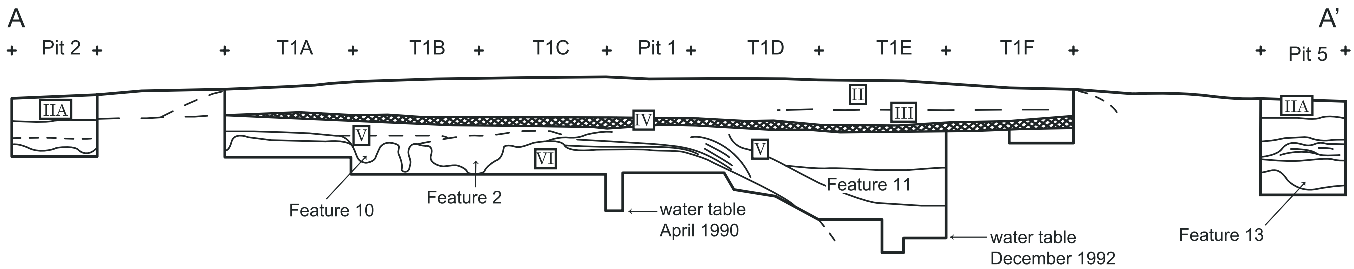


Figure 4.3. Profile across Mound 12: east walls of Trench 1 and Test Pits 1, 2, and 5. Roman numerals designate stratigraphic zones described in the text.

defined upper boundary and a diffuse lower boundary. It was identifiable throughout our excavations at Mound 12. Several Ocós-phase features were identified in the excavation of this layer, mainly in the 1993 extensive excavations. The characteristics of the layer are those we would expect of a ground surface that had been stable sufficiently long to develop a high organic content before construction of the platform, which preserved its upper surface. This same surface can be traced in Test Pits 2 and 5, where it is less sharply defined and damaged by rodent activity. In those two test pits, the layer below the plow zone and above Zone IV is darker and has a higher clay content than Zone II in the mound itself. I refer to it as Zone IIA. Cultural materials include eroded Initial and Early Formative sherds. Particularly important is the presence of Jocotal-phase sherds (1200–1000 BC), which post-date the Cherla occupation (1400–1300 BC) and are not present in the mound itself. Zone IIA appears to derive from slope wash off the surface of the platform, beginning in the Cherla phase and continuing to this day.

Zone III was identifiable beneath Zone II in parts of the excavations, mainly those units in which a deep pit, Feature 11, underlay Zone IV (see Figure 4.3). Zone III was somewhat lighter in color than Zone II: 10YR5/3 as opposed to 10YR3/3 to 4/3 for Zone II. Also, Zone III had a speckled appearance as a result of numerous tiny yellow mineral concretions. Its upper boundary with Zone II was diffuse. I believe that the distinction between the zones is the result of post-depositional processes, specifically the gradual migration of minerals through soil formation. My suggestion is that the clayey upper layers of Feature 11 retained moisture and created conditions that affected the lower part of what was originally a homogenous Zone II immediately above.

The Complex Cultural Deposits of Zone V

Within the mound itself—that is, in all units except Test Pits 2 and 5—the pre-platform ground surface, Zone IV, had a distinct upper boundary. It was somewhat clayey and its grayish color indicated a relatively high organic content. The color varied in different units (10YR3/2 to 3/3 ranging to 10YR4/3 to 5/3). The darkest colors, and apparently the highest organic content, were observed in the trench sections T1D, T1E, and T1F, above Feature 11, the deep pit. Just before construction of the platform, a slight depression of 15–20 cm marked the former location of this feature; it probably remained muddy after rainstorms and hosted abundant vegetation.

Zone IV was 15 to 40 cm thick. As we descended through it, this layer became lighter in color and sandier. The interface with the underlying Zone V was difficult to identify in some units and in others more readily delineated. Zone IV probably accumulated gradually, perhaps in some cases by episodes of deposition of fill in relatively small quantities. The surface of this zone was stable by the Ocós phase, allowing the beginnings of soil formation.

Zone V is the general term that will be used to designate the complex and varied cultural strata underlying Zone IV and overlying the sterile substratum of pure sand (Zone VI). The zone itself consists of numerous lenses and layers that share little beyond a generally high sand content and a similar derivation as the result of human activities.

Variation in Zone V in different parts of the excavations is indicated in Figure 4.4. In the areas excavated, two places seem to have been stable, slightly elevated surfaces already during the Locona phase. These are at the edges of the mound itself. One area of relatively higher ground was in T1A and the northernmost units of the 1992 extensive excavations, particularly E1–2 and F1–2. The other was at the southeastern corner of the 1993 extensive excavation, especially Units J7, K7, and K6. In these two areas, absent any Locona-Ocós feature, Zone V was about 60 cm thick. In a situation similar to that at Mound 1, the mound visible today derives from a Cherla-phase construction that obscures any remaining surface trace of the topography in this area during the Locona phase.

Zone V deposits extended particularly deep in four areas. First, penetrating the relatively high ground in the 1992 excavation block were two roughly parallel ditches or linear pits, Features 2 and 10 (Figure 4.4). These had filled with sand, silt, and lenses of abundant cultural material (Figure 4.5). There were some patchy cemented surfaces in this area as well, but nothing as well preserved as those in the 1993 excavations. The ditches date to Late Locona; by the Ocós phase, they had been filled in and this area had become an extensive toss midden.

Second, there was the deep pit, Feature 11 (Figures 4.4 and 4.6). This appears to have been an artificial feature dug in the later Locona phase. It filled gradually through the dumping of cultural materials and the in-wash of artifacts and sediment. The fill exhibits a stratigraphic sequence from Late Locona to Ocós to transitional Ocós-Cherla. The pit itself descended more than 3 m down from the surrounding Late Locona ground surface, very likely to below the water table of that era. The fill of Feature 11 is considered part of Zone V.

A third area is that of the superimposed, cemented surfaces of the Locona phase, first revealed by Test Pit 3 (Figure 4.7) and the focus of the 1993 extensive excavations (see Figure 4.4). The stratigraphy of Zone V in this area consisted of thin lenses alternating between sandy silt and pure sand, with some of the former cemented to form surfaces. The cause of the cementation is unknown. Drops of full-strength hydrochloric acid, applied to a sample from the 1993 excavations (Floor 10), failed to generate any particular reaction, thus ruling out calcium carbonate as the agent of cementation. In Test Pit 3, several post holes were identified in the cemented surfaces. (Two appear in profile in Figure 4.7.) It was that observation, plus the determination, in Test Pit 4, that these cemented surfaces continued some distance from Pit 3, that prompted selection of Units G4–G7 through K4–K7 for extensive excavation in 1993. The hope was to find a series of lower-status residences. The results, as was usually the case in the excavations reported here, were rather different than expected.

The fourth area of relatively thick Zone V deposits complicates understandings of the Locona occupation in this area. Around the sides of Element 11, in T1D and in Test Pit 1, Test Pit 5, and the 1993 excavation block itself, there are laminated, water-lain deposits that contain a clear Locona assemblage (not Late Locona). Close consideration of the stratigraphy indicates that these could not have been deposited as part of the fill of Feature 11. If that had been the case, they would have been deposited at a time when Feature 11 was nearly full, and thus their contents should be Ocós rather than Locona. It appears there was a *previous* significant depression in the general location of Feature 11 during the earlier Locona phase. That depression filled up with sandy, water-lain deposits. When the inhabitants dug Feature 11, they placed their pit in the area of this previous depression. The inclination of the Locona surfaces toward the west is observable in retrospect in Test Pit 3 (Figure 4.7). It shows up more clearly on the reconstructed profile in Figure 4.8, which angles through the excavations of the 1992 and 1993 seasons (C to C' in Figure 4.4). One possibility is that Feature 11 was dug twice, first in the earlier Locona phase and again later in the same phase, after the earlier pit had filled with sediment. An alternative is that this area may have been a natural drainage early in the occupation.

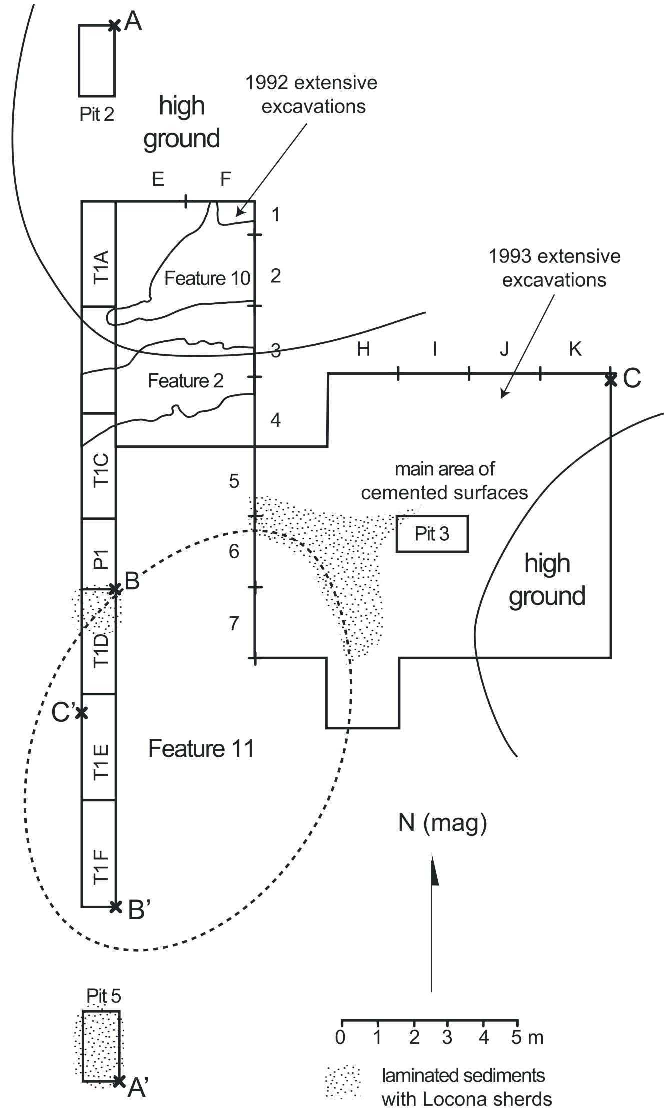


Figure 4.4. Plan of the Mound 12 excavation showing general spatial divisions discussed in the text. Also indicated are the end points of profile drawings presented in this chapter: for A–A', see Figure 4.3; for B–B', Figure 4.6; for C–C', Figure 4.8.

OVERVIEW OF THE FEATURES

Most of the features at Mound 12 appeared in Zones IV and V. The earliest human activities in this area, in the Barra and Locona phases, took place on an unstable ground surface of unconsolidated sand. In the rainy season, wa-

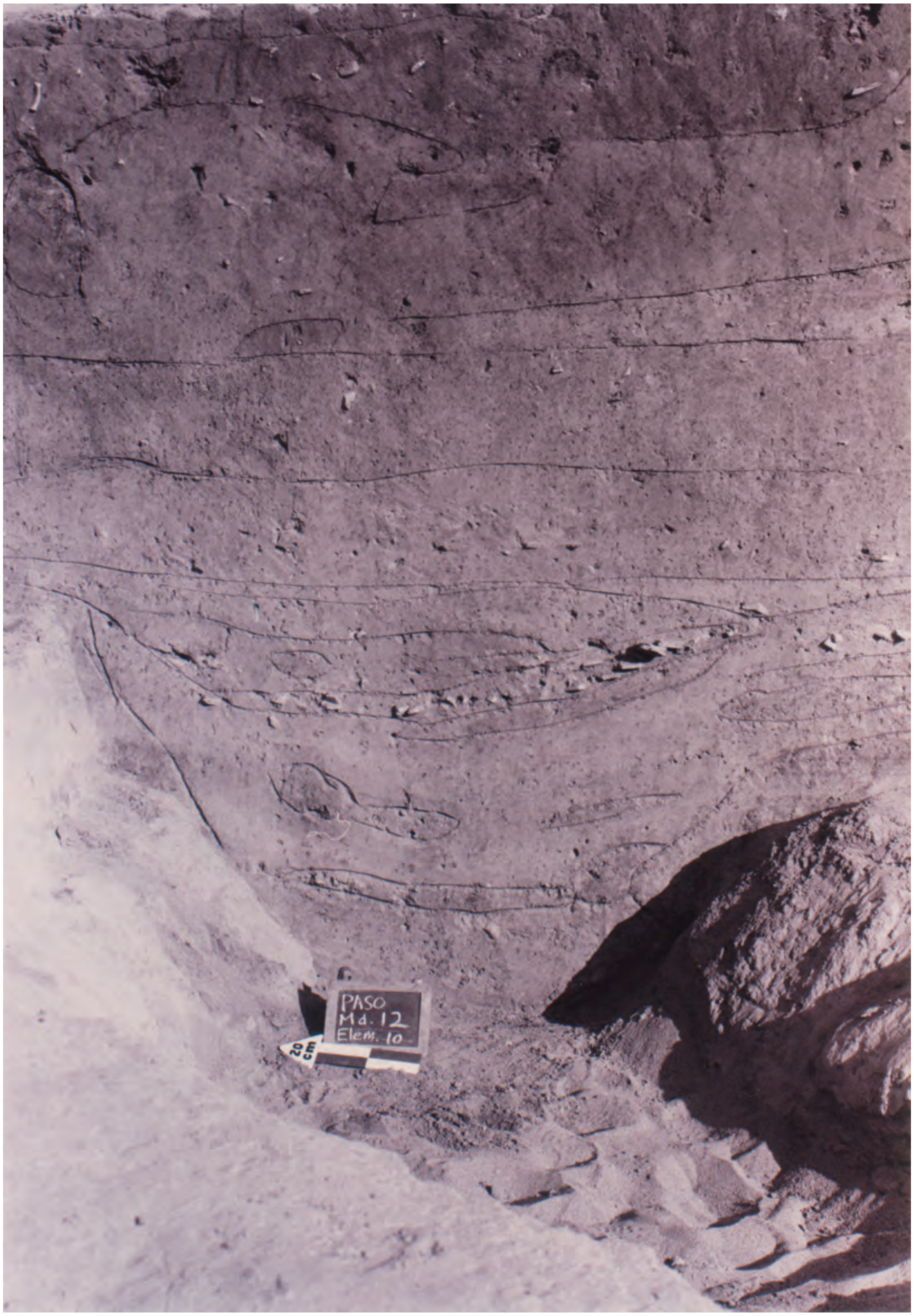


Figure 4.5. East profile of Units F1 and F2, with the plow zone at the very top and Feature 10 at the bottom. Note the variation in the lenses of fill in the feature, from dense concentrations of domestic refuse to in-washed sand and silt with little cultural material. Also of interest is the trampled sand of Zone VI in front of the profile. The zone was composed of loose, unconsolidated sand like that of an ocean beach. For a drawing of the profile shown here, see the left side of Figure 4.18.

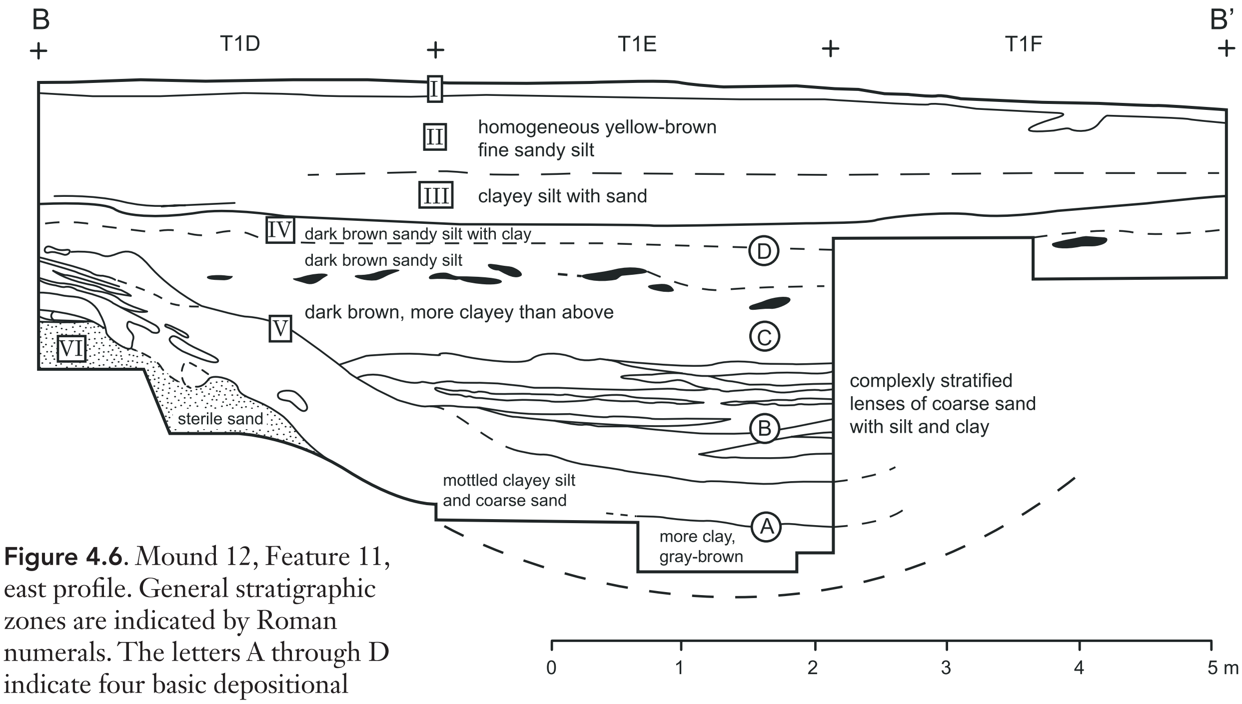


Figure 4.6. Mound 12, Feature 11, east profile. General stratigraphic zones are indicated by Roman numerals. The letters A through D indicate four basic depositional units within the pit.

ter drained through the main excavation block toward the southwest. This would seem to be an unlikely location for habitation, yet in the Locona phase we have a series of well-defined, cemented surfaces with numerous small, round pit features, many of which appear to have been post holes. The uppermost surfaces are late Locona in date, and they were associated with a variety of pit features filled with domestic refuse. Much of the excavated area became a midden in the Ocós phase, though there was also a cluster of burials. Features above Zone IV include the Structure 12-1 platform, dating to the Cherla phase, and several small features identified immediately below the plow zone.

BARRA OCCUPATION

Aside from occasional sherds carried up into later levels, the only evidence for a late Barra/early Locona occupation in the area of Mound 12 comes from Feature 13 in Test Pit 5, a pit dug into sterile sand and filled with clay and some domestic refuse. Levels 11, 12, and 13 of this unit correspond to Feature 13.

LOCONA OCCUPATION

Most of the 1993 season was spent excavating 11 patchy surfaces and the features associated with them. The surfaces, which dated to the Locona phase, were yellowish in color and hardened to a cement-like consistency, apparently through the deposition of minerals during occupation, since the small features (mainly post holes) that penetrated the surfaces were not hardened. In a small test pit in Mound 11, just to the south of Mound 12, similar hardened surfaces were encountered. Otherwise, this kind of cementation is rare at the site. It was not observed in excavations at Mounds 1, 6, 10, 13, 21, or 32. In describing the surfaces, I maintain our field designation of them as "floors" even though most seem to have been exterior living surfaces rather than floors of buildings.

In all the floors and fragments of floors encountered we identified small features, generally circular in plan and of varying depth. Some had flat bases, others rounded bases. Many were probably post holes, but some continued only a few centimeters below the floor surface on which they were discovered. In the following discussion, I use the term *post hole* when referring to instances interpreted as such. We excavated each new floor feature and screened the material in it before excavating the associated floor. Some floor features were difficult to follow because the fill in them was similar in color and texture to the matrix into which they had been dug. Often, however, post holes or other small features cut through or terminated on a previous floor, so an approximate depth could be determined. In no case did post holes clearly indicate the floor plan of a Locona residence. In the case of Floors 1 and 2, we may have caught one wall line of a structure that extended to the southeast of our excavations. If this is true, then the excavated surfaces we have were actually exterior patio areas rather than house floors; the interiors of all these structures would have been in Unit K7, where no surfaces were preserved. We did not test that interpretation by extending the excavation to the southeast. Any extension would have

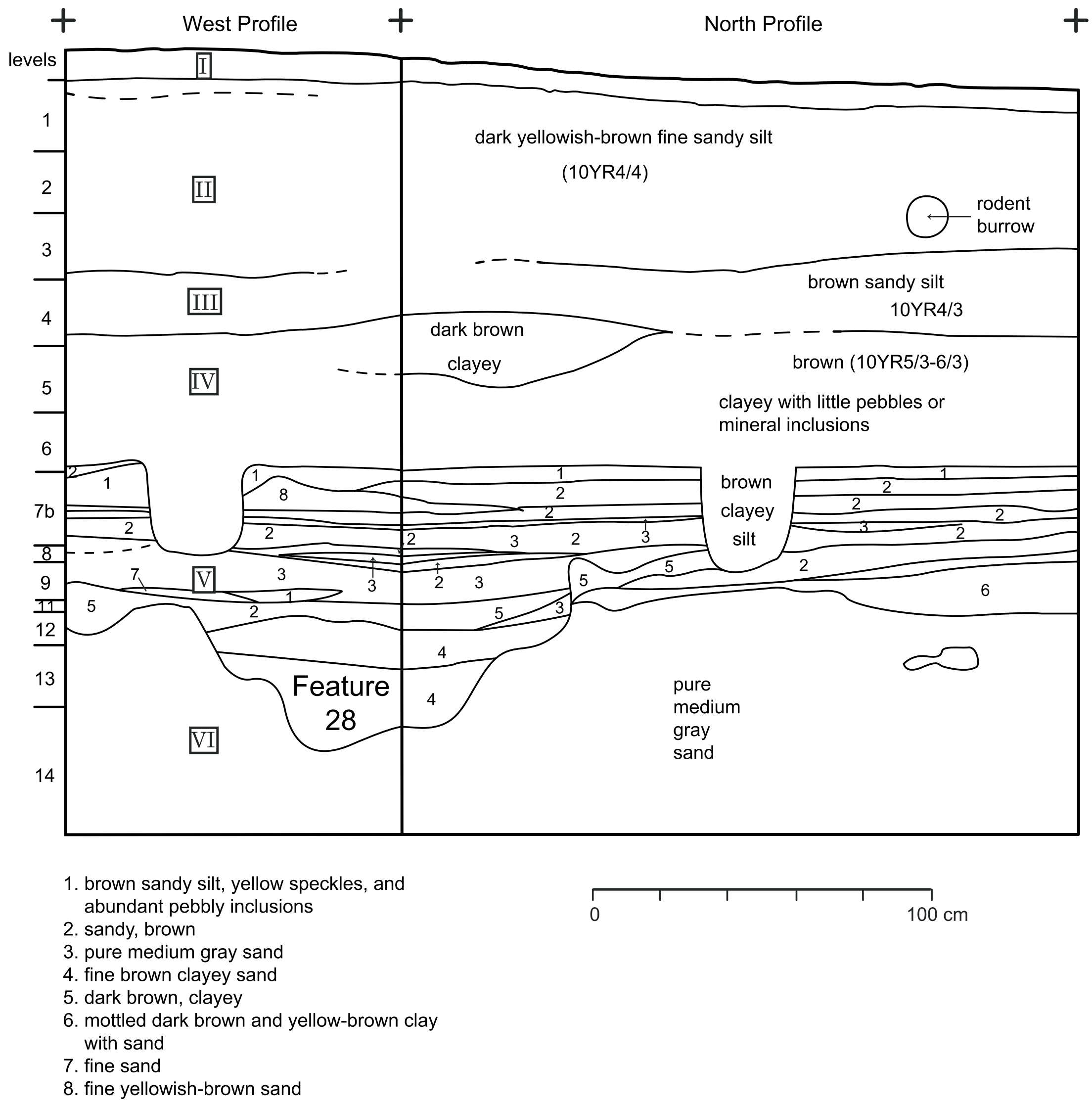


Figure 4.7. West and north profiles of Mound 12, Test Pit 3, which penetrated the cemented Locona occupation surfaces. The zones come out clearly in this drawing: Zone I was the plow zone; Zones II and III were platform fill; the top of Zone IV was the pre-platform occupation surface, and the zone itself consisted of occupational accumulation mainly during the Ocós phase; Zone V, sandy and complexly stratified, was in this area mainly Locona. Zone VI is the sterile substratum of pure sand. Note the two post holes, one in the west and one in the north profile. The fills of the post holes were identical in color and texture to Zone IV. These particular post holes likely penetrated Zone V from a surface within Zone IV that was not identified. Also to be noted is the ditch, Feature 28, which is discussed in the text under the Locona occupation.

been outside the protective cover of the Cherla-phase platform, where it is unlikely that any identifiable traces of Locona structures remain.

Floors 10 and 11 and Feature 28

Floors 10 and 11 are the earliest hardened surfaces located in the Mound 12 excavations. They were apparently contemporaneous surfaces separated by a shallow ditch (Feature 28), which, like both floors, sloped off to the southwest (Figures 4.9 and 4.10). The ditch was a drainage channel directing runoff either into an early version of Feature 11 or into the bajo to the southwest of the mound. The scatter of post holes found on Floors 10 and 11 is not readily interpretable; both surfaces may represent exterior activity areas, perhaps for a structure to the southeast of the excavations.

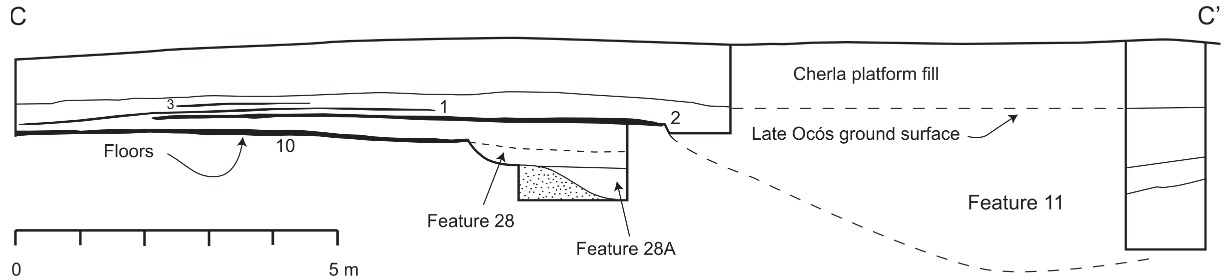


Figure 4.8. Schematic profile running diagonally across the 1993 extensive excavation at Mound 12 to Unit T1E of Trench 1, reconstructed in large part from plan drawings of the cemented surfaces. Note the inclination of Floor 2 toward Feature 11 and the even more pronounced slant of Floor 10 in the same direction. The drainage ditches, Features 28 and 28A, were filled with laminated, water-deposited sediments bearing Locona sherds, among which diagnostic Late Locona attributes were entirely absent. These observations support the suggestion that Feature 11 penetrated an earlier drainage channel or pit that had filled up with water-lain sediments.

Floors 10 and 11 were left intact at the end of the season, but we excavated three units down to sterile sand: Unit H6, Unit K7, and Test Pit 3. (In H6, Lots 48 and 49 yielded small sherd samples from Floors 10 and 11, respectively.) With these units, we determined that Floors 10 and 11 were, in fact, the earliest hardened surfaces in this area. In addition, the deep test in Unit H6 helped define some of the complexity of these early deposits (Figure 4.9, inset). The profiles of this test suggest that Floor 11 was a lateral extension of the Floor 10 living surface after this had been occupied for some time. An earlier ditch in the general location of Feature 28 began in H6 and fell steeply off to the west. Locona-phase trash removed from this early ditch (Feature 28a) as Lots 50, 51, and 52 was sealed beneath Floor 11. Clark inspected the obsidian from these lots and found macroscopically visible tumbling damage, suggesting that the artifacts in Feature 28a were moved by water (Clark personal communication, 1993). The laminated nature of the deposit is consistent with that conclusion.

Floors 8 and 9 and Feature 29

Overlying Floor 10 was Floor 8, another hardened surface with only a few scattered post holes, excavated as Lot 46 (Figure 4.11). Again, this was probably an activity area for a residence or residences located in the southeast corner of the excavations (Unit K7, where no trace of structure was preserved) or just outside our excavation limits. One reason for that suggestion is that that Floor 8 slopes down from Unit K7 to both the north and west.

The whole area to the west of Floor 8, corresponding to units H5–H7 and I5–I6, consisted of soft, laminated silts and sands. This deposit followed the edge of Floor 8 to the northeast corner of the excavations, in Unit K4. It overlay the earlier drainage ditch, Feature 28, and derives from continued water-lain deposition. If the drainage was into a pit, then that was substantially full by this time. In Units H4 and H14, these soft, laminated deposits bordered and eventually covered a fragmentary surface of hardened silt, Floor 9. Floor 9 was associated with two organic stains that extended into the laminated deposits (Feature 29) but that contained few artifacts; this fragmentary floor was approximately contemporaneous with Floor 8. Floor 8, which sloped sharply up from the laminated deposits, was occupied for some time while sediment slowly accumulated to the west through rainy-season water transport. Floor 9, on the other hand, was an activity area used only briefly before being covered by water-borne sediments.

Floor 2

Floor 2 was the most elaborately investigated of the surfaces at Mound 12 (Figures 4.12–4.14). It was excavated as Lot 37. Like Floors 10 and 8, Floor 2 dated to the Locona phase. It overlay Floor 8 and was prepared by the deposition of 2 to 20 cm of fill over much of the area of our excavation. This action leveled out the surface considerably, though not completely; Floor 2 still sloped gently to the west.

Several features of Floor 2 are consistent with the idea that the fill used to prepare this floor came from the excavation of the deep pit just to the west, Feature 11. First, materials from the lowest levels of Trench 1E (the deepest we dug into Feature 11 without reaching the bottom) are Late Locona. They therefore probably post-date Floor 2, but not by much: Floor 1, which directly overlay part of Floor 2, appears to have been Late Locona. Second, despite the fact that the western part of Floor 2 overlay a long series of water-lain deposits, there was no such deposition on top of Floor 2. A newly excavated 3 m deep pit just to

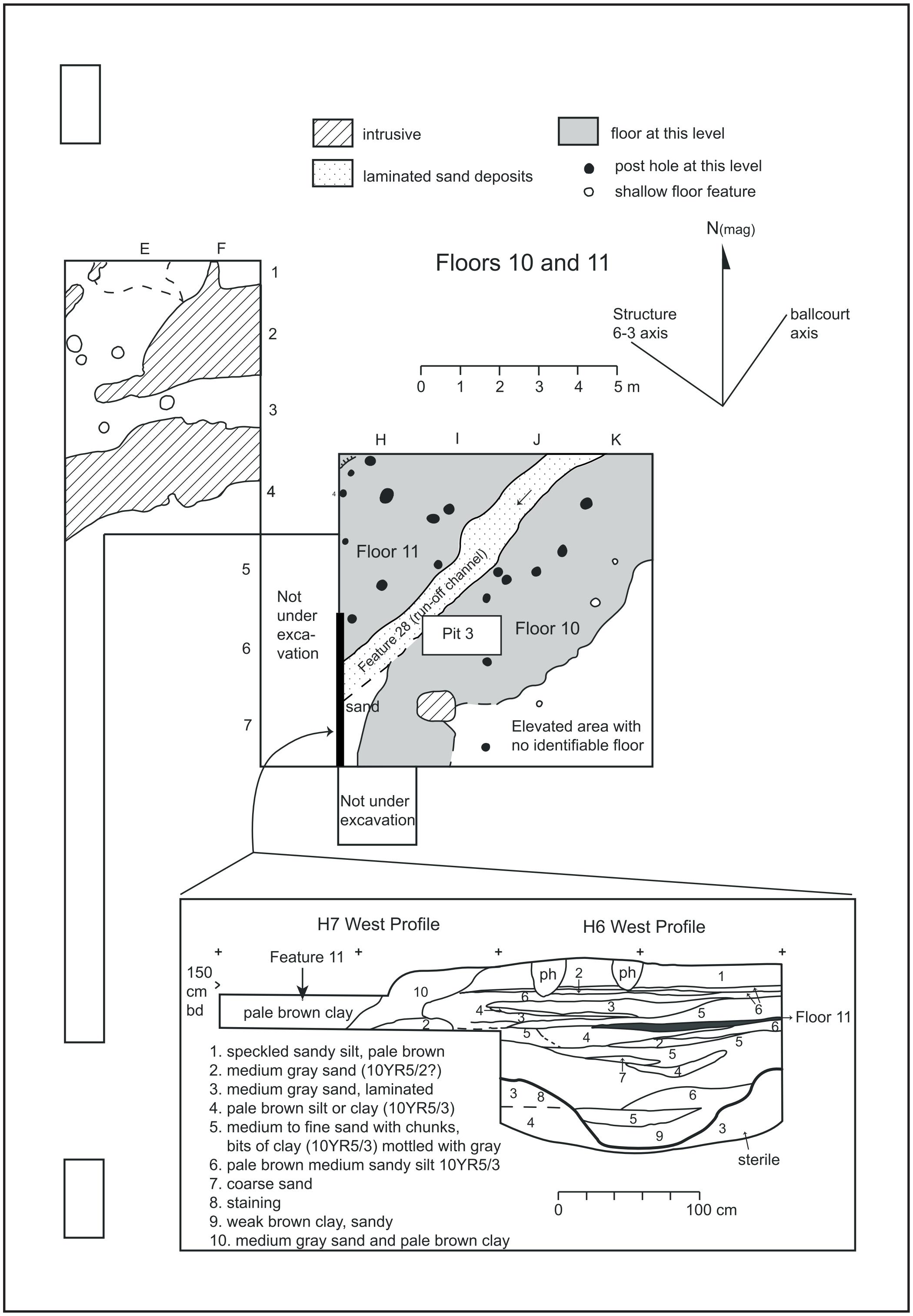


Figure 4.9. Plan of Floors 10 and 11 at Mound 12, with inset profile showing stratigraphy of Feature 28/28A ditches.

Figure 4.10. Removal of Floor 8 at Mound 12 to expose Floor 10. Floor 11 already exposed in left foreground.

the west of Floor 2 would certainly have ended the likelihood of water-lain deposition on the surface. Third, the gentle westward tilt of the floor is consistent with the idea that drainage was intended to be in the direction of Feature 11. Certainly the fill for Floor 2 had to come from somewhere; the excavation of Feature 11 would have afforded an ideal opportunity to resurface a nearby living area, and the preparation of Floor 2 was the most significant pre-Cherla filling event at Mound 12. (The Cherla-phase platform was vastly more ambitious.)

The focus of our investigation of Locona floors in Mound 12 became Floor 2 when we discovered that this was one of the better preserved floors, with a post hole concentration marking the possible location of a small structure in the center of our excavation (Figure 4.12). However, in retrospect there are several reasons to be uneasy with the interpretation of the dense cluster of post holes in Figure 4.12 as the remains of a structure associated with Floor 2. At the time of excavation of the floor, I considered Feature 11 to be intrusive into this layer. If, as I now suspect, Feature 11 was dug from the Floor 2 surface, this would seem an awkward place for a house: surely the inhabitants would have had to worry about, for instance, small children tumbling into the adjacent, 3 m deep pit? Another point is that the high concentration of post holes on Floor 2 appears only in the area in which Floor 2 was the uppermost preserved surface. There were far fewer post holes in the areas of Floor 2 that underlay Floor 1. Indeed, the frequency of post holes in that protected part of Floor 2—post holes originating from Floor 2, not descending from above, of course—was similar to the frequencies we have seen on Floors 8/9 and 10/11. It seems likely, then, that the dense concentration on the unprotected part of Floor 2 was a palimpsest and that the surfaces of origin of many of the post holes may have been above Floor 2. Those surfaces were not identifiable during excavation. We will see a similar pattern of densely concentrated post holes on Floor 1.

I have become somewhat skeptical about the possibility of identifying structures on these cemented surfaces. However, there are two positive points to be made. First, there were several cemented surfaces discovered in the 1992 extensive excavations and in Unit T1A of the trench. The uppermost surfaces in that area did not have the dense concentrations of post holes that appeared on Floors 1 and 2 of the 1993 excavations. The implication is that the area of

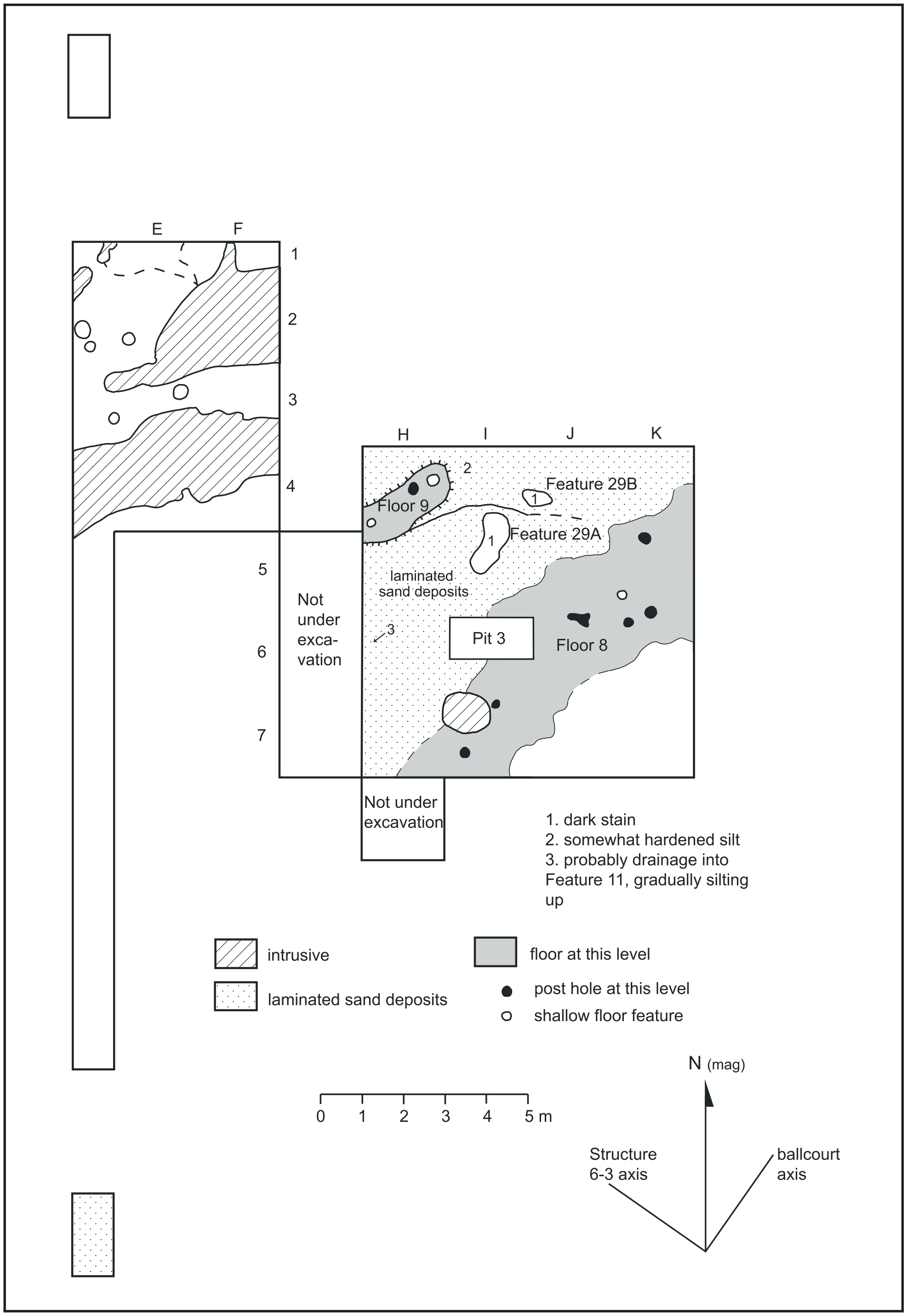


Figure 4.11. Plan of Floors 8 and 9 at Mound 12, with associated features.

our 1993 excavations may have been a particular location for residences in later Locona and Ocós. The area of the 1992 excavations, in contrast, seems to have been used as a midden, likely by the people living in houses a few meters to the southeast. A second interesting point will be developed further in discussion of Floor 1 and reprised in Chapter 7. There was a suggestive line of post holes along the southeastern edge of Floor 2, including several that appeared only with the removal of Floor 1. These post holes ran along the edge of the stable, higher ground at the southeastern corner of the excavation (Units J7, K6, and K7), where the floors could not be identified. This alignment is *roughly* perpendicular to the axis of the chief's houses at Mound 6 and parallel to the axis of the ballcourt in Mound

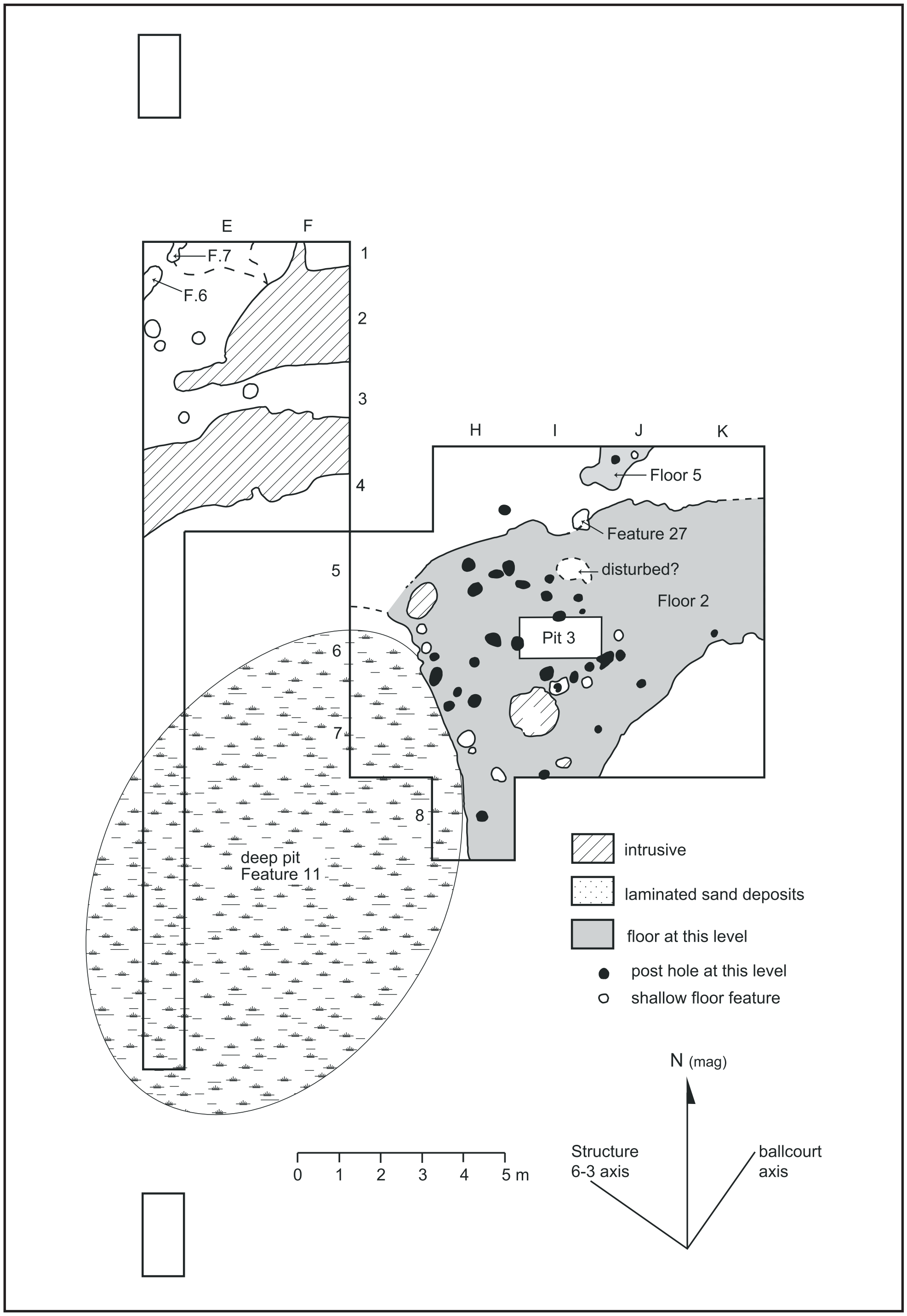


Figure 4.12. Plan of Floor 2 at Mound 12, with associated features.

7. We will see a continuity of this alignment on Floor 1.

After defining the extent of Floor 2 and excavating all post holes appearing in its surface, we laid out a grid of 50 x 50 cm units across the floor and took a 1 liter sediment sample from each unit (Figure 4.13). The procedures followed were the same as those employed in the sampling of Floors 4 and 5 in Mound 6 (Blake et al. 2006). The 50 x 50 cm subunits were labeled with a section number from 1 to 16, starting in the northwest corner of each 2 x 2 m unit and proceeding west to east. Thus, within each 2 x 2 m unit, Section 4 is in the northeast corner, Section 13 is in the southwest corner, and Section 16 is in the southeast corner. Processing of the Mound 12 sample was done by the same lab crew that worked on the Mound 6 materi-

Figure 4.13. Excavation of Floor 2 at Mound 12 in 50 x 50 cm grid units.

al. We recovered numerous micro-artifacts from the floor, including potsherds, obsidian fragments, small bones, and pieces of shell; we hoped these might indicate activity areas associated with the occupation of the surface and particularly of the structure that, at the time, we considered to be represented by the dense concentration of post holes.

Figure 4.14 shows patterns in the densities of sherds, obsidian fragments, bone fragments, and shell fragments in the 1 liter micro-artifact samples from Floor 2. As far as the identification of activity areas goes, the results are somewhat disappointing. High densities of the different artifact classes are correlated, suggesting that we found the fine remnant of sweeping debris (and thus, essentially, concentrations of secondary refuse) rather than primary activity areas. Also presented in Figure 4.14 are the results of a study of chemical traces in sediment samples from the floor, previously reported by Blake et al. (2006).

Features Associated with Floor 2

Aside from the numerous post holes (and other small round floor features that seem too shallow for post holes), there was Feature 27, a shallow depression in Floor 2 (Unit I4) with a dark brown matrix, containing chunks of burnt earth and a gray metamorphic cobble with abrasion on all projections (303537). In the 1992 excavations, on the surface that seems to have been associated with Floor 2, there were several post holes and two shallow pits, Features 6 and 7, with very little in them. Most important, Feature 11, a pit estimated at originally 12 by 8 m in horizontal dimensions, probably sat open at its maximum depth of more than 3 m at this time. The pit may have served as a well in the dry season, when water would not have been readily available at the site. Although the volume of sediment moved was significant, the coarse, unconsolidated sands in this area would have been easy to dig, even with rudimentary tools. If the idea was to get down to water as efficiently as possible, the spot was a good choice. The better consolidated, fine sands that begin in Unit K7 (and may continue to Mound 13 and Mound 1) would have been more difficult to dig through. Feature 11 took 150 to 200 years to fill with domestic refuse and in-washed sediment; the filling of the pit is discussed below.

Floor 1 and Features 2, 10, 18, and 21D

Floor 1 overlay Floor 2 in the eastern portion of the excavations (Figures 4.15 and 4.16). Its surface was 2 to 10 cm above that of the underlying Floor 2. The floor was vague-

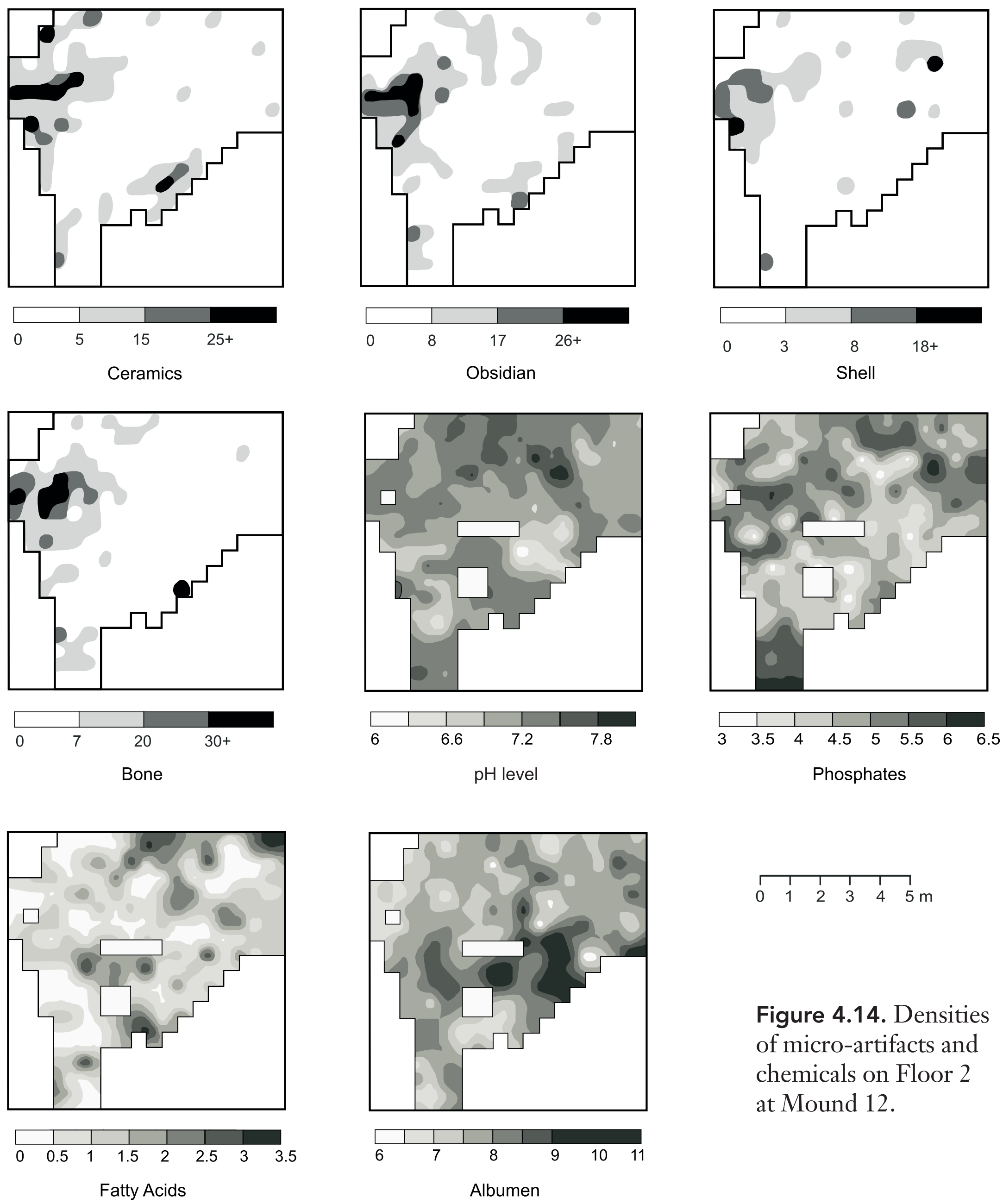


Figure 4.14. Densities of micro-artifacts and chemicals on Floor 2 at Mound 12.

ly V shaped in plan-view, with one arm extending from J6–K6 to H8 and another from K5–J5 to G5. Although Floor 1 yielded a linear concentration of well-defined post holes, to the northwest and southeast of this line the floor was not present (or not preserved), and it is uncertain on which side of the line a structure would have been located. It is noteworthy that this linear concentration of post holes followed a similar orientation to a set identified just below, on Floor 2. As noted in the discussion of Floor 2, the dense concentration on Floor 1 may be in part a palimpsest, with some of the post holes having descended from surfaces above Floor 1 that were not sufficiently well preserved to be identified during excavation.

The most likely scenario is that any structure in this area extended off to the southeast, toward the relatively high and stable ground represented by Units J7, K7, and K6 in our excavations. These units would thus represent the interior of a structure, the actual floor of which was not preserved. Such a building would have been at least 7 to 8 m long. Other reconstructions are possible, and it may be that multiple structures were built and dismantled in this area over the course of some 200 years. A series of buildings extending off to the southeast of the excavations may have been involved. The first of those would have been on Floor 2, followed by one or more on Floor 1, and potentially continuing on surfaces above Floor 1 that were not

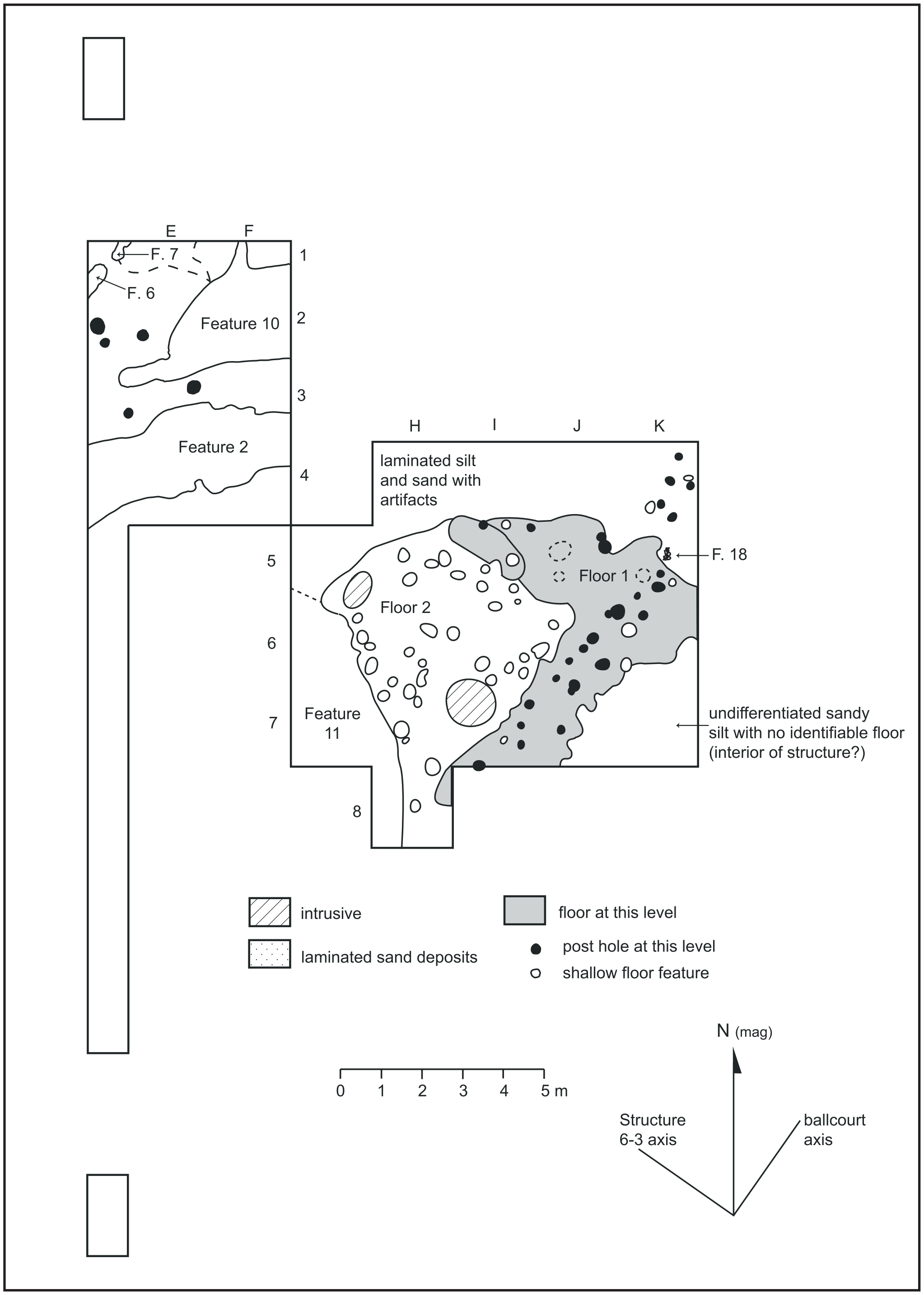


Figure 4.15. Floor 1 and associated features at Mound 12. Features 2 and 10 were open in this era.

preserved. There may also have been other nearby structures that were not part of that series.

The sherds from Floor 1 (Lot 36) are Late Locona. There were two small concentrations of domestic refuse directly atop Floor 1. Feature 18, in Unit K5, included fragments of Michis Red Rim tecomates, several of which conjoin. Also present was a fragment of a hollow support for a Michis tecomate and a solid support that may be from a bowl. Feature 21D, in Unit G5, consisted of a large piece of a red-slipped tecomate, broken in situ into multiple pieces. During the occupation of Floor 1, the deep pit to the west, Feature 11, stood open but was progressively being filled with domestic garbage and water-lain sediments. Finally, one or both of the ditch-like features from the 1992

Figure 4.16. Mound 12 excavations: Floor 1 (toward the far side of the excavation) and the underlying Floor 2 (in the foreground).

extensive excavations, Features 2 and 10, were probably associated with the occupation of Floor 1. If only one is associated, it was most likely Feature 2. This may have been a borrow pit from which fill was obtained to build up Floor 1. Thereafter, Feature 2 began to fill with domestic garbage and water-lain sediments.

FEATURES OF THE LOCONA TO OCÓS TRANSITION

Occupation of the area of Mound 12 continued from late Locona to Ocós, with continued gradual deposition of sediments with higher proportions of silt and clay than in the sandy layers below. A number of features are either difficult to assign to one phase or the other or include deposits that span the transition.

Floor 3

Floor 3, the uppermost surface with associated post holes encountered in the 1993 extensive excavations, overlay the northwestern portion of Floor 1 (Figure 4.17). The floor was fragmentary and poorly preserved, appearing in Units J4 and J5. Other patches of surfaces to the west, in Units G5, H4, H5, and I5, were probably associated with Floor 3. Based on the sherds it contained (Lot 32), Floor 3 would be late Locona in date, but there were concentrations of Ocós-phase sherds (Features 21A, 21B, 21C, and 21E) along its western edge.

Features 2 and 10

Features 2 and 10 were somewhat amorphous, ditch-like pits dug into the substratum of unconsolidated sand during the later Locona phase. They filled up with an in-wash of sediment and the dumping of domestic refuse (Figure 4.18). Materials recovered represent significant refuse samples: 15,895 sherds (133.9 kg) from Feature 2 and 7,059 sherds (55.8 kg) from Feature 10. The cultural materials in the bottom layers of both pits were Late Locona and in the upper layers Ocós. It may be that Feature 2 is the earlier of the two, since most of its fill was Late Locona, whereas a greater proportion of the fill of Feature 10 was Ocós. A breakdown of the lots (or units and levels of Trench 1) corresponding to each feature and a few of the more notable finds are provided in Data Record 4.1. Various soapstone and greenstone beads were recovered as isolated finds in the middens, all apparently lost or discarded. One sandstone abrader appeared in each feature, and in Feature 2 there was an unfinished greenstone bead, suggesting lapidary work as one activity of the residents of this locale. Perhaps most embarrassing for the

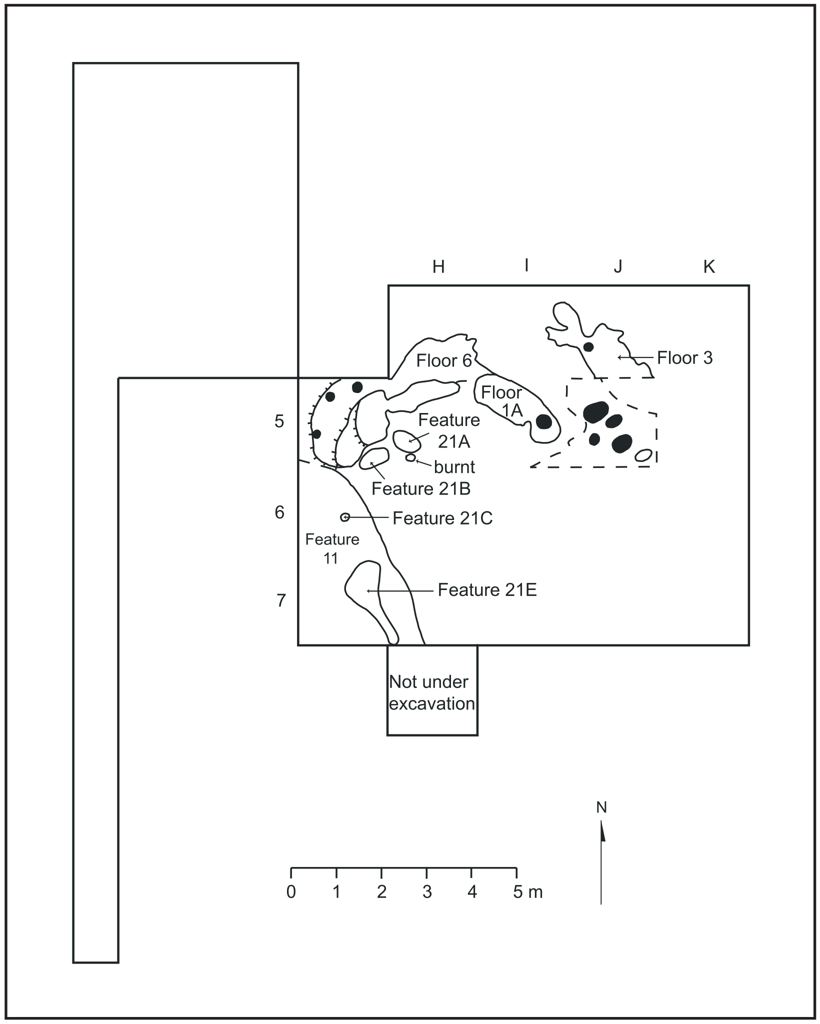


Figure 4.17. Floor 3 and associated features at Mound 12.

goal of excavating low-status residences was the spectacularly carved crocodile tooth (see Figure 15.3f–g), which the workmen immediately dubbed El Colmillo del Rey (The King's Fang).

The overall density of cultural material was greater in Feature 2 than in Feature 10 (22.6 kg sherds/m^3 compared to 13.4 kg/m^3), but in each case there was considerable variability within the fill, which accumulated from numerous dumping episodes as well as the in-wash of sediment (see Figure 4.5).

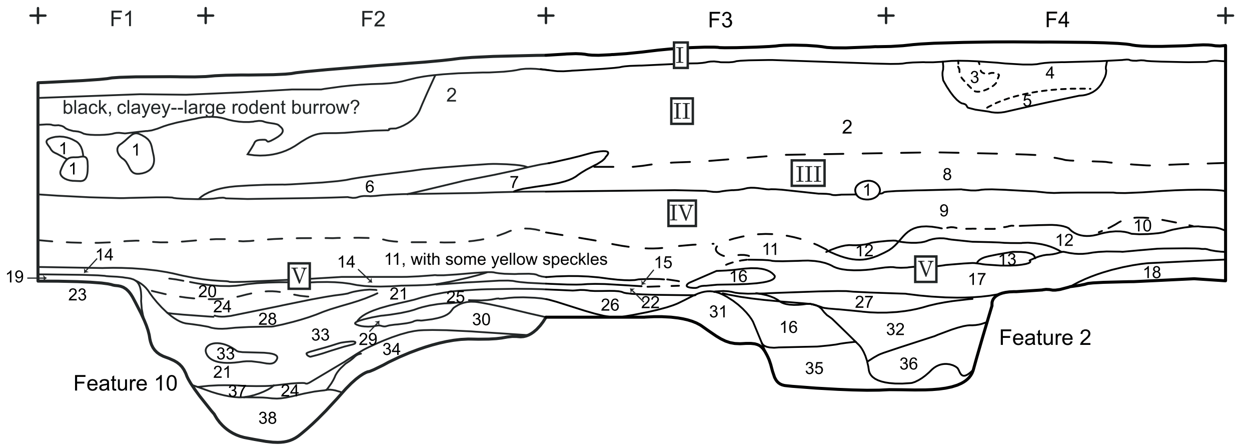
The Ocós Midden atop Features 2 and 10

After Features 2 and 10 had filled in, this area became a toss midden, probably for the residents of houses located a short distance to the southeast. The resulting concentration of refuse was not given a feature number, but the corresponding lots and highlights of finds are noted in Data Record 4.1 under the heading "Ocós Midden." The overall sample is quite large (42,228 sherds; 314.4 kg). The density was similar to that of cultural material in Feature 2 (21.5 kg sherds/m^3). At the surface of Zone IV, Ocós materials are mixed with Cherla.

Feature 11

I have already proposed that Feature 11, the deep pit identified in the trench sections T1D through T1F and in the southwestern corner of the 1993 extensive excavations, was dug during the Locona phase (perhaps as a well) and that it was associated with the occupation of Floor 2. The topic now is the filling of this feature.

The fill of the feature consisted of four basic depositional units (labeled A through D in Figure 4.6) in addition to the edge areas, which were somewhat puzzling and which I discuss last. Layer A, the lowermost excavated layer (we did not reach the bottom of the pit), consisted of a clayey silt mixed with coarse sand. In color it was mottled dark yellowish brown (10YR3/4) and dark grayish brown



1. rodent
2. yellowish-brown sandy silt
3. brown
4. soft dark gray
5. very black
6. gray, sandy
7. mottled yellow and gray clay
8. brown, clayey, yellow speckles
9. dark brown, clayey, yellow speckles
10. yellowish
11. brown fine sandy silt
12. dark brown sandy silt, abundant sherds
13. brown coarse sandy
14. fine silty sand, few inclusions
15. medium gray sand
16. brown medium silty sand
17. brown fine sandy silt, heavy yellow speckles
18. very hard yellowish silty sand
19. hard sandy silt
20. fine sand, abundant speckles
21. brown fine sandy silt
22. medium sandy silt, brown
23. orange stained
24. medium sandy
25. brown-gray medium sandy silt
26. fine brown sand, silty
27. coarse gray sand
28. brown medium silty sand packed with sherds
29. dark brown medium sand
30. fine yellowish-brown sand
31. fine silty sand
32. finely laminated medium and fine sandy silts
33. medium sand
34. medium–coarse gray sand
35. coarse gray sand
36. mottled silt and medium–coarse sand
37. sandy, lots of sherds
38. brown medium sandy silt

Figure 4.18. Profile of Features 2 and 10 at Mound 12, along the east profiles of Units F1 through F4. Part of the left side of this profile is shown in Figure 4.5.

(10YR4/2). This represents the initial stage of the filling of the pit. It probably was at least persistently muddy during the rainy season and likely held standing water. Cultural materials from this layer are Late Locona.

Layer B was complexly stratified, with lenses of silt and sand that appear to be water lain. Some lenses were clayey whereas others were almost pure sand. The overall color was a dark yellowish brown (though the high sand content made taking a satisfying Munsell reading difficult). Cultural materials in the lower part of this layer were Late Locona and in the upper part Ocós.

Layer C consisted of a dark brown clayey silt (10YR3/2) with Ocós sherds. At the top of this layer were lenses of very dark brown, almost black, clayey silt. These may have formed during an era of stasis in the filling of the pit, long enough to allow the accumulation of a heightened organic content.

Layer D, above these dark lenses, had a character similar to Zone IV elsewhere in the excavations. It was a dark brown sandy silt with some clay (10YR3/3). Cultural contents were Ocós with some Cherla. This represents the final stage of the filling of Feature 11.

Special finds in Feature 11 are noted in Data Record 4.1. They included a quartz crystal, several ceramic beads, and a bone fishhook. In contrast to the area of the 1992 extensive excavations (including Features 2 and 10), stone ornaments were absent.

The edges of the Feature 11 pit, encountered in Unit T1D, Test Pit 5, and several units of the 1993 extensive excavations, were composed of laminated lenses of sands and silts. These presented a puzzle initially, because they were definitively Locona (rather than Late Locona) in date, thus preceding the earliest deposition that we encountered within Feature 11. However, water could not have deposited these lenses unless Feature 11 had been nearly full. I have already mentioned the two proposed interpretations. Either there was an earlier version of Feature 11 that filled during the Locona phase and was then dug out again or there was a more general drainage toward the bajo to the southwest that silted up during the Locona phase.

Sherd Concentrations Surrounding Feature 11

Several concentrations of partially broken pots and large sherds appeared along the edges of Feature 11 (above the laminated Locona layers). The material recovered mainly dates to the Ocós phase, when the deep pit would have been half or more full. Some may be Late Locona. The reason for this intermingling is that the immediate edge of the pit was not experiencing deposition during this era.

Features 3 and 4, in T1D, were concentrations of large sherds within the Feature 11 pit. They included several nearly complete bowls. Features 21A, 21B, 21C, and 21E appeared in Units G5, H5, G6, and G7 and were also within Feature 11. They included tecomate fragments and other sherds. Apparently people dumping domestic refuse into Feature 11 reserved some of the larger vessel fragments at the edges of the pit in provisional discard.

OCÓS OCCUPATION

The Ocós occupation corresponds to the upper part of Zone V and Zone IV. As noted in the discussion of Floors 1 and 2, above, Ocós residences may have been constructed in the area of the 1993 extensive excavations on surfaces that were not preserved. Eventually, the location of residences may have been shifted to one side of the excavated area, but Ocós-phase features indicate their continued proximity. Much of the area under the present mound became a dumping ground for domestic refuse, and Feature 11 gradually filled up with sediment and trash. By the end of the Ocós phase, the former pit was just a slight depression in the landscape. It apparently lay exposed this way for some time, since a black organic layer formed on the surface of the old pit and the surrounding area. Perhaps it became a kitchen garden for an Ocós house just to the east of the mound. Other Ocós features probably associated with the same household include two human burials, a dog burial, and a trash-filled pit (Figure 4.19).

Burials

In Units H7 and I7 we encountered Burial 11, Burial 12, and Feature 20, the last being a disturbed dog burial. (See Chapter 23 for further description of the burials.) These features were intrusive through Floor 2 from above (in the case of Burial 11) or terminated just above Floor 2 (in the case of Feature 20 and Burial 12). The surface from which they were excavated was not precisely identifiable, but it was in Zone IV and dated to the Ocós phase. This area may have been a small family burial ground.

Burial 11 was a double burial of two articulated adults (Figure 4.20). Individual A, sex unidentified, head to the west, was placed to the northeast of and slightly higher than its companion. Individual B, a female, was placed slightly lower than and to the southwest of Individual A, with her head to the northwest. I believe that both individuals were placed in a common grave at or near the same time. The burial pit was clearly identifiable as it intruded through Floor 2 as a single, rounded pit. Individuals A and B also appear to be spatially arranged to fill this pit, with A to the northeast and B to the southwest. Individual B was placed in the pit first. The bones of Individual B were found completely intact and do not appear to have been removed or disturbed at all. The only offerings were three stones placed between the heads of the two individuals, the placement further suggesting a double burial rather than two separate episodes of interment.

Burial 12 was an infant, articulated but only partially preserved. The head appears to have been toward the southeast and the bent legs to the northwest. There were no associated offerings.

Feature 20 was the articulated lower skeleton of a dog, with only the pelvis and hind legs intact; the rest may have been disturbed subsequent to burial. It is interesting that a dog was interred here in the same area as humans. This pattern was identified in Trench 1 at Paso de la Amada and at the site of Chilo as well (Clark 1994a).

Features 14, 15, 16, and 23

In the southeast corner of Unit J7, at the surface of Zone IV, was Feature 14, a small concentration of domestic garbage. Underneath a layer of rather small sherds was a concentration of animal bone. Feature 23, in Unit K4, was a similar small concentration of refuse; the sherds were heavily eroded.

Feature 15 was a fragmentary hearth or small oven that appeared in Zone IV in Unit K6. All that was left of the feature were portions of parallel, slightly incurving walls about 12 cm deep and 0.5 cm thick, composed of earth burnt in situ. The interior floor of the feature was black but without any collectible charcoal. A rodent burrow had destroyed much of the feature.

Feature 16 was a small, circular concentration of domestic refuse, about 40 cm in diameter and about 10 cm thick, that appeared in Zone IV in Unit K6. Within this small space, sherds and fragments of grinding stones were tightly packed.

Feature 19

In units K7 and K6, some 10 cm beneath the surface of Zone IV, a large pit filled with Ocós trash, Feature 19, was identified. The pit was nearly 190 cm long in the eastern profile of the units and extended some 80 cm into our excavations. The pit contained a dense concentration of cultural material (88.2 kg sherds/m^3). In the pit were a complete, badly burnt and eroded Paso Red bowl, one nearly complete effigy bowl (missing the animal head), a substantial portion of a frog effigy bowl, a large portion of a Michis tecomate covered with shell-back rocker stamping,

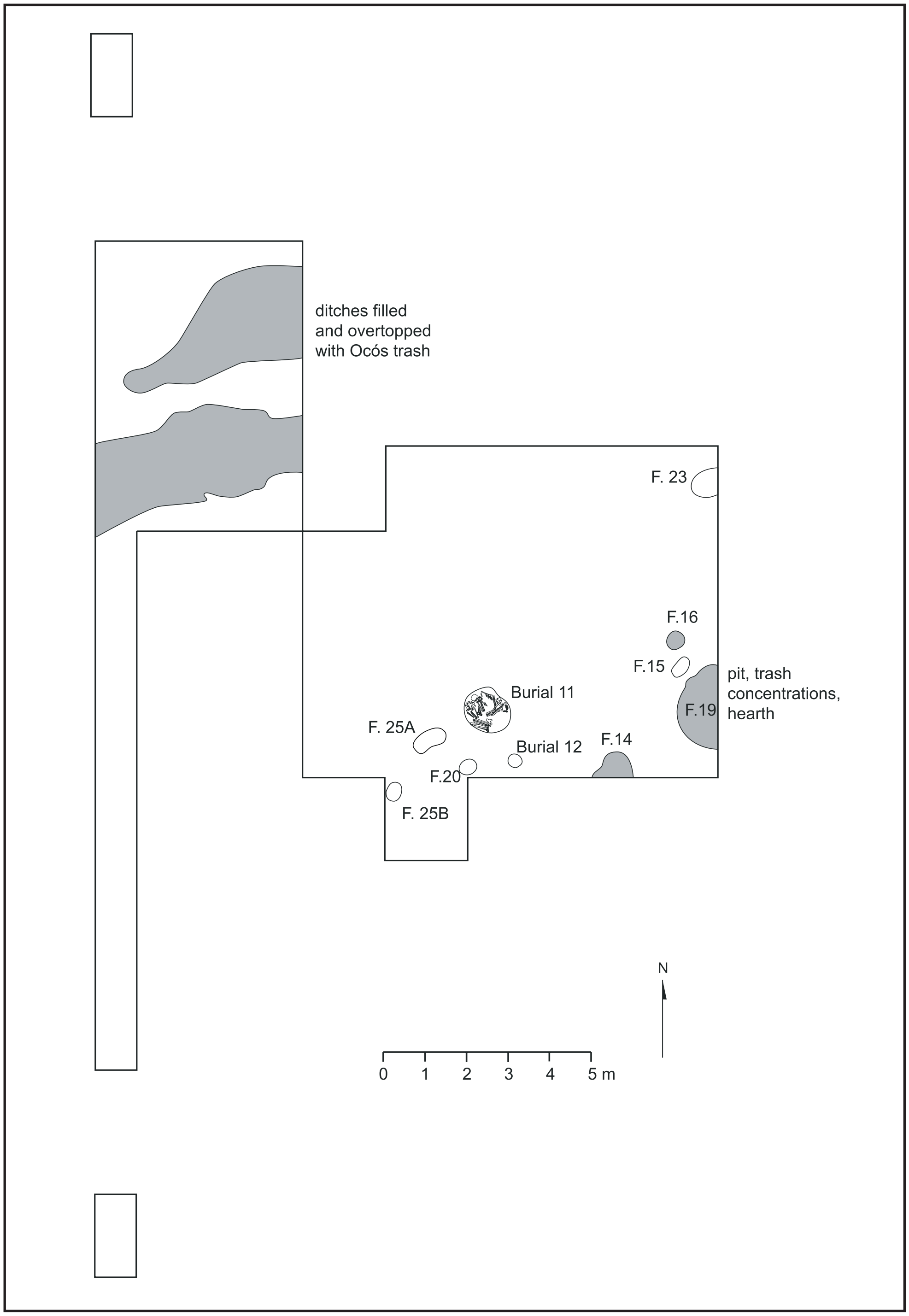


Figure 4.19. Ocós-phase features in Zone IV at Mound 12.

and numerous other large sherds. There were also many tiny sherds, and all the ceramics were eroded due to their position here at the edge of the mound with little protective overburden. Other finds include a large amount of obsidian and animal bone. Bone included many gar scales, including three intact sheets of articulated scales. A typical method of preparing gar today, which we observed in Mazatán in 1990, is to singe the outside of the whole fish in a fire before breaking off the scales in sheets very similar to those we found in Feature 19. It is possible that the numerous gar scales in the pit derive from a single fish, singed over a fire in Feature 15, the skin being tossed immediately into the adjacent pit.

Feature 19 was not filled to the brim with trash. Although the heavy concentration of refuse appeared near the surface in the southwestern part of the pit, the layer of

Figure 4.20. Burial 11 at Mound 12.

dense cultural material sloped off from there toward the northeast. In the northeast side of the pit, the upper layer of fill was a clayey matrix with little cultural material. This pattern probably resulted from repeated dumping of refuse into the pit from the south and east. If we assume that people would walk directly from their house to the garbage pit, then the residence associated with Feature 19 was probably to the south or east of Feature 19.

Features 25A and 25B

In Units H7 and H8, we found two disturbed hearths in Zone IV. Feature 25A appeared beneath Lot 29 in Unit G7. The hearth measured 80 x 40 cm and was characterized by a concentration of chunks of burnt earth in a black-stained matrix. Feature 25B appeared at the surface of IV in Unit H8. It was roughly circular, about 40 cm in diameter, and, like Feature 25A, consisted of chunks of burnt earth in a patch of black-stained earth. In both cases there was nothing but tiny flecks of charcoal associated with the burnt earth.

THE CHERLA OCCUPATION

Occupation of Zone IV continued into the Cherla phase, but the evidence of Cherla occupation was less obtrusive than that of the Ocós phase. Figure 4.21 shows concentrations of Cherla materials based on percentages of diagnostic Cherla sherds (including Bala White, Bala Brown, Pino Black, Pino Black and White, Mavi Plain and Red Rim, and Extranjero Black and White) among rim sherds in the uppermost layer of Zone IV. Also noted are diagnostic Cherla artifacts, including earspools, cylinder seals, ceramic spatulas, and white-slipped figurines. The minor presence of Cherla in relation to Ocós diagnostics may mean that the platform was constructed relatively early in the Cherla phase, sealing Zone IV and thereby ending deposition of cultural material in that layer.

The Structure 12-1 Platform

At the time of the Ocós occupation of Zone IV, there still was no "mound" at the location of Mound 12, though the

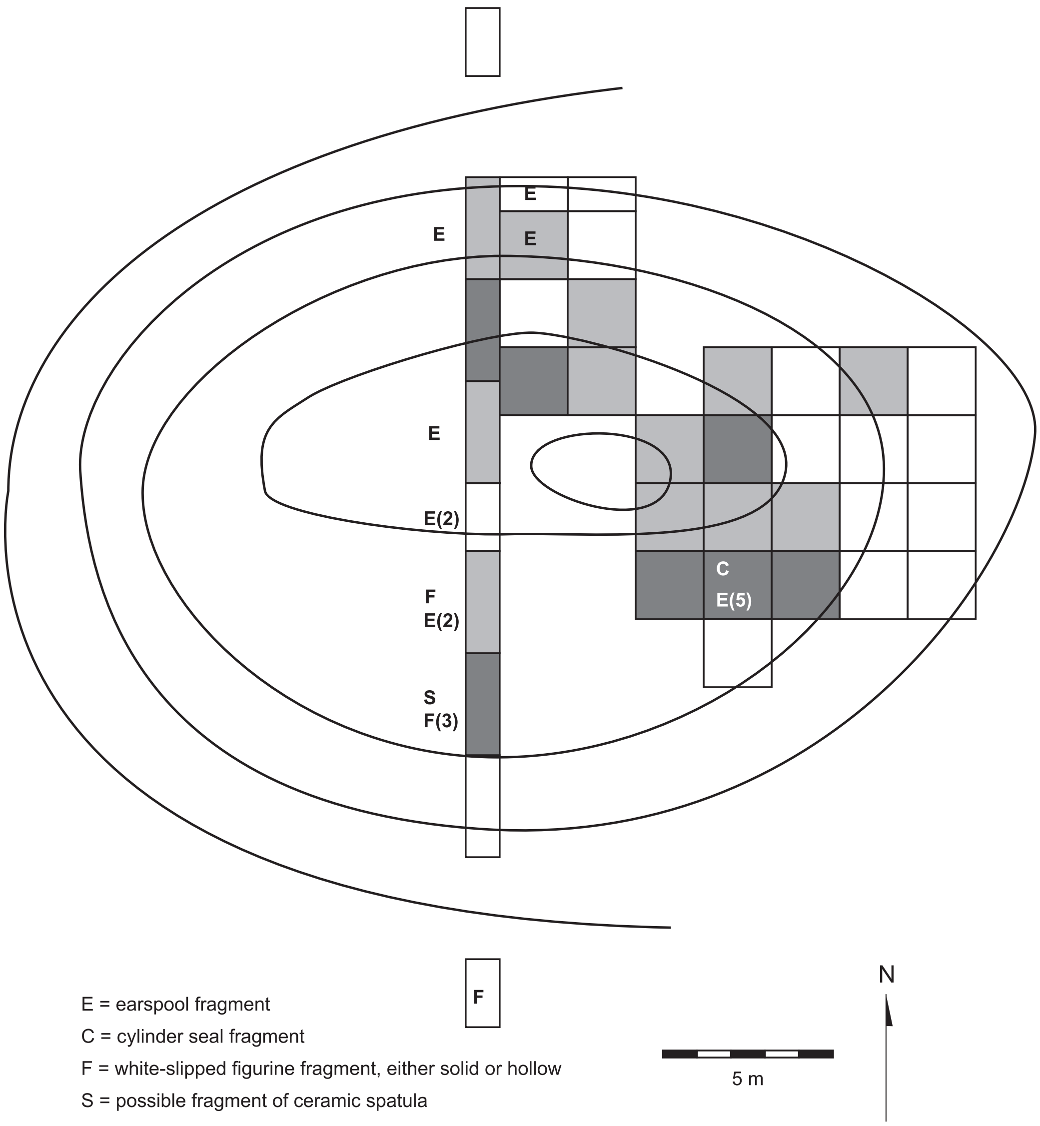


Figure 4.21. Cherla diagnostics in Zone IV at Mound 12, with a contour map of the overlying mound shown superimposed. No shading: Cherla diagnostics 0–8 percent of rims; light gray: Cherla diagnostics 9–18 percent of rims; dark gray: Cherla diagnostics 20 percent or more of rims. Contour interval 10 cm, measured with a line level.

settled area was generally elevated in relation to seasonally flooded bajos to the north, west, and south. What was visible in 1992 as "Mound 12" was an artifact of the single-episode, Cherla-phase platform construction. Mound 12, unlike Mound 6, was not composed of superimposed structures of similar orientation. Rather, the evidence of habitation under the mound bore no relation, in terms of orientation or layout, to the subsequent platform construction. Traces of structures were, however, preserved from rodent and root action by the overlying meter of platform fill.

Based on the stratigraphy observed in our excavations and on several remnant pit features atop the mound, the platform must originally have risen at least 1.0 to 1.1 m above the surrounding ground surface. The original shape of the platform was oval or rectangular. Unlike the Locona platforms in Mounds 6 and 32, the width of the Mound 12 platform appears to have been similar to its length (Figure 4.21), though less clearly so than at Mound 1. The construction of the Mound 12 platform represented a significant labor investment. The cubic volume of fill would have been at least 450 to 500 m^3.

Use of the Platform

As in the case of Structure 1-1, the Cherla-phase platform at Mound 1, I initially assumed that the Structure 12-1

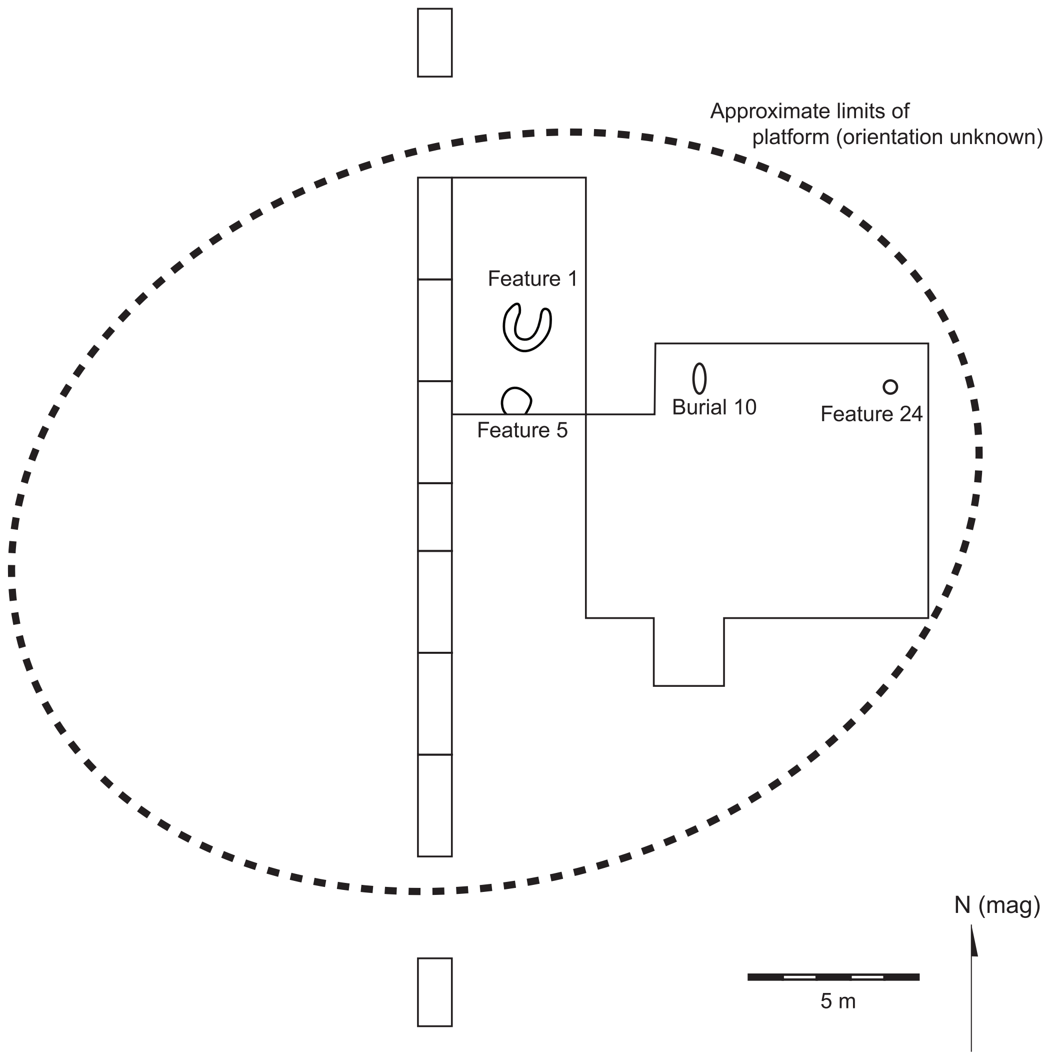


Figure 4.22. Approximate boundaries of the Cherla-phase platform at Mound 12, showing locations of features atop the platform.

platform was built for a high-status residence. I now suspect that both 12-1 and 1-1 were not residential in function (Lesure 2011a). The discussion here is continued in Chapter 7.

Test Pits 2 and 5 were the only units that sampled off-mound deposits. Although the exposure is small, the excavations recovered no evidence of domestic middens related to platform-top occupation such as we found at Mound 32 (see Chapter 5). In both test pits, the layer corresponding to Zone IV (Level 4 in Test Pit 2 and Level 3 in Test Pit 5)—that is, the ground surface corresponding to the initial use of the platform—yielded Ocós sherds with a minor presence of Cherla. The frequency of Cherla sherds in this layer off the platform was similar to the low end for Cherla presence *under* the platform (Figure 4.21), consistent with the idea that we have no deposition of domestic refuse in these pits derived from use of the platform (since that should have added significant amounts of Cherla to the areas surrounding the platform). In the slope wash above Zone IV in the test pits, sherds were, in both cases, Ocós mixed with some Cherla and Locona; they were all heavily eroded. In Test Pit 2 there were in addition two diagnostic Jocotal-phase rim sherds: a Mapache Red Rim tecomate in Level 2 and a Suchiate Brushed tecomate in Level 1. A few more Jocotal sherds were recovered from the plow zone atop the mound. In the slope wash in both pits, density of sherds per cubic meter and average sherd weight were similar to values for the platform fill. In sum, the evidence as it stands suggests a lack of domestic refuse accumulation related to use of the platform and thus raises the possibility of a non-residential function.

Four features were identified immediately below the plow zone (Figure 4.22). Feature 1, in Units E3–F3, is the very bottom of an unusual burnt, horseshoe-shaped hearth. The upper part of this feature was cut off by the plow, so that only 2–3 cm remained. The bottom of the feature

Figure 4.23. Stone spheres from the Feature 24 cache in Unit K4, atop the platform at Mound 12.

was packed with sherds of plain, necked jars that indicate a post–Early Formative reoccupation of the mound surface. Burial 10, encountered in Unit H5, was a very poorly preserved human burial. Only the legs were intact; the rest had been destroyed by plowing. No offerings were identified, and the date of the burial is unknown. Feature 5, in Units E4–F4, was a shallow pit with chunks of burnt earth in a dark matrix. Finally, in Unit K4, also just beneath the plow zone, we found Feature 24, three ground-stone spheres, two of white andesite and one of granite, ranging in diameter from 5.4 to 6.4 cm (Figure 4.23). This was likely an offering; like the other features, it is undated. If it was associated with the Cherla-phase use of the platform, it was placed near an edge rather than in the center.

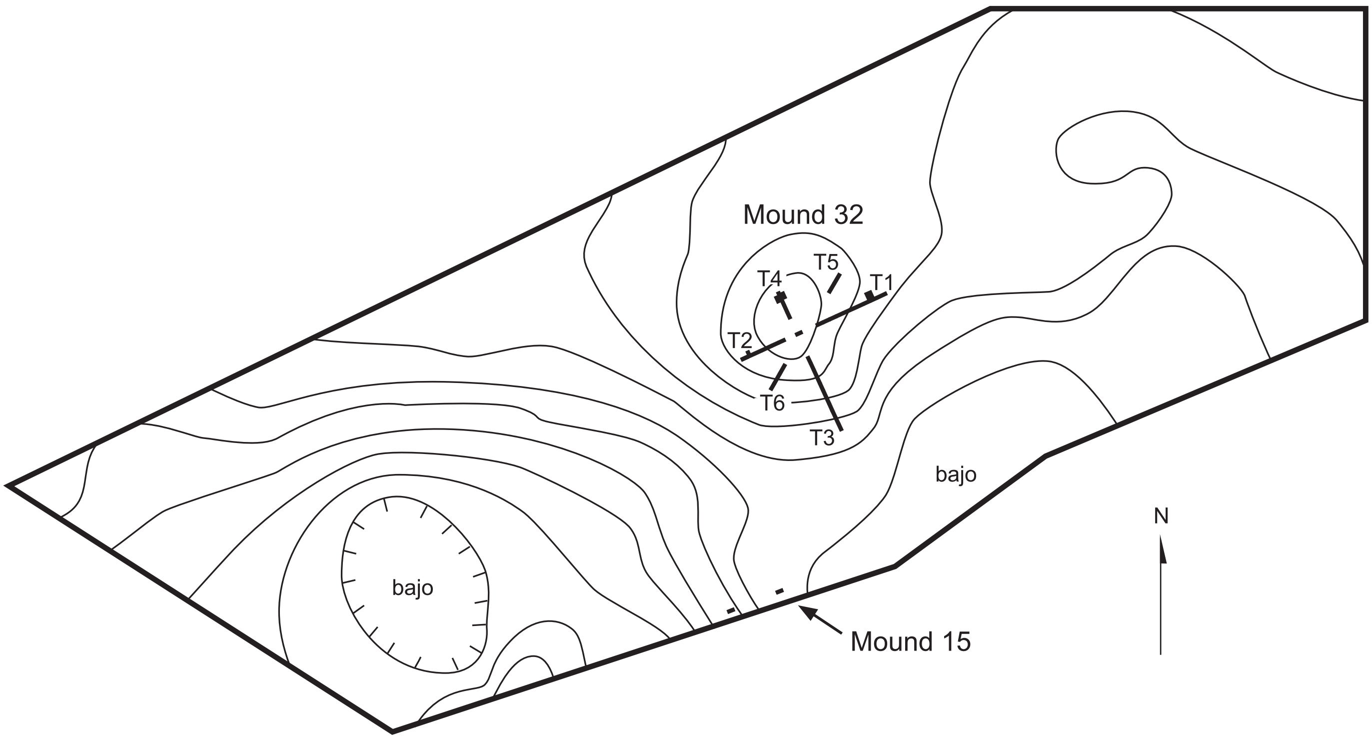


Figure 5.1. Map of Mound 32 and its surroundings. Excavation units are shown in black; the reconstructed Locona platform is shown with a dotted line. Note how the platform was actually at one side of the full extent of the mound, a point relevant to discussion of extensions to the platform later in this chapter and to the model of multi-dwelling residential units proposed in Chapter 7. Contour interval is 20 cm. *Illustration by R. Lesure and project staff.*

CHAPTER 5

Mound 32

Richard G. Lesure

MOUND 32 IS A LOW natural prominence in the northwestern sector of the site. It was first investigated in November of 1992 with three 1 x 2 m test units, which revealed an earthen platform of the Locona phase. Investigation of that platform was the focus of work in the 1997 season. Six trenches and several small extensions exposed a total of 89 m^2 and allowed definition of the approximate size, shape, and orientation of the platform.

The excavation strategy was informed by the results of previous work at Mounds 1 and 12. At both those mounds, despite extensive excavations revealing significant (though only partially preserved) architectural traces, the platforms themselves were never fully understood in terms of shape and orientation, primarily because the sub-platform deposits rather than the edges of the platform became the focus of investigation. Mound 32 was particularly promising for an investigation focused instead on understanding the platform as a construction. In particular, there was only a single construction episode, meaning that the likelihood of recovering evidence of a platform-top structure, after years of damage by plowing, was slim. Further, the deposits below the platform were relatively simple, with very few artifacts.

The strategy focusing on platform edges was quite successful. Excavations revealed a Locona-phase platform somewhat larger than Structure 6-4 at Mound 6. Numerous fragments of a remarkable ceramic statuette appeared along with typical domestic refuse in a Locona midden to one side of the platform. More extensive Ocós middens indicate continued occupation of the mound into that phase. There was also a Cherla trash pit and a burial on the upper surface of the mound. Analysis of the stratigraphy and spatial locations of midden deposits at Mound 32 are key elements in an argument on differential formalism at Paso de la Amada discussed in previous publications (Lesure 1999a, 2011a) and Chapter 27 of this book.

THE SETTING OF THE MOUND

Mound 32 is located on a low promontory bordered to the south by a series of bajos (Figure 5.1). Some 140 m away, across a remnant oxbow of the Coatán, was the ballcourt, Mound 7. The nearest excavated mounds are 15 and 21. The six trenches excavated at Mound 32 are shown in Figure 5.1. In terms of the setting of the mound, an interesting find in the southern end of Trench 3, described below under "Stratigraphy," was that the sterile substratum in the adjacent bajo was a light gray clay, deposited in a low-energy depositional environment such as a lagoon. It is possible that some of the bajos at the site were lagoons already in an advanced stage of siltation at the time of earliest human settlement.

EXCAVATION PROCEDURES

Excavations at Mound 32 were conducted in two field seasons (Figure 5.2). The preliminary soundings, Test Pits 1, 2, and 3, were excavated in November of 1992, under my direction, with a crew of workmen from the *ejido* of Buenos Aires. Pit 2A was a 1 x 1 m extension of Pit 2 excavated to recover the remainder of a small trash-filled pit, Feature 3. Excavation was by arbitrary 20 cm levels, except where natural layers could be identified during excavation.

All levels of Pit 1, Pit 2, and Pit 3 were screened through a 5 mm mesh.

The 1997 excavations involved six trenches and three small expansions. Each trench was subdivided into lettered units of 1 x 2 m or 1 x 3 m. Trench 1 began with the original Pit 1 (located at the approximate center of the mound) and extended to the northeast. In the new labeling system, Pit 1 became Unit T1A of the trench. Because the focus of investigation was definition of the edges of the platform, Units T1B and T1C were not excavated; excavation of Trench 1 began with T1D and extended through T1M for a total of 21 m. All excavated units in this trench were 1 x 2 m except for T1M, which was 3 m long. Unit 1 was a 2 x 2 m unit excavated along the northern profile of T1K and T1L to sample an Ocós-phase domestic midden.

Trench 2 extended to the southwest from Pit 1 and included Pit 3 and Pit 2, which correspond, respectively, to T2B and T2F in the new system of labeling. The excavated units of Trench 2 were T2B through T2G, totaling 13 m long. (All units in this trench were 2 m long, except T2D, which was 3 m.)

Trench 3 extended to the southeast from Pit 1. It consisted of 12 units labeled T3D through T3N and was 24 m long, with all units 1 x 2 m. Trench 4 extended to the northwest from Pit 1. It consisted of four units, T4C through T4F, totaling 8 m long. Excavations in this trench proved time-consuming because of the complexity of features and midden deposits encountered. Two 1 x 2 m extensions, Units 2 and 3, were excavated to recover more of the Locona midden in Units T4E and T4F.

Inspection of the profiles of Trenches 1 through 4 suggested that the original platform, consisting in part of readily identifiable masses of gray clay, had been significantly longer than it was wide and had crossed the excavation grid at an angle, with its long axis oriented northeast–southwest. That idea was evaluated by excavating Trenches 5 and 6, aligned along the hypothesized axis of the platform at the northeast and southwest ends, respectively. Trench 5 was located 12 m to the north of Pit 1. It was divided into two sections, each 1 x 3 m, for a total of 6 m. Trench 6 was located approximately 8 m to the south of Pit 1. It was divided into three units and totaled 8 m long, with T1A and T1B each 1 x 3 m and T1C 1 x 2 m.

I directed the excavations with a crew of graduate and undergraduate assistants (Christopher Attarian, Sheila Egan, Daniel Cummins, and Enrique Flores) and a team of workers from the *ejido* of Buenos Aires. Thomas Wake visited during the course of the season, which was conducted from mid-January through mid-March of 1997.

Excavations were by lots, but the system used was different from that employed in the excavations of Mounds 1 and 12 (Chapters 3 and 4). In the 1997 excavations, each lot represented a minimal provenience unit. Thus lots did not cross the boundaries of excavation units. A lot could be any sort of layer within the unit, defined either arbitrarily or in accordance with natural strata. Whenever an excavator opened a new lot, he or she went to the master list for Mound 32 and signed out the next available lot number in sequence. As a result, lot numbers that are numerically adjacent (for example, 19, 20, 21) were assigned near each other in time, but they are not necessarily in the same excavation unit. The stratigraphic sequence within a single excavation unit is thus often a series of disparate lot numbers. For example, the sequence in Unit T1G of Trench 1 was 37, 41, 47, 57, 77, 82, 84. The advantage of this system is that each lot number uniquely designates a minimal provenience unit. Of course, it also yields large numbers of lots. During the 1997 season, Lots 1 through 245 were excavated at Mound 32.

In most units, the plow zone was not screened, but subsequent lots were screened through a 5 mm mesh. Exceptions were Units T1E through T1G, in which the platform fill was not screened, and T3I, T3J, T3K, T3M, and T3N, in which none of the lots was screened.

In contrast to the 1992–1993 excavations, anything labeled a feature in 1997 also had at least one constituent lot. Thus feature numbers were assigned in addition to lot numbers rather than as substitutes for lot numbers (as had been the practice for smaller features excavated in 1992–1993).

STRATIGRAPHY

In the central part of the mound, in the area of the Locona platform, there was a sequence of five basic strata, labeled Zones I through V (Figure 5.3). Zone I, a dark, grayish-brown silt (10YR4/2), was the plow zone. Immediately beneath that was Zone II, a layer approximately 40 cm thick made up of masses of light gray clay (10YR7/2–6/2) and yellowish-brown silt, the latter sometimes containing small lumps of gray clay. In profile, masses of these two sediments inter-fingered in a way not characteristic of a natural deposit; the case for this as an artificial deposit built up with basket-loads of earth is strong. In terms of structure, therefore, the fill of the Mound 32 platform, referred to also as Structure 32-1, resembled that of the Locona platforms in Mounds 6 and 7 rather than the more homogeneous Cherla-phase fill deposits in Mounds 1 and 12. Also in contrast to the fill in Mounds 1 and 12, the density of cultural materials in Zone II was quite low, typically ranging from 1.0 to 2.0 kg/m^3. Sherds were Barra and Locona types.

Consistently underlying Zone II was Zone III, a yellowish-brown silt without any masses of gray clay (10YR5/3–6/3; from a distance, the layer looked more yellow than the Munsell readings taken at close range would suggest). The difference in texture between this layer and the masses of clay in the overlying Zone II is visible in Figure 5.4. No features were identified either on the surface of Zone III or immediately under it. Densities of cultural material were similar to those in Zone II, and the sherds were again Barra and Locona. The yellowish-brown silt of this layer was quite similar in color and texture to the masses of

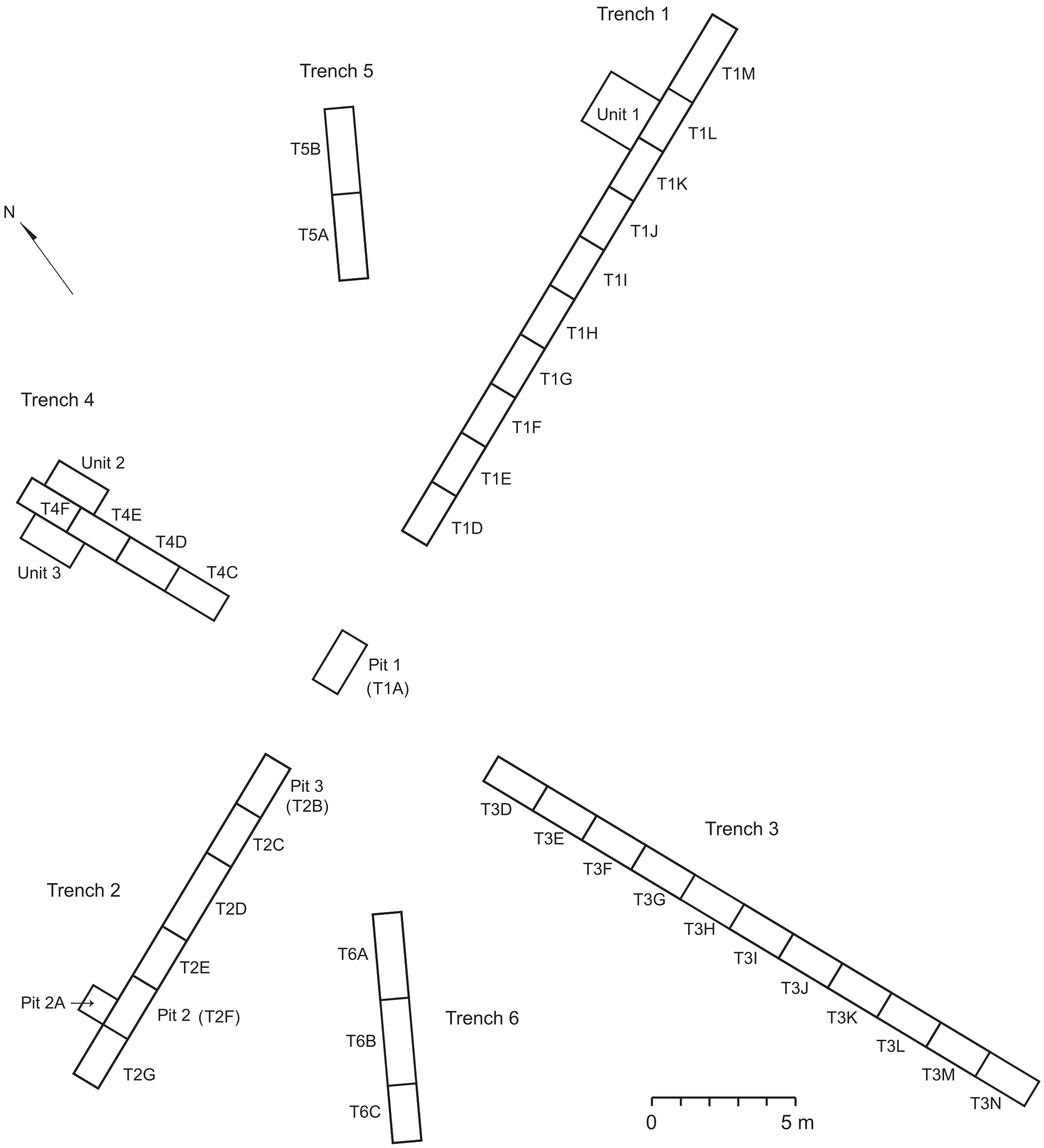


Figure 5.2. Excavation units at Mound 32. Note that the original Pits 1, 2, and 3 from 1990 correspond, in the system of 1997, to Units T1A, T2F, and T2B, respectively. *Illustration by R. Lesure and project staff.*

yellowish-brown silt that appeared in Zone II. It was also similar to the pre-occupation substratum in this area, Zone V. Most likely, Zone III was part of the artificial platform of Structure 32-1. Below, in discussion of Zone VI, I note a depositional scenario that would account for the stratigraphic sequence observed in Zones II and III, which together form the platform.

Zone IV underlay III. It was more clayey than III (and the underlying Zone V) and was darker in color. From a distance, when the profile was dry, Zone IV was clearly identifiable as a dark band in the trenches in which it was exposed. The transition between it and the overlying Zone III was sharp, but it was also subtle and difficult to register with the Munsell color chart: Zone III was lighter (10YR6/3–5/3) while Zone IV was darker (10YR5/3–4/3). The distinction was easier to identify in profile than it was as one descended during the course of excavation. Densities of cultural material were less than 1.0 kg/m^3 and thus less even than in the overlying Zones II–III; both Barra and Locona types were present.

Zone IV was the ground surface prior to construction of the platform. No convincing features were identified in

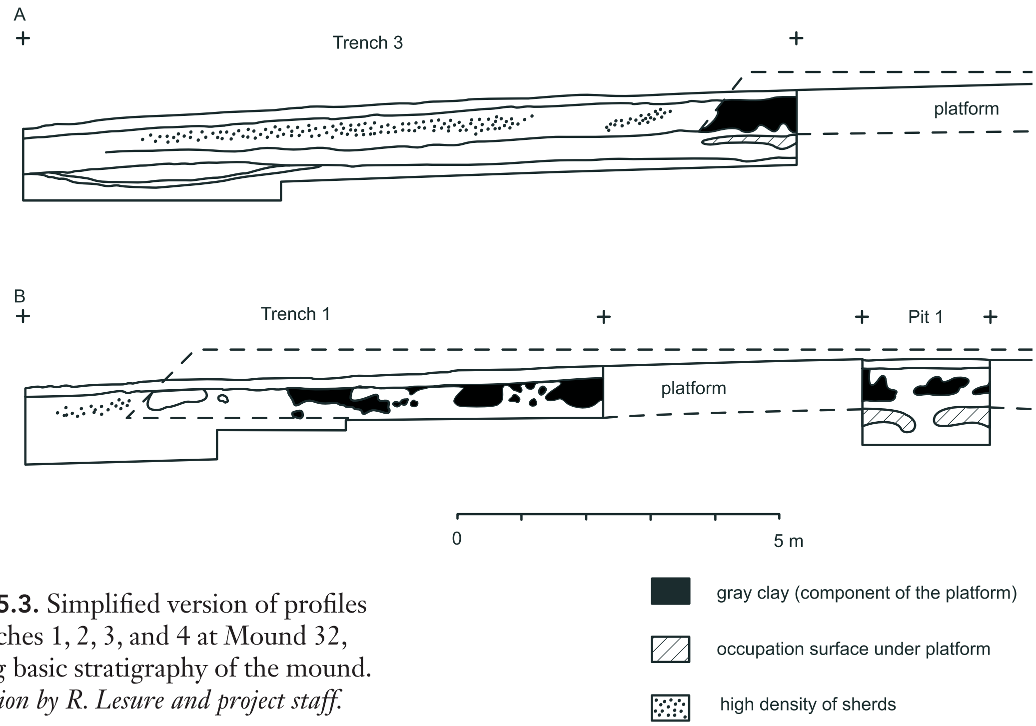


Figure 5.3. Simplified version of profiles of Trenches 1, 2, 3, and 4 at Mound 32, showing basic stratigraphy of the mound. *Illustration by R. Lesure and project staff.*

this layer within the original Locona platform. Beyond the original edges of the platform were some features associated with the equivalent of this layer, Zone IVA, which could be traced only intermittently. Zone IVA was most evident in Trenches 2 and 4, where there appears to have been an Ocós-phase extension to the platform that partially protected the occupation surface.

Zone V, underlying IV, was a yellowish-brown silty sand similar in texture to Zone III (10YR5/3 to 6/3, brown) but mottled with light gray (10YR7/2). This was the pre-occupation substratum, a natural deposit of the Coatán delta.

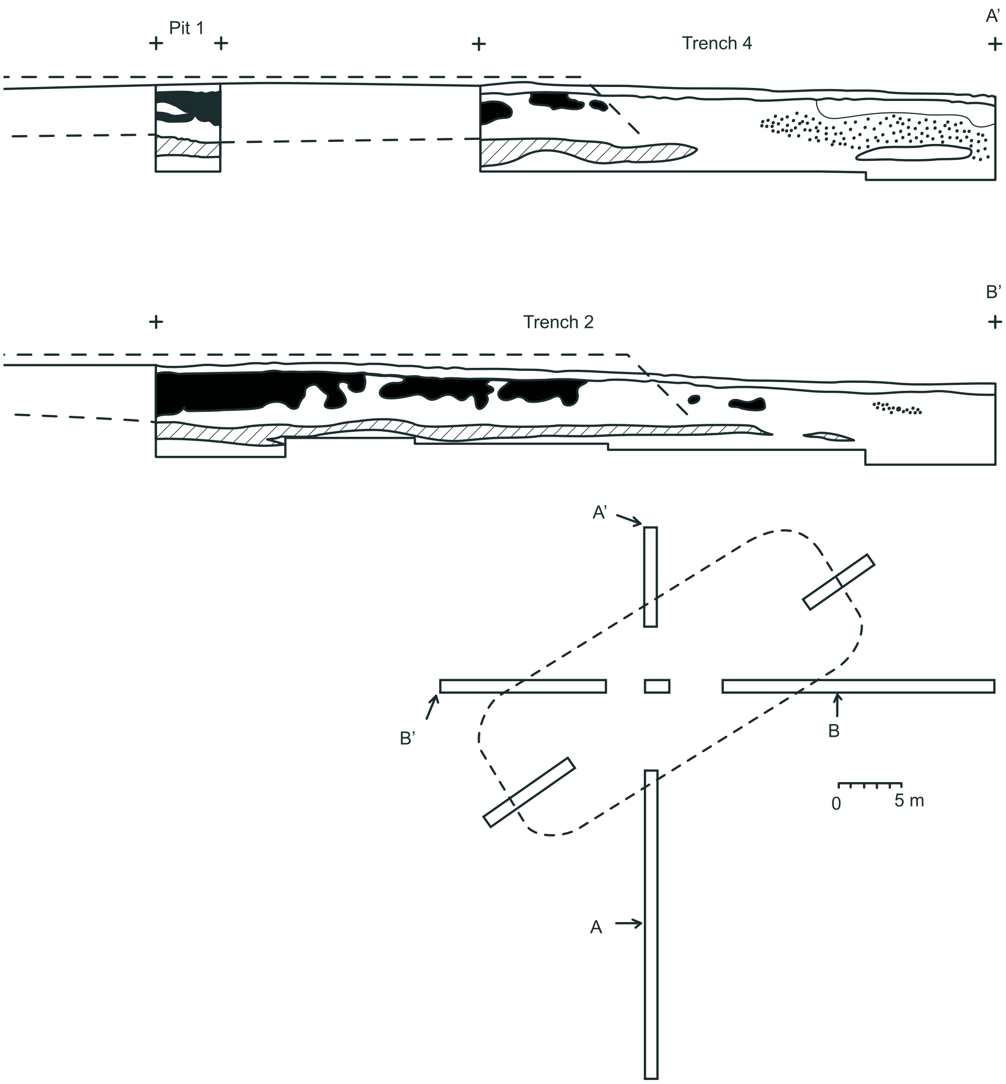
As observed in other mounds, the profiles outside the platform were more homogeneous in color and texture. In color, they graded from browner and yellower closer to the platform to more gray away from the platform. Primarily, these deposits represent accumulation by slope wash in the last 3,000 years, but Trenches 2 and 4 revealed an artificial addition to the platform, dating to the Ocós phase. The platform extension was indistinguishable in color and texture from deposits of slope wash.

The only other deposit outside the platform designated as a zone was VI, which appeared in the southern end of Trench 3 (Units T3J through T3N). This was a light gray clay (10YR7/2) with tiny yellowish-brown mineral concretions. Like Zone V, VI was a natural, pre-occupation deposit, and it underlay Zone V. Rather than the river deposits encountered in other parts of the site, the clay here derived from a low-energy depositional environment such as a lagoon bottom. Zone VI was similar in color and texture to the gray clay of the platform fill in Zone II, whereas the yellowish-brown sediment of Zone V was similar to Zone III and parts of Zone II. These natural deposits to the south of the mound are indeed the likely sources of the sediments used to build up the platform. Based on the superposition of V on VI, it appears possible to account for the stratigraphy of the platform itself, if we imagine the original stratigraphy of a borrow pit in this area. The lower layer of the platform (III) derived from Zone V, the first layers of the borrow pit, and the upper layer (II) derived from a mixture of V and VI and thus from the lower layers of the pit.

The reconstruction of the size and shape of the Locona platform and the existence of an Ocós-phase extension are based on a variety of stratigraphic observations, often quite subtle. Those are summarized in the following sections, along with other finds in the trenches and evidence for the proposed dating of the platform.

Stratigraphic Evidence Concerning the Orientation and Shape of the Platform

Identification of the edges of the platform was no trivial matter. Reconstructions of the approximate size, shape, and orientation of the platform were based on a careful inspection of the profiles of the trenches, which indicated an original construction crossing the trenches at an angle (Figure 5.5). Consistencies between the profiles of Trenches 1 through 4 suggested a platform significantly longer than it was wide, with the long axis oriented approximately 30° east of north. That hypothesis was tested with Trenches 5 and 6.



To identify the edges of the original platform, I considered several lines of stratigraphic evidence. The clearest evidence of platform fill was Zone II, with its masses of light gray clay in a matrix of yellowish-brown silt. The larger masses of clay, as much as 40 cm thick in profile, are particularly good evidence of parts of the original platform not subsequently disturbed. These larger masses appear to have been concentrated particularly in the central part of the platform. Toward some of the edges, the other component of Zone II, the yellowish-brown silt, was the predominant sediment. This proved unfortunate for the archaeologist, since the sediment was less readily distinguishable from zones of slope wash off the original platform. Where the yellowish-brown silt dominated the profile, the occasional presence of small masses of light gray clay was an important indication that the platform continued.

Figure 5.5 registers the outermost terminus (as one moves in each trench toward the edge of the mound) of the larger masses of gray clay (M) and the smaller lumps of gray clay in a matrix of yellowish-brown silt (L). The first is very strong evidence that the platform continued outward at least to that point. The second is less certain but also suggests continuance of the platform.

The next two sources of evidence are the presence of Zone IV or Zone IVA. The former is the clayey layer that I identify as the Locona-era ground surface on which the platform was constructed. In a pattern similar to that observed in Mounds 1 and 12, the platform preserved the previous ground surface as an identifiable layer. Thus the outermost terminus of a continuous and readily distinguishable Zone IV (as one moves toward the edges of the mound) is a further source of evidence relevant to determining the edge of the original platform; these points are registered as IV in Figure 5.5. As a continuous layer, Zone IV usually ended at approximately the location of the outer terminus of the gray clay (M or L). Sometimes this layer could be traced further, in patchy or less clearly identifiable form. In these cases, the layer was labeled Zone IVA. The location and extent of significant patches of Zone IVA are shown in Figure 5.5 as IV-A. The patchiness of this zone is evident in that sometimes it could be distinguished in one profile of a given unit, but just a meter away in the opposite

Figure 5.4. Cleaning the north profile of Trench 1 (Units T1D through T1F) at Mound 32. The difference in texture between the gray clay of Zone II (which broke off in chunks from the profile) and the sandy underlying Zone III is evident. Also to be noted is how few sherds are visible in the profile, a symptom of the low density of artifacts in the platform fill. *Photo by R. Lesure.*

profile it was not identifiable. Zone IVA appeared primarily in Trenches 2 and 4, where an Ocós-phase extension to the platform helped preserve it.

The final sources of evidence concerning the boundaries of the platform are deposits of domestic refuse resulting from the occupation of the mound. Various sources of evidence were considered, including average sherd size, the volumetric density of sherds, and ceramic complexes represented. The two main stratigraphic sources of evidence on use of the platform were: (1) layers of large sherds at a consistent orientation sloping away from the mound center and (2) dense concentrations of secondary refuse. These are labeled S1 and S2, respectively, in Figure 5.5. The former are particularly important because they appear to have been deposited on exposed outer surfaces of the mound. In contrast to the indicators M, L, and IV, instances of S1 in Figure 5.5 mark the closest appearance of such sherd layers to the center of the mound as one moves from the edges toward the center. These mark the outermost possible limit of the original platform. In fact, these layers of sherds are all Ocós in date; they appear to derive from activities a century or more after construction of the original platform. The locations of dense middens (S2), indicated with gray shading in the figure, are clear evidence that one is outside the original platform, but they are not particularly helpful in determining details of the construction.

To sum up, Figure 5.5 shows the outermost location of masses of gray clay identifiable as platform fill and of the ground surface on which the platform was built either in well-preserved or patchy form. It also shows the innermost occurrence of concentrations of sherds defining slanting surfaces sloping toward the edges of the mound and of extensive deposits of secondary refuse. The resulting reconstruction of the original platform is shown.

As can be seen from the figure, the various indicators (especially M, L, and IV) generally correspond, but not always precisely. The observations that led to recognition of the basic shape and orientation of the platform began with inspection of the Trench 3 profile, where the fill edge and termination of Zone IV were well preserved and appeared to indicate a platform crossing the trench at an angle. Observations in Trench 1 and 4 were consistent with that idea. Trench 2 was somewhat more difficult to interpret. There were several lumps of what appeared to be gray clay of the platform somewhat outside the developing reconstruction of the platform boundaries. Also, sloping surfaces defined by concentrations of sherds (S1) began farther from the termination of the gray clay of the fill than in Trenches 1 and 3. I now resolve these apparent puzzles in Trench 2 by positing an extension to the original platform on this side only.

The consistencies among the four original trenches yielded the hypothesis of a long platform, about 12 m wide, oriented approximately 30 degrees east of magnetic north. Trenches 5 and 6 were intended to test the hypothesis by seeing if we could locate the edges of the plat-

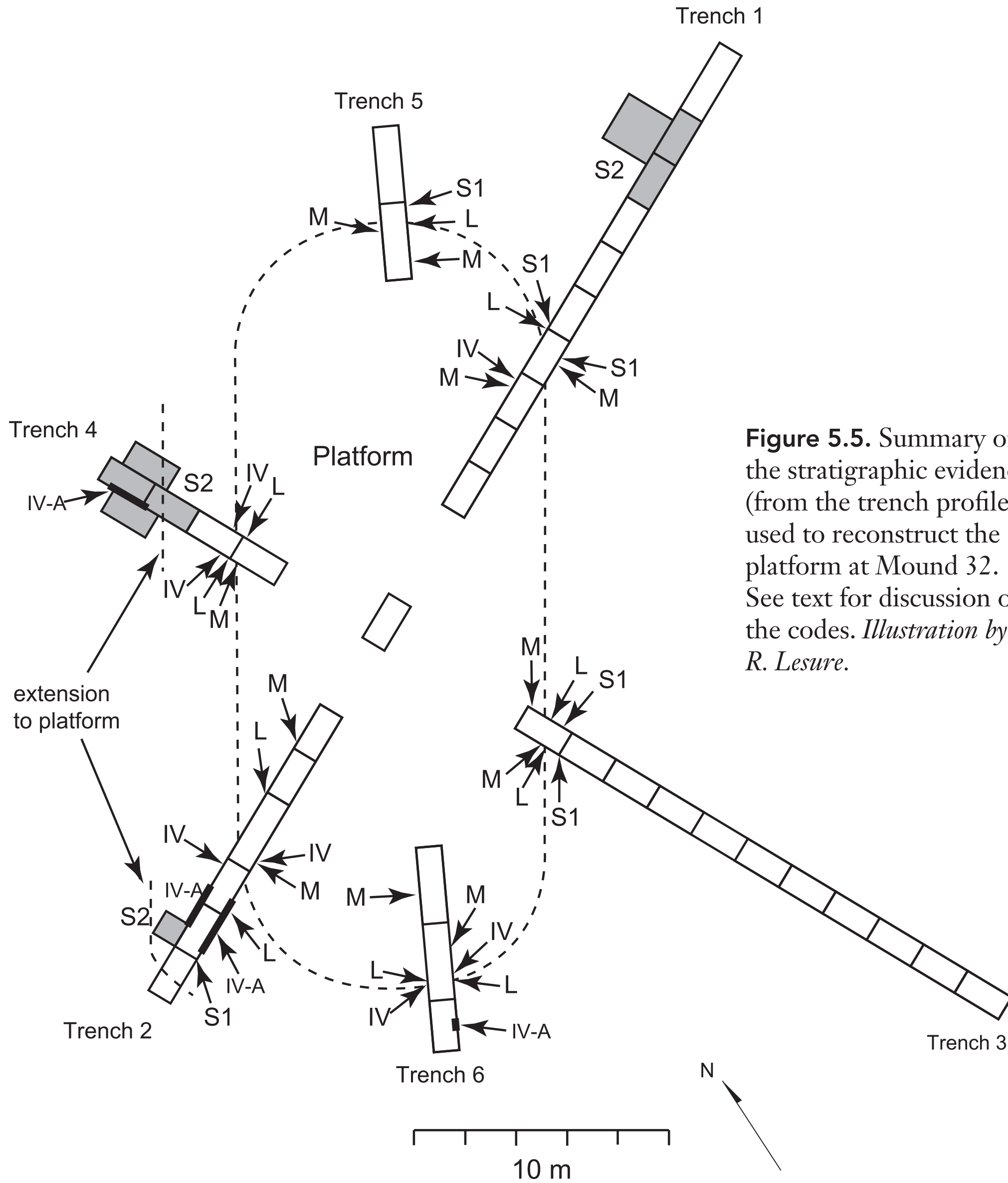


Figure 5.5. Summary of the stratigraphic evidence (from the trench profiles) used to reconstruct the platform at Mound 32. See text for discussion of the codes. *Illustration by R. Lesure.*

form along its long axis. That effort was successful. The edge in Trench 5 appeared where we thought it would. We were too conservative in our original placement of units in Trench 6 (T6A and T6B) in that the platform turned out to be longer than expected. Excavation of T6C convincingly revealed the edge.

Stratigraphy by Trench

This section provides further commentary on stratigraphy in individual trenches.

In Units T1D and T1E of Trench 1, we excavated only down to the surface of Zone IV as we proceeded out from the center of the mound looking for the edge of Zones II and III (Figure 5.4). We excavated somewhat deeper in T1F and, with the transition to off-platform deposits in T1G, we began excavating down to the sterile substratum. About 6 m beyond the original platform edge, we encountered an Ocós-phase domestic midden (Feature 6), particularly in the northern profile of Units T1K and T1L (Figure 5.6). We eventually expanded in Unit 1 to recover more of this midden (Figures 5.7 and 5.8). The midden, which accumulated in a shallow pit feature (perhaps a borrow pit for an extension of the platform), provides good evidence for the Ocós-phase ground surface here at some distance from the platform. The occupation surface of that era has been covered by 60–70 cm of sediments, apparently primarily through slope wash.

The evidence for the Ocós ground surface in Units T1K and T1L indicates maintenance of a relatively flat space on this side of the platform. The distance of the Feature 6 midden from the center of the mound contrasts with the situation particularly in Trench 4. I suggest that the flat area relatively devoid of debris in T1H through T1J was

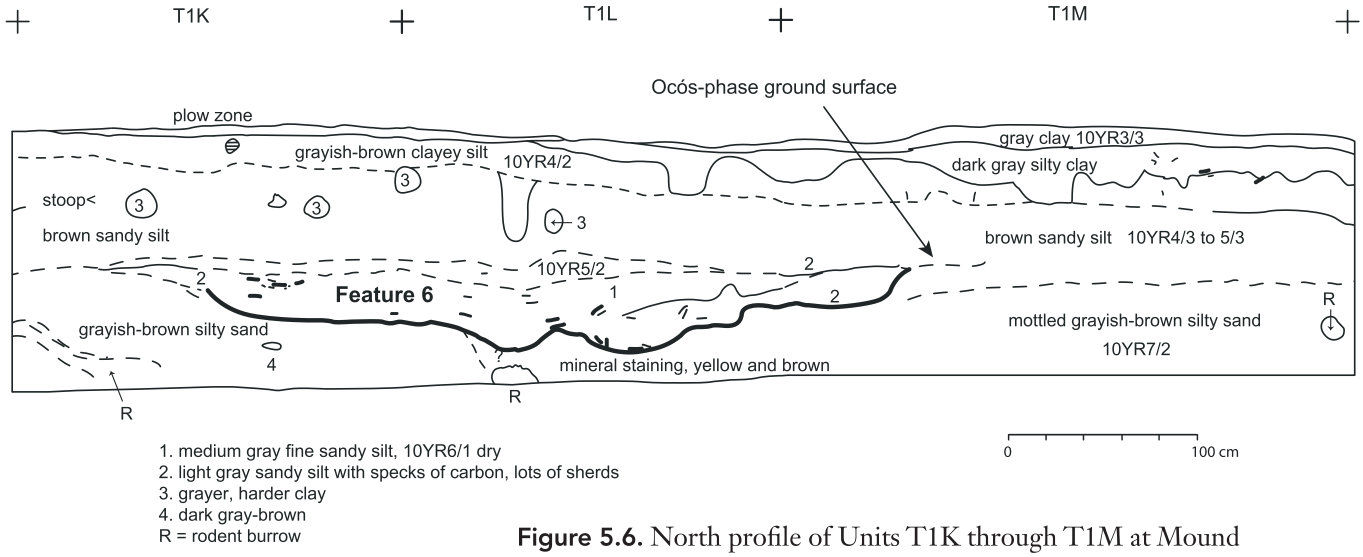


Figure 5.6. North profile of Units T1K through T1M at Mound 32 (before excavation of Unit 1), showing Feature 6 and the inferred Ocós-phase ground surface. *Illustration by R. Lesure and project staff.*

part of a patio area along one of the long sides of the original platform. That suggestion is reinforced by turning next to Trench 3, which also crossed the proposed patio.

A segment of the Trench 3 profile is shown in Figure 5.9. As can be seen in Unit T3D at the extreme right, Zone IV ended immediately under the outermost clay mass of Zone II. When I drew the profile of the southern part of T3D into T3E, I distinguished an upper layer of pale brown clayey silt from a somewhat darker, sandier layer beneath, which I took to be an extension of Zone III. That distinction gradually became more diffuse as one moved into T3F and beyond. I was unsure when I drew the profile whether Zone III or Zone IV represented the pre-platform ground surface; I now propose the latter interpretation and suggest that, in this off-platform area, the actual ground surface associated with the original platform was not readily distinguishable, probably because of gradual accretion through slope wash that began during the Locona occupation. If we extend Zone IV from T3D, then we would have an originally flat area extending some 8 to 10 m to the south of the platform in this area. As in the 6 m stretch in Trench 1, there were no pits or middens in this area. In my reconstruction of the Locona platform, I propose that this was a patio area at the front of Structure 32-1.

In T3H and T3I, the lower stratigraphy became somewhat complex. I believe that what was revealed in profile (Figure 5.9) were natural rather than artificial deposits having to do with the interface between two distinct substrata, the gray clay of Units T3J through T3N (14 in the figure) and the silty sand that forms the prominence on which the platform was built (7 and 17 in the figure).

In Trench 2, the most important finds were two concentrations of Ocós-phase refuse (Figure 5.10, top). The first was excavated in Pit 2 (= T2F) and its extension, Pit 2A, in 1992. This was a small pit, Feature 3, close to the original platform. It was dug from Zone IVA—in other words, from what would have been the ground surface beside the platform. It contained domestic refuse of the Ocós phase. Only about a meter away horizontally was Feature 5 (Lot 13) in Unit T2G, a concentration of large Ocós sherds deposited on a sloping surface of the mound (Figure 5.11; see also Figure 5.10). The vertical difference between the surface of deposition of Feature 5 and the surface from which the Feature 3 pit was dug was at least 50 cm. This 50-plus cm of accumulation all occurred in the same phase. Slope wash therefore seems unlikely. Instead, it appears that after the filling of Feature 3, a thick lens of artificial fill was deposited on this side of the original platform. Interestingly, this does not seem to have been shaped into a formal platform with a vertical exterior face. Rather, the fill was deposited in a more stable fashion, to form a gentle slope descending from the center of the mound. In other words, the Ocós-era addition was made to what at that point was a mound rather than a formal platform in the architectural sense.

The only other trench that requires separate discussion is Trench 4 (Figure 5.10, bottom). This excavation yielded various important finds. Unfortunately, the Locona-Ocós construction history was somewhat obscured by a Cherla-phase pit and significant rodent disturbance in Unit T4D. Despite this disturbance, the original platform edge and the probable boundary of the Ocós-era extension to the mound were identifiable in profile. The edge of the latter, with its sloping surface, was in T4E. This interpretation is not based on any discernible color or texture change. It was again the concentration and orientation of sherds that provided subtle evidence of the edge. There was a dense deposit of Ocós refuse—secondary refuse, including large, reconstructable vessel fragments—that, in its stratigraphy, exhibits an upward slant toward the center of the mound.

Figure 5.7. East profile of Unit 1, Mound 32, showing dense domestic refuse in Feature 6. (In the photo, the field label identifying this as the west profile is wrong). *Photo by project staff.*

Figure 5.8. Excavation of Lot 211 in Unit 1 at Mound 32, showing broken pottery in situ. *Photo by project staff.*

This deposit accumulated at the basal edge of the Ocós-era mound. Beneath the Ocós refuse in T4E and T4F was Zone IVA, pretty clearly preserved in both profiles in this location (7 in the figure). Unlike the situation in all other excavated locations, Zone IVA here was a Locona midden, which yielded abundant secondary refuse (with several large reconstructable vessel fragments and also numerous pieces of a ceramic statuette). This Locona deposit appears to have been a midden generated by inhabitants of the original platform.

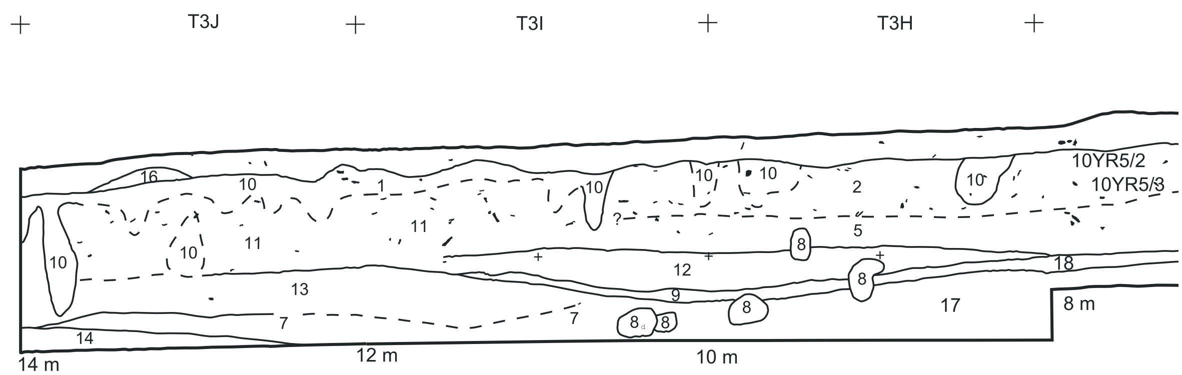


Figure 5.9. Section of the western profile of Trench 3 at Mound 32 (Units T3D throughT3J). The Locona platform (Zones II and III) and underlying ground surface (Zone IV) appear only at the extreme right and Unit T3D. Note, at the extreme left, the natural clay deposit, Zone VI, which underlay Zone V. The bajo to the southeast of the mound may have been a seasonal lagoon well before human occupation. This clay deposit is the likely source of the masses of clay used as platform fill. *Illustration by R. Lesure and project staff.*

1. gray clay, 10YR6/2 to 7/2 dry
2. clayey silt, 10YR6/3 dry
3. clayey silt with flecks of clay, 10YR6/3 dry
4. medium-coarse sand in gray clay, 10YR6/2
5. fine sandy silt, 10YR5/3
6. fine sandy silt, somewhat clayey, 10YR5/3 to 4/2
7. fine silty sand with mottled mineral stains

Dating of the Platform and Its Extension

I have repeatedly indicated that, in my assessment, the original platform was constructed in the Locona phase. The extension was built up during the subsequent Ocós phase. In this section I lay out the case for those claims. Table 5.1 identifies rim sherds from screened units of the platform fill, the proposed extension, and Feature 3. I consider the following six propositions:

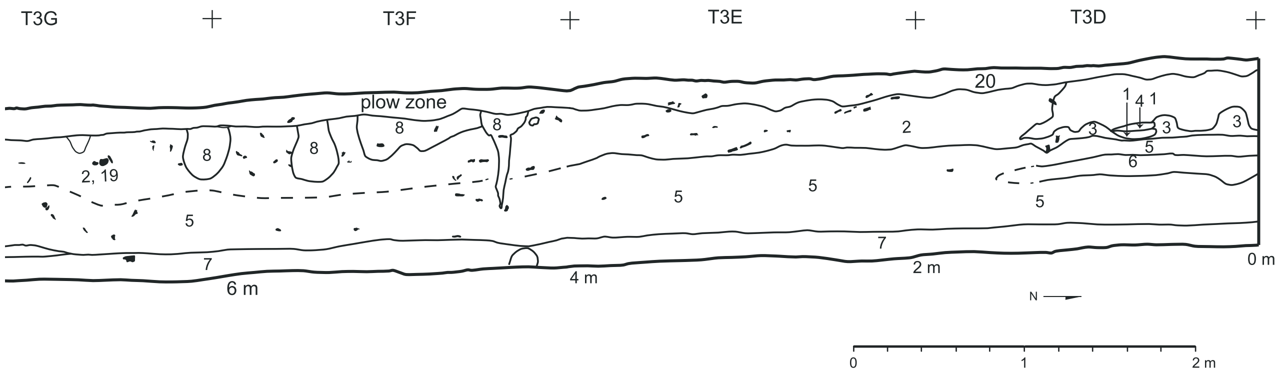
- A1. The platform was constructed in the Locona phase.
- A2. The platform was constructed in the Ocós phase.
- A3. The platform was constructed later than the Ocós phase.
- B1. The extension was constructed in the Locona phase.
- B2. The extension was constructed in the Ocós phase.
- B3. The extension was constructed later than the Ocós phase.

I also explain the basis for envisioning a time lag between construction of the original platform and the "extension." In other words: Could this simply have been one construction?

Of particular interest are datable features atop or sealed beneath either the platform or its extension. Features 3 and 5 are very important in that regard. The contents of the platform and its extension are relevant but less definitive. In those cases, Locona sherds are pervasive, indicating that construction must have been in that phase or later. It is relevant to consider whether there are also Ocós (or later) sherds in these deposits that might help place construction subsequent to the Locona phase. However, given clear evidence of rodent burrows and root disturbance, we need to look for a recurring pattern of later sherds in multiple units. Lots from the platform extension in Trench 4 are particularly problematic because they were disturbed first by a Cherla-phase pit and then by extensive rodent burrows.

As a first step, we can eliminate propositions B1, B3, and A3 based on Features 3 and 5. Feature 3 was sealed under the platform extension. Since it was convincingly Ocós rather than Locona, the extension cannot have been built before the Ocós phase (eliminating B1). Feature 5 consisted of large sherds deposited on the sloping side of an existing platform extension. Since the sherds are convincingly Ocós rather than Cherla or later, we can eliminate both B3 and A3.

In sum, the extension was constructed in the Ocós phase. The remaining questions are: Was there really a lag in time between the original platform construction and the extension? And if there was, was original platform construction in Locona or Ocós? Let us first consider the issue of a lag in time between the construction of the plat-



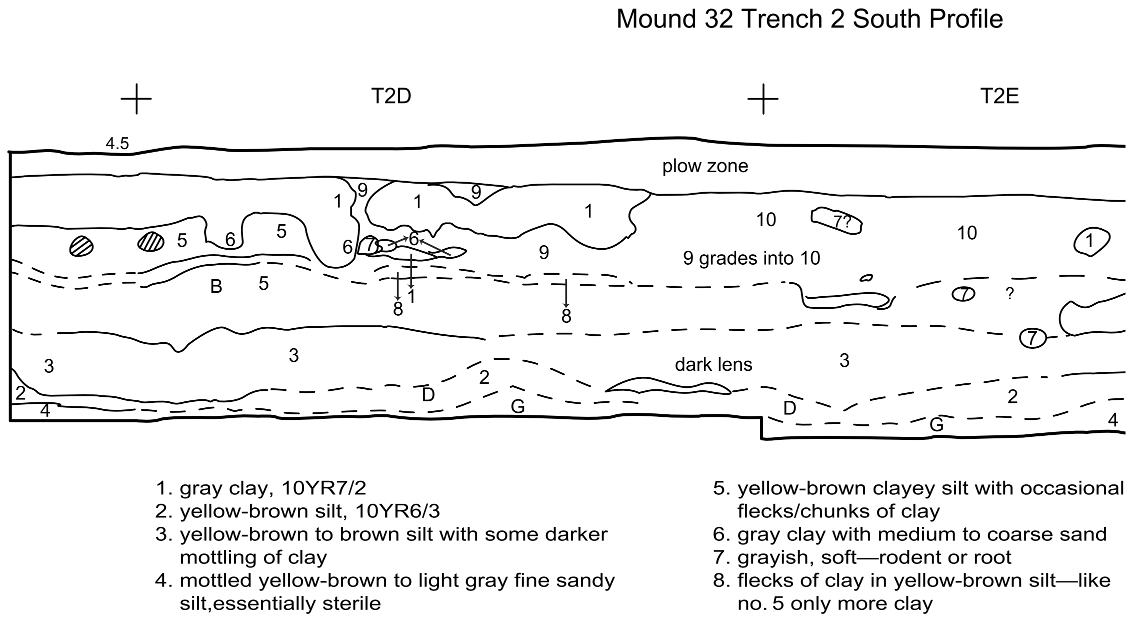
7. fine silty sand with mottled mineral stains
8. grayish silt, not very compact—probable rodent burrow or root, 10YR4/1 to 5/2
9. 10YR6/3 silt with dense yellow (10YR5/6) speckles and brown inclusions
10. like no. 8 only not so loose. Older? Root rather than rodent?
11. clayey silt grading from 10YR5/2 at top to 10YR5/3 at bottom
12. 10YR5/3 to 6/3 fine sandy silt with some inclusions (yellow and brown)
13. clay, sand, and silt, grades from 10YR5/3 to 10YR6/3
14. 10YR7/2 white-gray clay with yellow and brown mineral concretions
15. 10YR5/2 to 4/2 clayey silt, mineral inclusions
16. hard, black clayey silt
17. yellow speckles and brown inclusions, but less than above
18. 10YR 6/3 silt with dense yellow speckles
19. grades from gray at top to brown at bottom
20. 10YR5/2 clayey silt

form and its extension. The case is circumstantial; it cannot be definitively proved. There are two general points to be made. First, there is the Locona midden in Trench 4. The midden was primarily in T4F, outside the hypothesized boundary of the extension. It could therefore date from before construction of the platform. However, the midden was appropriately positioned for deposition of refuse by occupants of the platform. Underneath the platform, the density of cultural material was extraordinarily light and no features were identified. The sherd assemblage was also generally earlier than the T4F midden, with a substantial percentage of Barra sherds. The T4F midden is accounted for most satisfactorily by positing that its deposition post-dates construction of the platform. Since it was deposited in the Locona phase, there would necessarily have been a lag in time between construction of the original platform and the Ocós-phase extension.

A second consideration is the composition of the fill in the original platform versus the proposed extension. That of the original platform was a mixture of masses of sediments with distinctive colors and textures, sediments that are identifiable as deriving from natural, pre-occupation substrata in the vicinity of the platform. The matrix of the extension was, in contrast, a homogeneous brown that was indistinguishable in color and texture from subsequently deposited zones of slope wash. The most likely reason is that the sediment used for the extension was dug from slope wash rather than from a pre-occupation substratum. It was obtained, in other words, from a deposit that had accumulated since occupation of the site began. In terms of composition, then, the original platform fill looks like it should be from earlier in the occupation of the site, when pre-occupation substrata were still close to the surface in lower-lying areas of the site. The fill of the extension, in contrast, looks later, since it derives from slope wash that would have buried natural strata like Zone VI during the first few hundred years of occupation of the site.

That argument for the original platform versus the extension at Mound 32 is consistent with the composition of other platforms at the site. The platforms in Mound 6 and the ballcourt construction in Mound 7, also Locona in date, have fill composed of masses of sediments of distinct colors and textures—most likely deriving from natural, pre-occupation substrata in the vicinity of those mounds. The Cherla-phase platforms in Mounds 1 and 12 appear to derive from middens and slope wash. In color and texture they are similar to the proposed extension at Mound 32. In sum, then, the fill of the original platform looks like Locona-phase platform fill elsewhere at the site, whereas the fill used for the extension looks more like those of later platforms.

If we accept the likelihood of a gap in time between construction of the original Structure 32-1 platform and its subsequent extension, there still remains the issue of the phase of construction (propositions A1 versus A2). I have already basically laid out the case for A1 in the preceding discussion by: (1) noting that the Locona midden in T4F is best explained as generated by occupants of the platform; (2) noting a similarity in the composition of the Structure 32-1 platform and that of Locona platforms in Mounds 6 and 7; and (3) tying those compositions to the conditions of availability of sediments early in the occupation of the site, in other words, during the Barra or Locona phases. The only additional point to be made is that the cultural contents of the fill of the platform and the underlying ground surface (Zone IV) are consistent with construction of the original platform during the Locona phase.



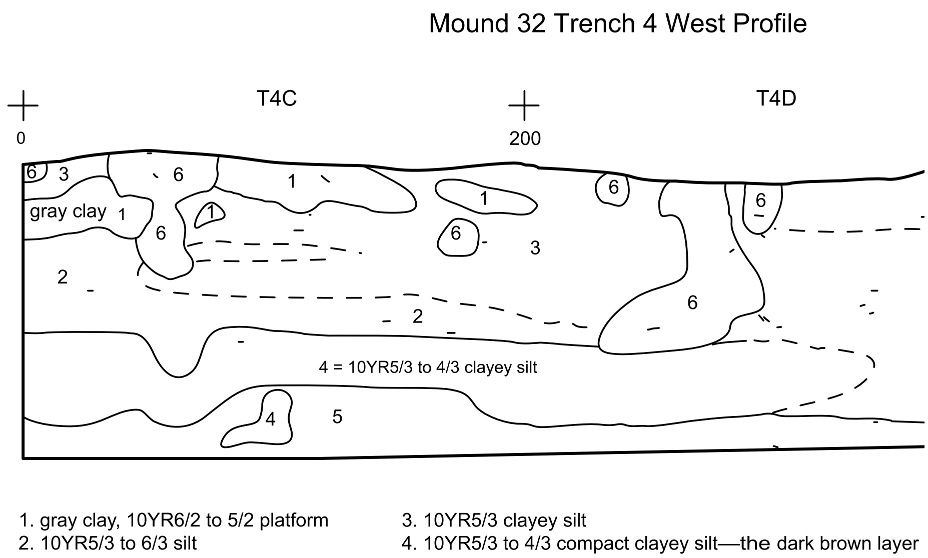
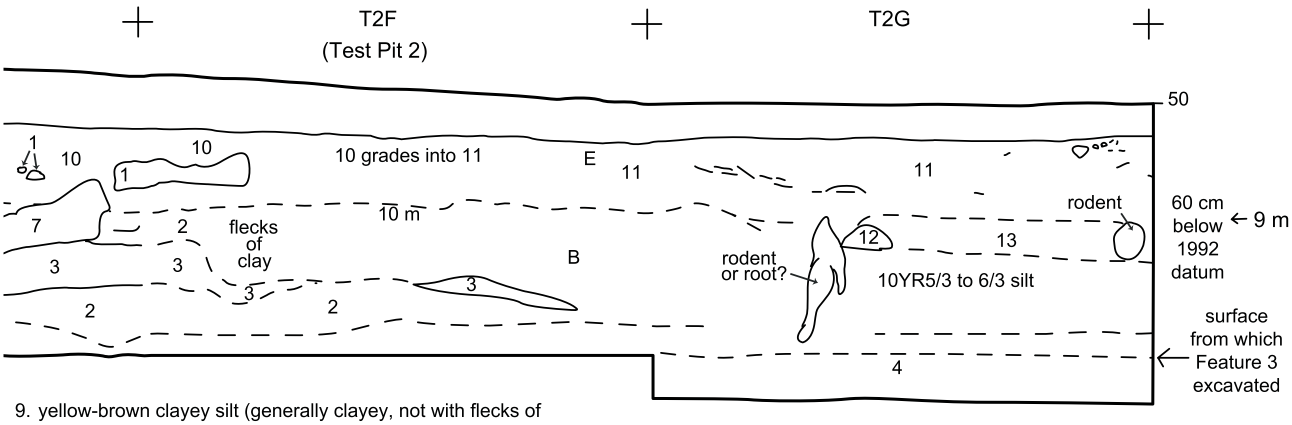


Figure 5.10. Segments of Trench 2 and Trench 4 showing the termination of the fill lenses and, in the case of Trench 2, Feature 5 and the level from which 3 was excavated. *Illustration by R. Lesure and project staff.*

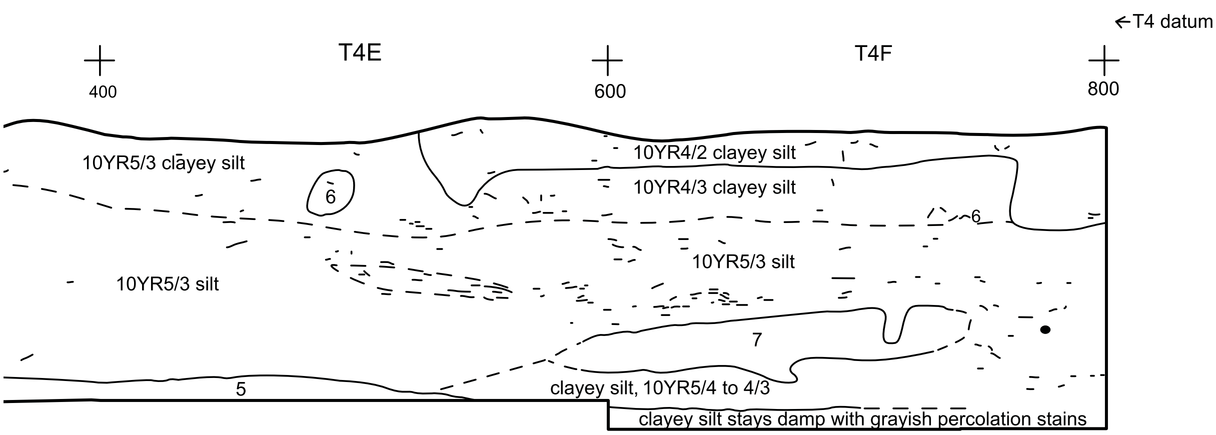
OVERVIEW OF FEATURES

Investigations at Mound 32 focused on one very large feature, the platform. Probably because of the reliance on trenches rather than extensive block excavations, relatively few other features were encountered. Several trash-filled pits and toss middens were excavated in the ancient ground surface surrounding the platform. Five features were encountered on the surface of the platform or its extension. Of those, only two can be confidently dated. (The owner of the land at the time of excavation reported that, as a child, he had lived with his family in a pole-and-thatch structure atop the mound.)

An important theme that emerged from study of the features and finds at Mound 32 is the changing character of activities and their organization from Locona to Ocós phases. I have analyzed this in terms of differential formalism, first in an article focused on Mound 32 (Lesure 1999a) and then in a more general work proposing that Locona-phase ceremonialism at Paso de la Amada was based on differential formalism, without a distinction between "public" and "domestic" (Lesure 2011a). The argument is revisited in Chapter 27, but it is helpful to note the following attributes that, appearing in combination, indicate formalized use of space during the Locona phase at Paso de la Amada: architectural platforms 50 cm or more in height; traces of large structures more than 10 m long; careful termination of a structure; refurbishment of struc-



9. yellow-brown clayey silt (generally clayey, not with flecks of clay as in nos. 5 and 8), 10YR6/3
10. pale brown clayey silt, ranges from 10YR6/3 to 10YR6/2, slightly grayer than underlying yellow-brown silt, also somewhat clayey
11. pale brown clayey silt, ranges from 10YR5/3 to 5/2
12. yellow-brown clayey silt with flecks of yellowish (10YR7/3) clay
13. pale brown clayey silt, slight yellowish mottling when wet



5. 10YR5/3 to 6/3 silt mottled with 10YR7/2 light gray
6. dark gray, loose, rodent or root, 10YR5/2 to 4/2
7. 10YR5/3 to 4/2 clayey silt—the dark brown layer

tures or platforms with continuity of location, orientation, and function; subfloor offerings; and the presence of certain rare ritual objects. Informal spaces are indicated by lateral or ad hoc extensions to platforms, traces of structures 8 m or less in length, isolated human burials, clusters of burials, domestic garbage on the floor of a structure, pits filled with domestic refuse, toss middens representing accumulations of domestic trash on an occupation surface, ditches (often filled with refuse), very deep pits that may have been wells, and occupation of an unstable surface of loose sand.

My basic proposal concerning Mound 32 is that although people lived on the mound during both the Locona and Ocós phases, the daily activities of the Locona occupants were self-consciously formalized whereas those of the Ocós occupants were informal (Lesure 2011a:125–26). That contrast is a theme in the following review of the successive occupations.

THE LOCONA OCCUPATION

It remains uncertain whether there was any occupation at Mound 32 prior to construction of the platform. There were both Barra and Locona sherds in the buried ground surface under the platform, but the density of cultural material was light and no definite features were recovered. Topics to be discussed are the platform itself and associated evidence for structuring of the activities of the occupants, the contents of the Locona midden, and a single feature atop the platform that cannot be definitively dated.

Figure 5.11. Feature 5 in Unit T2G at Mound 32, showing sherds in situ, apparently a surface deposit on a sloping outer edge of the mound during the Ocós phase. This feature, especially when compared to the underlying Feature 3 (see text) is an important piece of evidence for an Ocós-era extension to the platform. *Illustration by R. Lesure and project staff.*

Structure 32-1

The original platform was approximately 30 m long and 12 m wide (Figure 5.12). Its thickness at the time of excavation was about 70 cm. The original height before erosion and plowing must have been at least 90 to 100 cm. The long axis of the platform was oriented 30° east of north, approximately parallel to the orientation of the nearby Mound 7 ballcourt and more or less perpendicular to the large structures at Mound 6.

The platform was constructed sometime during the Locona phase. Since Mound 6 appears to have been continuously occupied throughout that phase, with a series of steadily enlarged platforms, each supporting a large perishable building, the Mound 32 platform must have been occupied at the same time as one of the Mound 6 buildings. If Structure 32-1 was contemporary with Structure 6-4, then it was rather similar in height and somewhat larger in its horizontal dimensions than its counterpart at Mound 6. If instead it was contemporary with Structure 6-3 or some later structure at Mound 6, then the platform at Mound 32 was distinctly smaller than its Mound 6 contemporary. Either way, the general similarities in shape, particularly with the well-documented Structure 6-4, suggest that, like the platforms at Mound 6, the Mound 32 platform was architectural in that it served as the base for a large, roofed structure made of perishable materials. I will assume that was the case; the point cannot be definitively demonstrated.

Another feature of Structure 6-4 was a prepared clay floor extending somewhat to the sides and back but particularly to the front of the building. The result was a patio area some 45 m wide extending 13 m out to the front of the building (Clark 2004a:58, Figure 2.4). Something similar seems likely along the southern side of Structure 32-1, as noted above in discussion of Trenches 1 and 3. Because there was no protection provided by fill from later platform construction, conditions of preservation of the Structure 32-1 patio were poor. The primary evidence for a patio is that the Locona ground surface was essentially flat for about 7 m to the front of the platform. Further, judging from the low densities of cultural material (Figure 5.12), this area appears to have been kept clean during the Locona occupation.

The swept-clean southern side of the platform contrasts with the northern side, where a Locona midden was revealed in Trench 4. As noted above in the discussion of stratigraphy, this midden appears to consist of refuse generated by the occupants of Structure 32-1.

Consideration of the finds at Mound 32 alongside those at Mound 6 suggests that the Locona midden area at Mound 32 marks the back of the platform-top building, with the patio area the front. Sweeping in front of the building maintained the formal spatial division between the raised platform surface and the surrounding area. Refuse was deposited in a segregated area out of sight from the front of the building.

The Locona Midden

The Locona midden to the back of Structure 32-1 contained 73 pieces of a remarkable object: a hollow, ceramic statuette that originally stood at least 60–70 cm tall (shown in Figure 16.8). It is the largest example of statuary known from the Locona phase. The size alone raises the possibility of use in collective rituals with numerous participants.

After the initial discovery of multiple fragments in T4E and T4F, Units 2 and 3 were excavated to recover more of the figure. Additional fragments were recovered only in Unit 2; it is obviously unknown whether further excavation would have recovered the entire figure. The implication of these observations is that when the statuette was broken—whether intentionally or unintentionally—the pieces were collected and deposited relatively rapidly in a midden near the location of use. That point certainly suggests the ritualized deposition of a special object through an act intended to remove its sacred power. Still, the pieces of the statuette were mixed into a midden full of other objects. Minus the statuette, the contents of that midden are entirely explicable as deriving from normal domestic activities. The full spectrum of such activities is represented.

Tables 5.2 and 5.3 document these claims concerning the domestic character of the Locona midden through a comparison with contents of three collections of Ocós-phase refuse from Mound 32. I have chosen this approach (rather than a comparison with Locona-phase refuse samples from other mounds) because it is important to my argument here to document continuity in the domestic character of daily life at Mound 32, even as the structuring of those activities shifted from formalized to informal. (For a comparison with other Locona middens, see Lesure 2015:Table 1.) This is one of the observations that previously prompted me to propose that the distinctions temple-versus-residence and, more generally, public-versus-domestic were not yet present in Locona-phase ceremonialism at the site (Lesure 2011a).

Table 5.2 provides the percentage distribution of vessel forms (based on counts of rims) in the Locona midden, the overlying Ocós midden, and Features 3 and 6. The classification is as close to a functional one as is possible without considering rim diameter (which is not available for all the rims analyzed). The most notable differences between the Locona midden and the Ocós refuse samples is the high percentage of slipped tecomates in the Locona sample. Although such tecomates are generally smaller than unslipped tecomates and likely more often associated with serving than storage/preparation, the pattern observed in Table 5.2 is actually generally observed between Locona and Ocós vessel assemblages. (See Table 2.8B, rightmost column, and Table 20.8.) It thus cannot be interpreted in a specific way in relation to Mound 32. The same argument holds for restricted-rim bowls and vertical-walled bowls, which are both slightly more common more generally in the Locona phase than in Ocós (see Table 20.8). Overall, Table 5.2 documents substantial continuity in the functional nature of the vessel form assemblage from Locona and Ocós occupations at Mound 32, with differences ascribable to larger patterns of change between the phases rather than to changing social practices specific to Mound 32.

Table 5.3 presents other relevant artifacts and statistics. Under "Basic Statistics," the density of sherds, the average sherd weight, and the rim sherd completeness index (see note with table) are of interest in assessing the comparability of the deposits in terms of formation processes. The last two, in particular, help in consideration of the possibility that the refuse associated with the Locona statuette might have been a background of well-trampled tertiary debris. The statistics suggest that the Locona midden instead represents typical secondary refuse. The average sherd weight is similar to those of the Ocós refuse deposits. The completeness index is somewhat less than in the Ocós samples, but all four of those are actually relatively high, with the Locona value well within the range of secondary refuse.

In the rest of the table, other artifacts are registered either as counts or by weight; in the case of the more common artifacts, volumetric densities are provided. The overall picture is again one of pervasive similarity. There are grinding stone fragments and net weights in all the deposits. The volumetric density of fire-cracked rock is lower in the Locona midden, but that of fish bones is higher. (Bone was not particularly well preserved in the Locona-Ocós deposits at Mound 32.) The lack of "special" stone artifacts such as celts, bark beaters, and sandstone (used for lapidary tools) in the Locona midden is not especially surprising since most deposits do not contain any of those rare items. Their presence in the Ocós refuse, from an era when activities at the mound were no longer highly formalized, is of interest. Personal ornaments appear in both Locona and Ocós deposits.

The presence of possible ritual objects is of great interest given the statuette in the Locona midden. The question is whether ritual objects generally are more common there than in the Ocós deposits. Possible ritual objects appear in both the Locona and Ocós refuse samples. In terms of volumetric density, noted in the last row of the table, the Locona sample is not distinctive in terms of the overall frequency. It stands out only in the presence of the virtually unique statuette.

Feature 1

Besides the platform and associated midden, no other definitively dated Locona features were identified at Mound 32. Feature 1, excavated in 1992, turns out to be very close

Table 5.1. Rim sherds by type and form from the Mound 32 platform, the extension to the platform, and Feature 3

Type by Phase	Vessel Form[a]	Platform	Extension	Feature 3
Typical of Barra or Locona				
Capote White	T2c	1		
Chilo Red	B	3		
	B1 or B4	1		
	B1a		2	4
	B3	2		
	B4			
	B9?	1		
	BR1c	4		
	BR4			2
	T2		1	
	T2a	8		2
	T2b			2
	T2c	2	1	
	T3		1	
Colona Brown	BR1c	2		
Cotan Red	T2	3		
Michis Specular Red	T1		1	1
Monte Red on Buff	T1	1		
Papaya Orange-Pink	B1	1		
	B3	1		
	B effigy	2		
	T2	3		
Tusta Red	T3		1	
Locona or Ocós				
Michis Red Rim	T1	6	1	12
Red	B	3	1	
	B1	5	1	3
	B3	1		
	B5	1		
	BR1c		1	
	L1	1		
	T2	3		
	T2a	3		1
	T4			1
Typical of Ocós				
Amada Black-to-Brown	T5			2
Paso Red	B	1		
	B1b			2
	B5			1
	BR3b			1
	BR7			2
	T2a			1
Michis Burnished Rim	T1			4
Mijo Black and White	BR7			1

Type by Phase	Vessel Form[a]	Platform	Extension	Feature 3
Post-Ocós				
Unidentified jar			1	
Miscellaneous, Non-diagnostic				
Black or Brown	BR1c			1
	T2	2	1	
Burnished Buff	B4	1		
Coarse	B1	2	2	1
	B4			1
	C3			1
	L?	1		
	P1			5
	T		1	
White	B1a		1	
	T2			1
Unidentified	B	3	1	
	T	10		6
	unidentified	8		

[a] Codes for vessel forms are presented in Figure 8.1.

Table 5.2. Percentage distribution of vessel forms in midden contexts at Mound 32, based on rim sherds[a]

Vessel Form	Locona Midden (3203A)	Ocós Midden (3204A)	Feature 6 (3205A)	Feature 3 (3201A)
open bowl (various codes)	40.1	43.4	35.1	33.3
vertical-walled bowl (B3)	2.5	0.8	0.6	
restricted-rim bowl (B5)	5.5	2.1	1.9	1.8
unspecified bowl (B)	0.4	2.7	12.6	
slipped tecomate (T2, T3)	21.5	10.5	3.7	10.5
unslipped tecomate (T1)	15.6	29.8	25.0	29.8
unspecified tecomate (T)	8.9	8.7	15.9	10.5
decorated tecomate (T4)			0.8	3.5
regular basin (B9)	0.4	0.6	0.8	1.8
large basin (B9)	0.8			
crude plate (P1, P2)	3.4	0.8	3.3	8.8
other	0.8	0.6	0.2	
	100.0%	100.0%	100.0%	100.0%
Not included above				
censer		1	9	1
lid (L)	5	3	1	
unidentified rim	11	33	2	
Total rim sherds	253	553	527	58

[a] The samples include the following lots: Locona midden: Lots 179, 189, 210, 212, 214, 216, 243, 245; Ocós midden: Lots 170, 173, 175, 201, 205, 231, 235, 237, 240, 241, 242; Feature 6: Lots 29, 33, 72, 75, 78, 80, 193, 196, 199, 200, 202, 204, 206, 211, 213, 219; Feature 3: designated "Mound 32 Feature 3" in 1992 excavations.

Table 5.3. Contents and basic statistics on midden contexts at Mound 32[a]

	Locona Midden	Ocós Midden	Feature 6	Feature 3
Basic Statistics[b]				
Volume excavated (m^3)	2.516	3.013	3.044	0.116
Weight of sherds (kg)	24.58	65.66	65.75	4.26
Density of sherds (kg/m^3)	9.8	21.8	21.6	36.8
Average sherd weight (g/sherd)	8.0	7.8	7.5	6.4
Completeness index	0.056	0.065	0.068	0.083
Food Procurement or Processing				
Metate fragments	3	5	11	
Mano fragments: two hand/one hand	2/2	0/2	1/1	
Mortar fragments	2	0	0	
Pestle fragments	0	0	2	
Cylindrical clay net weights	1	1	13	0
Notched sherd net weights	1	1	2	0
Fire-cracked rock, kg (and kg/m^3)	1.86 (0.7)	2.69 (0.9)	5.54 (1.8)	0.26 (2.2)
Fish bones, NISP (and $NISP/m^3$)	16 (6.3)	13 (4.3)	3 (1.0)	42 (362.0)
Special or Imported Tools				
Obsidian flakes, kg (and kg/m^3)	0.823 (0.33)	1.758 (0.58)	0.816 (0.27)	0.106 (0.91)
Celt fragment	0	0	1	0
Bark beater fragment	0	1	0	0
Sandstone (unworked)	0	1	0	0
Personal Adornment				
Greenstone pendant	1	0	0	0
Soapstone disk bead	0	1	1	0
Ceramic bead	0	0	1	0
Possible Ritual Objects				
Ceramic statuette	1[c]	0	0	0
Hollow figurine fragment	2[d]	1	0	0
Solid figurine fragment	17	13	20	1
Whistle fragment	0	0	0	1
Rattle fragment	3	8	10	3
Censer fragment	0	1	10	1
All ritual objects per m^3	*9.1*	*7.6*	*13.1*	*51.7*

[a] The lots included are the same as those listed in Table 5.2.

[b] Average sherd weight is the weight of sherds (in grams) divided by the number of sherds; completeness index is the proportion of rim sherds constituting 15 percent or more of the original mouth of the vessel. (Measured rims comprising less than 5 percent of the original mouth are treated as unmeasurable to minimize inter-observer differences.)

[c] Numerous fragments from a single large statuette that originally stood 60 to 70 cm tall.

[d] There is a third piece that appears to be from the same figurine as one of the other two.

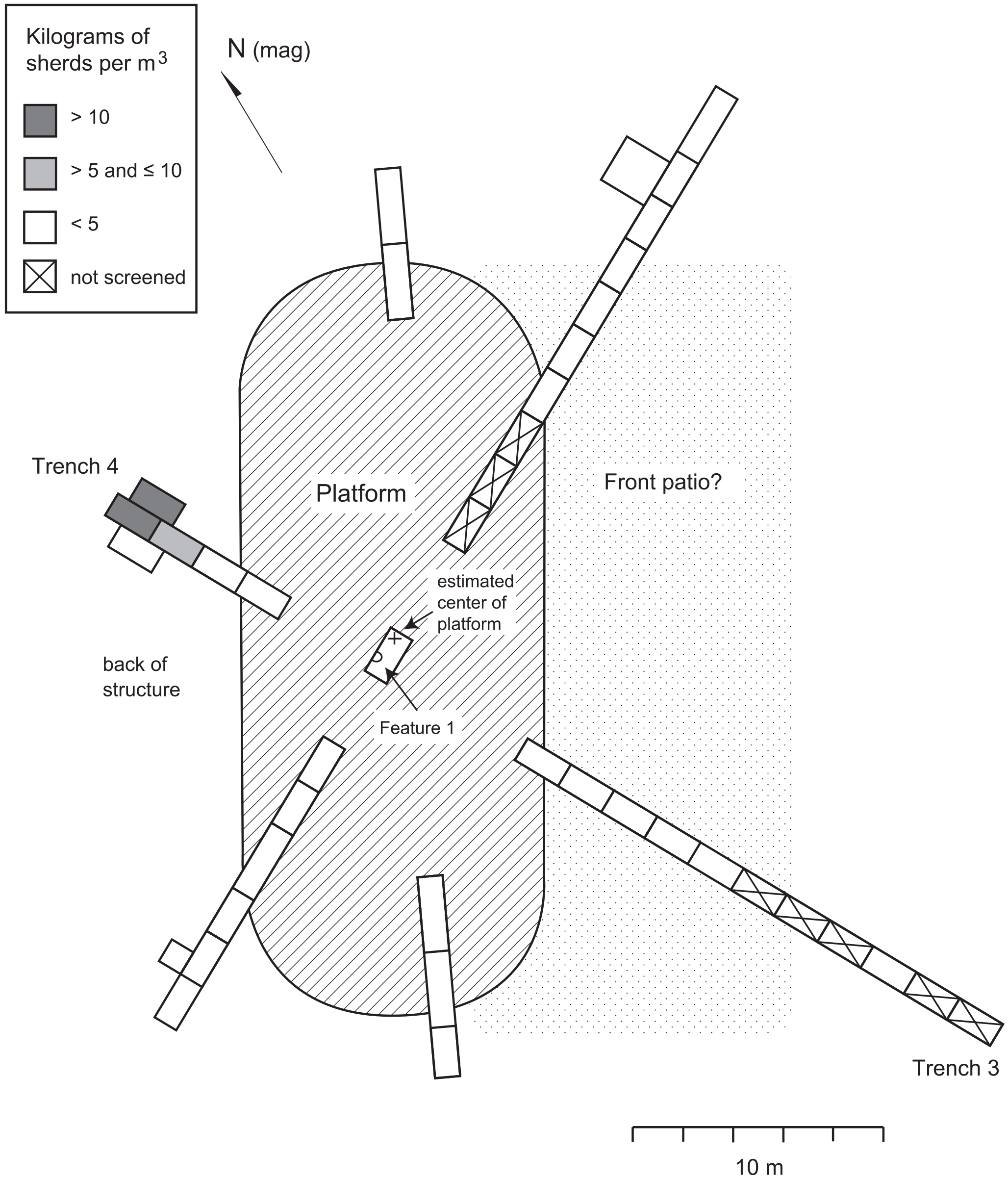


Figure 5.12. Locona occupation at Mound 32, showing the platform of Structure 32-1 and associated features. Note the restricted distribution of Locona-phase domestic refuse toward what was likely the back of the platform, as indicated by the densities of sherds per cubic meter. *Illustration by R. Lesure*.

to the center of the platform as extrapolated from the stratigraphic evidence in the trenches (Figure 5.12). It was a round, flat-bottomed pit or post hole, 45 cm in diameter and about 50 cm deep. The fill was characterized by the same low density of Barra and Locona sherds as the platform into which it was dug (Figure 5.13). It cannot be definitively dated. This feature could be a centerline post hole for the platform-top structure (though the flat bottom is somewhat puzzling). Another possibility is that it was dug to place a perishable offering near the center of the structure.

Summary

To summarize, the Locona midden at Mound 32 indicates that the occupants of the Structure 32-1 platform were engaged in a full range of ordinary domestic tasks. The large, platform-top structure, like those at Mound 6, was a residence—people lived there. In contrast to the occupants of other, contemporaneous households and to the Ocós-phase inhabitants of Mound 32 itself, the Locona-phase occupants conducted their domestic life in a formalized manner. They kept the front of the platform swept clean,

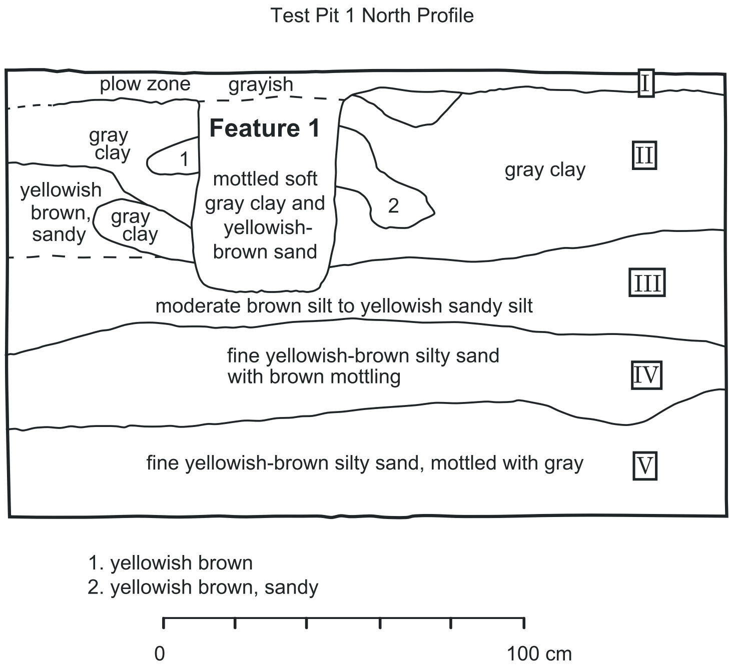


Figure 5.13. North profile of Test Pit 1 at Mound 32, showing Feature 1. *Illustration by R. Lesure and project staff.*

maintaining a set of spatial divisions between activities (minimally, those atop versus beside/around the platform). They deposited garbage to the back of the platform rather than strewing it around haphazardly. Finally, although all households were engaged in ritual activities, the presence of the statuette suggests that certain rituals conducted at Structure 32-1 were not common to other households. The large size of the statuette would have made it appropriate for viewing at a distance and thus for a ritual involving significant numbers of participants; all other ritual objects registered in Table 5.3 are much smaller items. I suggest that the greater formalism of daily practice at Locona-phase Mound 32 was accompanied by periodic rituals involving participants well beyond the occupants of this particular dwelling.

THE OCÓS OCCUPATION

Occupation at Mound 32 continued into the subsequent Ocós phase. By the Ocós phase, however, a significant accumulation of sediment had occurred at the edges of the original platform. This would have made the platform itself less impressive. In addition, the inhabitants began to deposit refuse in a less segregated fashion, around the sides of the original platform instead of just to the "back" (Figures 5.14 and 5.15). Indeed, the platform by this time had become a mound: an accumulation of deposits with gently sloping sides rather than a formally maintained construction.

Extension to the Original Platform

There was at least one significant artificial extension to the original platform during the Ocós phase. This is discussed above under "Stratigraphy," and a suggested reconstruction is shown in Figure 5.15. Two important points distinguish this construction from platform extensions observed at Mound 6. First, the extension did not encase the old platform. It was a lateral extension along one side of the original platform. Second, the extension appears to have differed in character from the original platform in that its outer surface was gently sloping. It was not constructed as a formal architectural platform with a vertical exterior face. Instead, it seems to be better characterized as an extension to the upper surface of the *mound*. In this Ocós-phase extension, we do not see the effort, evident in the case of the original platform, to create distinctive spaces (a raised upper surface of the platform distinguished from the surrounding area).

Features 3, 5, and 6 and the Ocós Midden

Various refuse features document domestic activities during the Ocós phase, indicating that people were still living atop the platform. Features 3 and 6 were pits filled with domestic refuse in Trenches 2 and 1, respectively. Feature 5 was a scatter of large sherds on the sloping side of the platform extension in Trench 2. The "Ocós midden" was a stratified accumulation of refuse identified in Trench 4. Contents of Features 3, 6, and the Ocós midden are reported in Tables 5.2 and 5.3; see also Figures 5.6–5.8 and 5.10–5.11.

Summary

In general, the Ocós occupation of Mound 32 displays less order, arrangement, and segregation than does the preceding Locona occupation. There was no longer a clear spatial

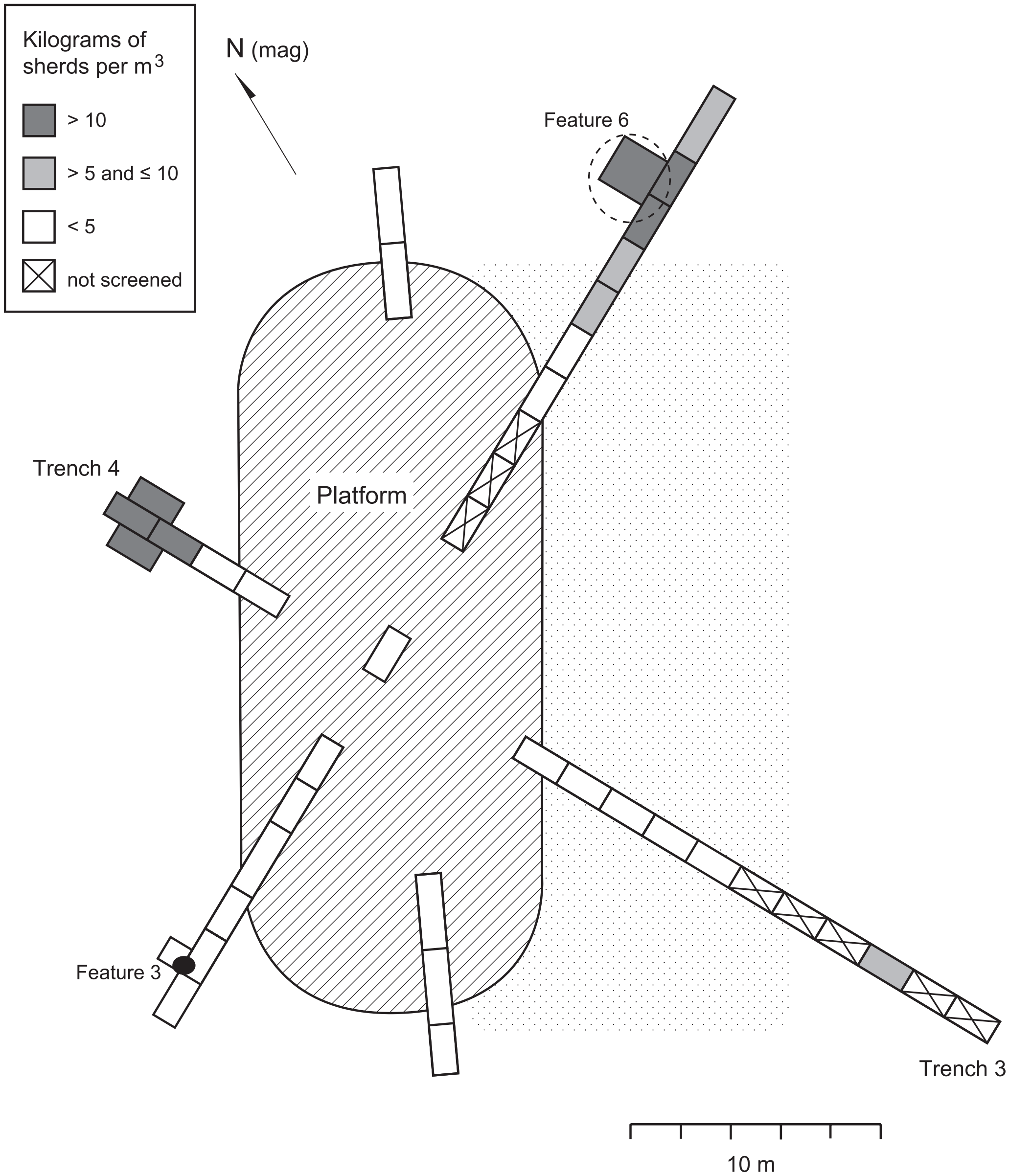


Figure 5.14. Initial Ocós occupation at Mound 32. Note the accumulation of refuse in additional locations compared to the Locona occupation shown in Figure 5.12. *Illustration by R. Lesure.*

distinction between the platform and its immediate surroundings, and the distribution of artifacts indicates that the occupants no longer made an effort to maintain such a distinction. The Ocós extension to the original Locona platform at Mound 32 does not reveal the concern with formalism and continuity that one sees in the series of constructions at Mound 6 during the Locona phase. However, as I have previously noted, Ocós-phase activities at Mound 6 may also have been less formalized than their Locona-phase counterparts, despite the very impressive mound on which they took place. Such observations suggest a history of ceremonialism itself at the site (Lesure 2011a), an issue that is considered in Chapter 27.

OCCUPATION AFTER THE OCÓS PHASE

In terms of the overall accumulation of domestic debris, the Cherla-phase occupation of Mound 32 appears quite minor in comparison to that of the preceding Ocós phase. Deposition of refuse in the stratified midden in Trench 4 ceased by the end of the Ocós phase. Although still domestic in character, the Cherla occupation of the mound appears to have been brief, and it is likely that occupation was not continuous from the end of the Ocós phase.

One Cherla-phase feature and one likely Cherla feature were excavated (Figure 5.15). Feature 8 was a trash-

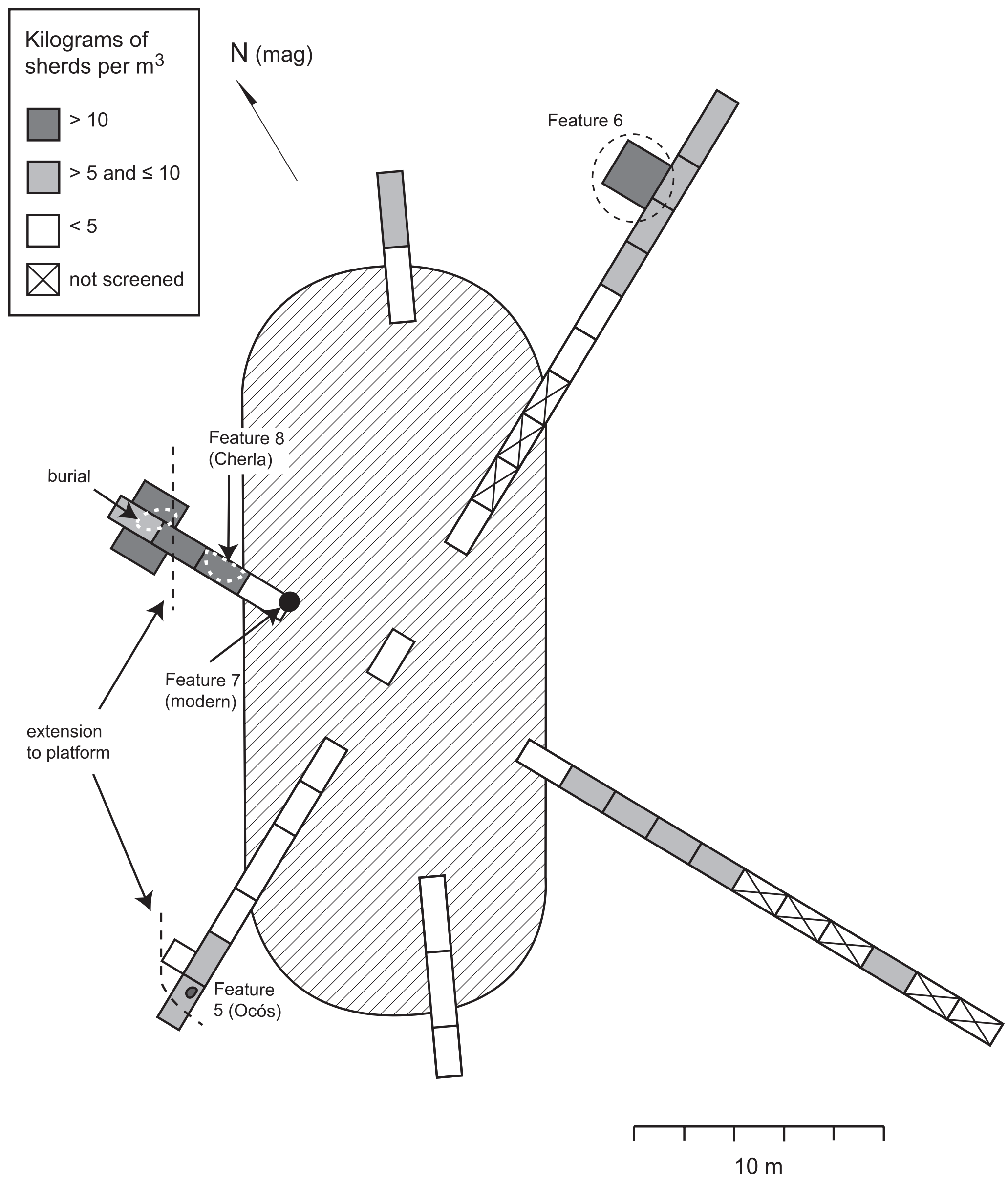


Figure 5.15. Later Ocós to Cherla occupation at Mound 32. The original platform had by this time been extended, though in form it was more a mound (with gently sloping sides) than a platform (with distinct edges). Note the accumulation of domestic refuse to all sides of the original platform; compare with Figures 5.12 and 5.14. *Illustration by R. Lesure.*

filled pit that appeared immediately below the plow zone in T4D. This pit penetrated into the Ocós-era extension to the platform. Burial 1 appeared about 40 cm beneath the plow zone in Unit T4F and Unit 2. It penetrated into the Ocós midden rather than the extension to the platform. Thus, while it could possibly be (late) Ocós in date, it is more likely post-Ocós. The Cherla phase is most likely, though there seems to have been a Jocotal occupation of the mound, so that would be another possibility. The bones were in very bad shape (Figure 5.16). The lower body was extended and articulated.

By the end of the Cherla phase, continuous occupation of the mound had ended. In layers of slope wash surrounding the mound, we found a persistent minor occurrence of Jocotal sherds, suggesting the possibility of a domestic occupation, again apparently relatively brief judging from the scant overall accumulation of debris.

Figure 5.16. Burial 1 at Mound 32. The bone was poorly preserved; shown here are the extended legs, in Unit 2. *Photo by project staff.*

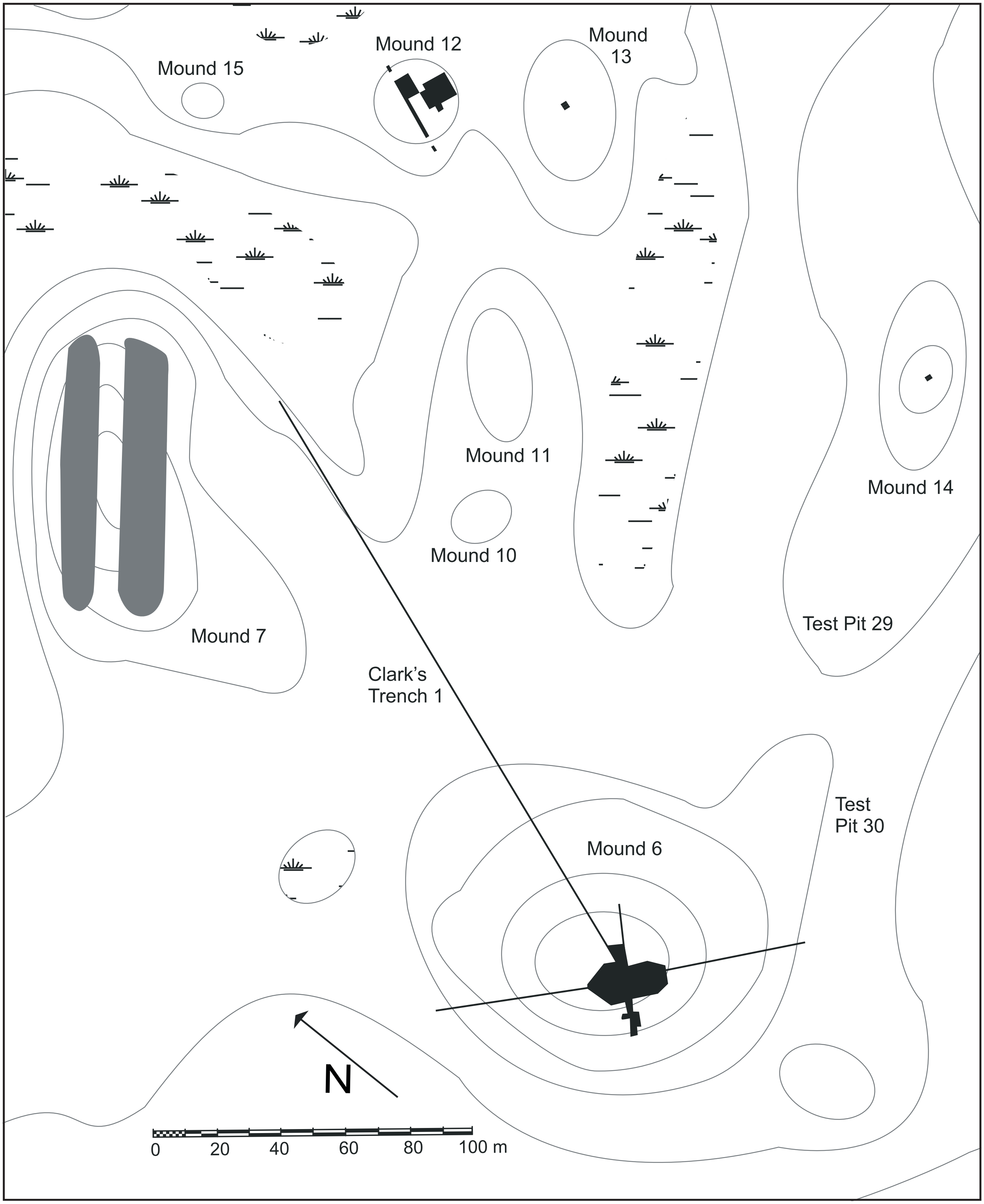


Figure 6.1. Mounds and excavations in central and southwestern sector of site. The ball court is shown superimposed on Mound 7. *Illustrations in this chapter by R. Lesure and project staff unless otherwise noted.*

CHAPTER 6

Excavations in Other Mounds and in Off-Mound Areas

Richard G. Lesure and Michael Blake

SMALL-SCALE EXCAVATIONS conducted from 1990 to 1997 were concentrated in the southwestern sector of the site, including test excavations at Mounds 10, 11, 13, 14, and 15 and in off-mound locations in Test Pits 29 and 30. Particularly interesting was Mound 14, which appears to have been part of a platform more than 100 m long and dating to the Ocós and Cherla phases, and Mound 13, which may have been the location of a Locona-phase building protected by the fill of an Ocós-era expansion.

Excavations in the southeastern sector of the site included the Test Pit 32 excavations, where an off-mound Locona-Ocós occupation was discovered. In the northern sector of the site, Mound 21 was investigated with five test units. At the northern fringes of the site, excavations at Mz-250 revealed a deep Locona-phase pit.

SMALL EXCAVATIONS IN THE SOUTHWESTERN SECTOR

The southwestern sector of the site has been the location of significant excavations that will be reported in future volumes, including the ballcourt in Mound 7, the elite residence at Mound 6, and Clark's three lengthy trenches radiating from Mound 6. The investigations described here are all small soundings (Figures 6.1, 6.2).

Mound 10

Mounds 10 and 11 are located at the northern end of a low elevation that extends out from Mound 6 toward Mounds 12 and 13 (Figure 6.1; see also Figure 4.1). There are low-lying bajos to the northwest toward Mound 7, to the northeast toward Mounds 12 and 13, and to the southeast toward Mound 14. In 1990 we excavated a single 1 x 2 m sounding in each mound, (long axis toward magnetic north). Excavation was by arbitrary 20 cm levels except where stratigraphic distinctions could be identified during the course of excavation. All material was screened through a 5 mm mesh.

Mound 10 did not have any noticeable elevation in comparison to immediately surrounding areas. However, it was identifiable as a distinctly light-colored patch surrounded by gray. This is a pattern characteristic of all mounds at the site; it derives from plow damage. The inference is thus that Mound 10 used to be a slight mound some 15 m or so in diameter. Plowing has erased its differential elevation in relation to the low promontory on which both it and Mound 11 are located.

The first level consisted of a homogeneous yellowish-brown sandy silt (Figure 6.3) with a mixture of Locona, Ocós, and Cherla sherds. From Level 2 on, sherds represented were Barra and Locona types. The yellowish-brown sandy silt continued to a depth of about 68 cm, at which point there began a gradual transition to a yellowish-gray clayey sand with tiny, dark-colored mineral concretions. The clayey layer was first encountered in Level 4 and continued into Level 5. Under this layer was a natural, pre-occupation deposit of fine orange-brown sand with occasional whitish mottling. That layer, 60–70 cm thick, was essentially sterile, though a few sherds had worked their way into the upper levels. Lesure records taking a handful of this sand to the test excavations then under way in Mound 7; the Mound 10 sample was identical to the "fine

Figure 6.2. Work in southwestern sector of site toward the end of the field season in 1990. Excavations are in progress on Mound 13. The arrow to the left indicates the large heaps of backdirt at Mound 6. The arrow to the right indicates the faintly visible backdirt from the test excavation in Mound 11. *Photo by R. Lesure.*

gold sand" that Michael Ryan recorded as the sterile layer there. Beneath the orange-brown sand at Mound 10 was coarse gray sand, at a depth of 160–170 cm below surface.

The clayey layer above sand at Mound 10 was probably the ground surface during the initial occupation of the site. It contained predominantly Barra sherds. Based on suggestions by Clark (2004a:57–58) and in consideration of the stratigraphy of Mound 11 discussed below, we suggest that the location of Mound 10 may have been an open plaza area early in the occupation of the site. The subsequent accumulation of more than 60 cm of sediment in this area probably involves at least some episodes of purposeful filling, but it would take more extensive excavations to reach a good understanding of the post-Barra depositional history in this location.

Mound 11

Mound 11 is located at the northern end of the low elevation described under "Mound 10" above; it is about 30 m from Mound 10. Mound 12 is about 50 m away in the opposite direction (Figure 6.1; see also Figure 4.1). The first level contained abundant cultural material in a dark gray silty clay (Figure 6.3). In Levels 2 and 3, sherd densities were quite high (41.7 and 31.1 kg/m^3, respectively), but values for average sherd weight were not (6.3 and 5.8 g/sherd). Inspection of the profile after completion of the excavation determined that this abundance of material derived from a lens of grayish-brown clayey silt, 40 cm thick in the north and west profile of the excavation and pinching out toward the southeast. At that point we labeled this Cherla-phase midden—probably a trash-filled pit—Feature 2.

At the bottom of Level 3, a distinction was identifiable between the gray clayey matrix of Feature 2 and the deposit into which the pit was intrusive, a yellowish-brown fine sandy silt with fewer sherds. We excavated these two as Levels 4A and 4B, respectively. Although 4A was from the bottom of Feature 2, the material recovered has significant Locona admixture and we do not treat it as part of the Cherla midden. Sherds in Level 4B were Locona, as were those in Level 5, though in that case possibly with a small number of Ocós sherds.

The most interesting layer in the Mound 11 sounding is a deposit of yellowish-gray sandy clay with small yellow and brown mineral concretions. Some masses of sediments with different colors and textures appeared within this layer: there were pockets of fine, yellowish-brown sand mixed with yellowish-gray clay and of dark gray sandy clay with yellow and brown mineral concretions. Such a mixture of masses of sediments of distinct colors and textures is a common characteristic of Locona fill deposits. (See discussion of the Structure 32-1 platform in Chapter 5.) The fill deposit was excavated in Levels 6 and 7 of the Mound

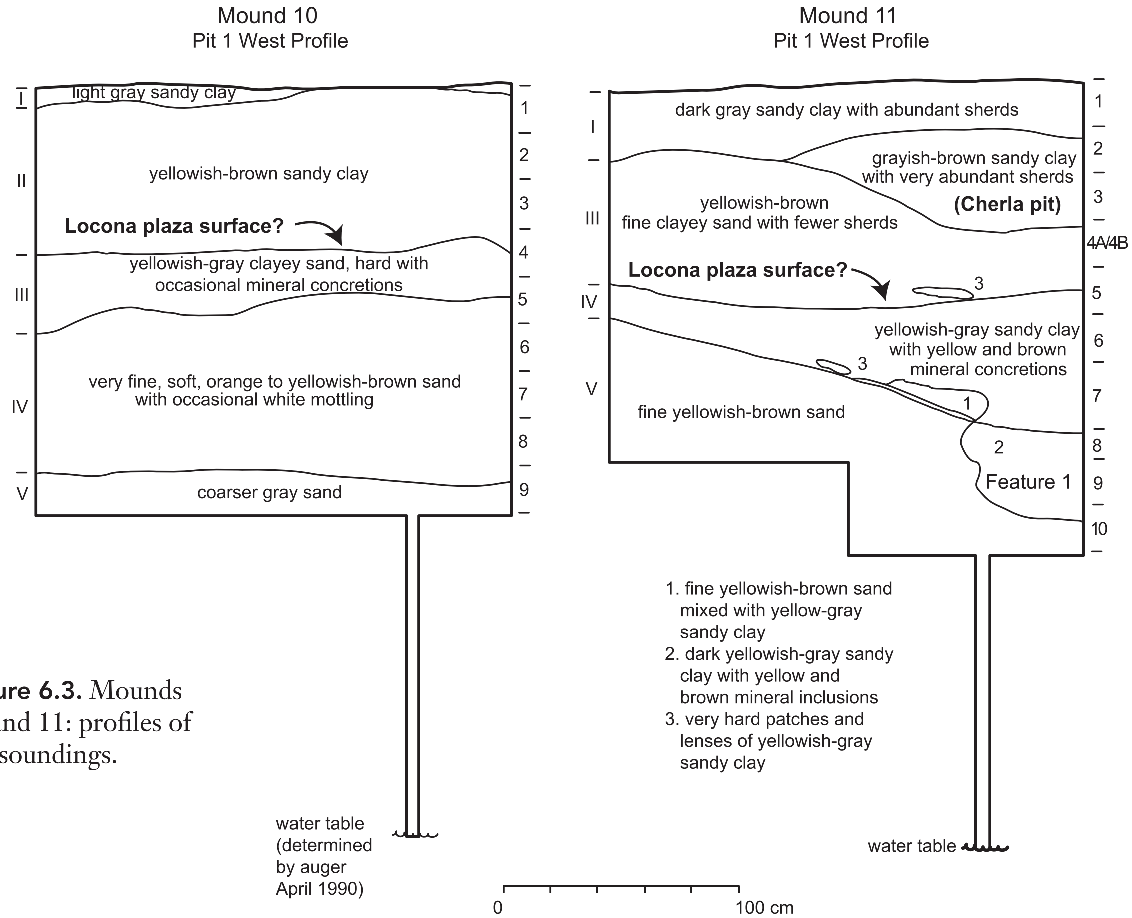


Figure 6.3. Mounds 10 and 11: profiles of the soundings.

11 sounding and contained a low density of Barra and Locona sherds.

Level 7 ended on a pure, fine, yellow sand that sloped off steeply to the north, descending 50 cm vertically in just 2 m horizontally. This sand, excavated as Levels 8, 9, and 10, contained a few Locona and Barra sherds at the top but was increasingly sterile as we descended into it; it is a natural, pre-occupation deposit of the Coatán delta. At the surface of this deposit a small Locona feature was identified in the northwestern corner of the excavation. Feature 1 seems to have been a small pit, about 45 cm deep, containing a modestly high density of sherds (11.1 kg/m^3).

The natural deposit of sand appears to have sloped steeply down into the bajo that separates Mound 11 from Mound 12. A comparison of the Mound 10 and Mound 11 profiles (Figure 6.3) suggests that the Locona fill in Mound 11 would have had the effect of leveling off the occupation surface between these mounds. That would make sense if this area were part of a plaza associated with the "ceremonial core" of the site (Clark 2004a:57–59; Lesure 2011a:132–39). We therefore propose that the fill was not architectural in function. Unlike Locona constructions in Mounds 6 and 32, it did not support a building. Its purpose was instead to expand an open plaza area associated with Mounds 6 and 7.

Mound 14 and Test Pit 29

Mound 14 is located on a long, low, linear elevation that runs from the vicinity of Mound 6 toward the northeast; we will refer to this as the "Mound 14 promontory." Two soundings have been excavated in this area (Figure 6.1). Warren Hill tested Mound 14 itself in 1993. Previously, during the 1990 season, Lesure excavated Test Pit 29, approximately 80 m to the southwest of Hill's test. P29 was on the Mound 14 promontory, but the elevation of the ground surface must have been lower than at Mound 14. Based on the contour map of the site, we suggest at least 50 cm difference between the ground surface at Mound 14 and that at P29. Unfortunately, the two pits were excavated in different field seasons, and we have no specific information relating the ground surface at one pit to that at the other.

At the time of excavation, we did not realize the importance the Mound 14 promontory would come to play in the effort to understand Paso de la Amada as a ceremonial center rather than a cluster of autonomous of residences. The shift in thinking was initiated by Clark (2004a:57), who built on an earlier suggestion by Lowe (1977) to interpret the southwestern sector of the site as "a large plaza defined by the ballcourt on the west (Mound 7), the elite residence on the south (Mound 6), and a long platform of

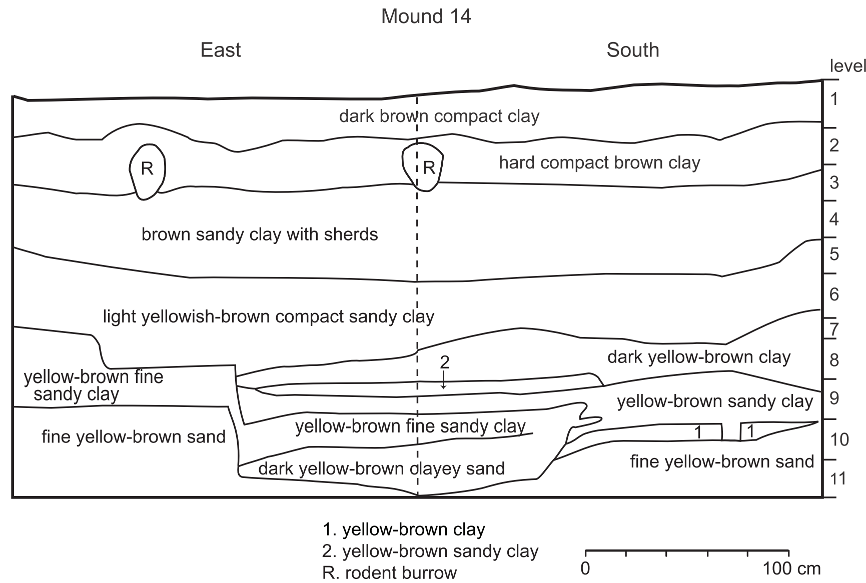
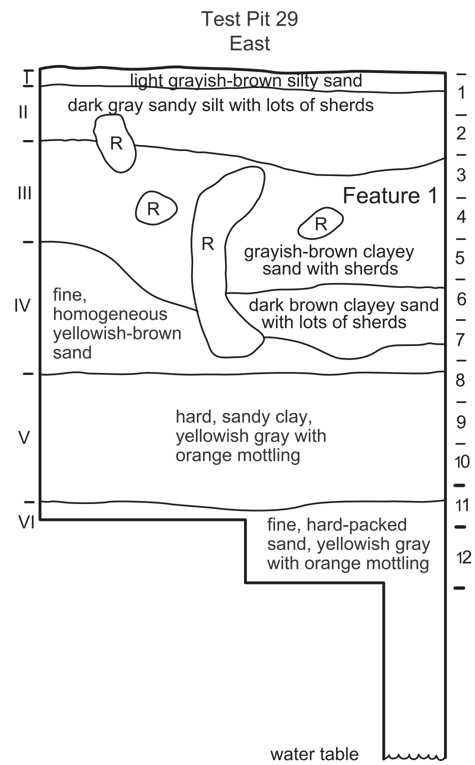


Figure 6.4. Mound 14 and Test Pit 29: profiles of the soundings. *Illustration by Warren Hill, Michael Blake, R. Lesure, and project staff.*



unknown function on the east (Mound 14)." In Clark's interpretation, the entire Mound 14 promontory is an artificial construction that defined one side of a large plaza. Lesure (2011a:133–40) has commented previously on Clark's proposal based mainly on P29. Here we consider the issue again based on additional data from Mound 14. Our assessment is somewhat hampered by a lack of data tying elevation of the two pits together.

The Mound 14 sounding was a 2 x 2 m unit, excavated in 11 arbitrary levels of 10 to 20 cm (Figure 6.4). Toward the bottom of the unit, a pit feature was identified and excavated separately as Basurero 4; however, it contained only 99 sherds.

Level 1, the plow zone, was a dark brown compact clay, which gave way in Level 2 to brown clay. Levels 3 and 4 descended in a brown, sandy clay. A notable find in Level 3 was a large fragment of a hollow, Cherla-phase figurine of the Zanga type (Figure 6.5). The head is missing, as is the left leg, the right arm, and the left hand. The paste is white on the exterior and gray on the interior. The surface is badly eroded. The figure is sexless and seated, with legs spread in front of the body and slightly flexed at the knee. There is no mark suggesting that the left hand was depicted touching the body. The unusually high level of reconstructability of this figure prompted examination of associated materials to see if it derived from a midden of secondary refuse. The associated sherds, however, are heavily eroded and not particularly large. They are also mixed: Cherla and Ocós with some Locona. The Cherla is definitive in Levels 2 and 3, including diagnostics such as Pino Black and White and Extranjero Black and White. There were also two earspool fragments and a fragment of ceramic spatula in Level 2. However, there was also a substantial presence of Ocós sherds. These levels are likely platform fill deposited during the Cherla phase. The figurine, in contrast, was probably a subfloor offering dating to the Cherla phase.

In Level 5 was the beginning of a transition to a yellowish-brown sandy clay. In Level 7 was a transition to a Locona midden, the bottom of which was labeled Basurero 4. Levels 6 and 7 were part of the midden, which really looks like undisturbed secondary refuse rather than a tertiary deposit of platform fill: average sherd weight was 14.9 g and 15.3 g in Levels 6 and 7, respectively, and the rim sherd completeness index (see Chapter 2) for the two levels together was 0.10, well above what is usual even for secondary refuse.

Before reconstructing the depositional history of Mound 14, let us first consider the stratigraphy of Test Pit 29 (P29). The unit measured 1 x 2 m and excavation was by

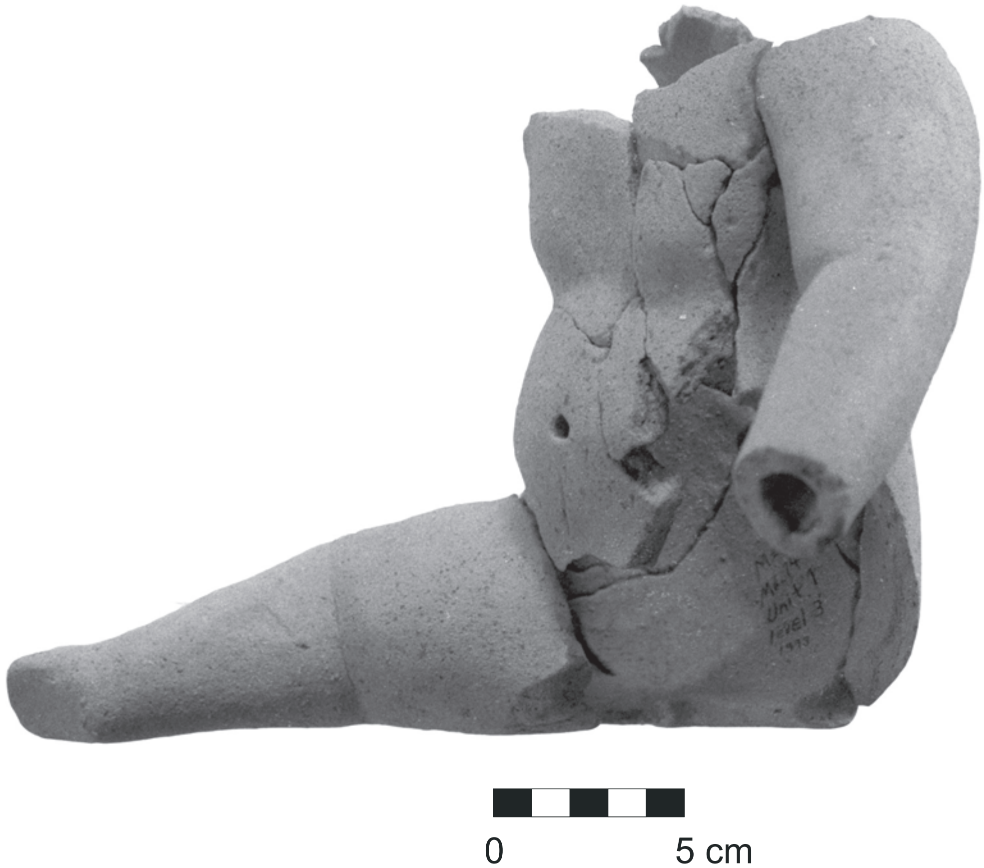


Figure 6.5. Large fragment of hollow figurine of the Zanga type (Cherla phase), from Level 3 of the sounding in Mound 14. *Photo by R. Lesure.*

arbitrary levels, screened through a 5 mm mesh. The plow zone was a light grayish-brown silty sand. Beneath that was a dark gray silt with many sherds (Figure 6.4). At the top of the dark gray were a few pockets of volcanic ash, likely remnants of the 1902 eruption of Santa María Volcano, an indication of stability during the last century of layers below this. In Level 3 was a transition to a grayish-brown clayey sand. The first three levels yielded numerous sherds, very eroded. They were also mixed: Ocós and Cherla with some Jocotal. Levels 1 and 2, and part of Level 3, represent slope wash since the Early Formative; somewhere toward the bottom of Level 3 was the Jocotal-phase ground surface. In Level 4, Lesure noted a concentration of sherds in the southeastern corner of the unit. This proved to be the first indication of a refuse-filled, Cherla-phase pit that unfortunately was not properly isolated and excavated separately (as Feature 1) until the bottom of Level 6. The appearance of the artifact concentration already in Level 4 is important because it helps fix the Cherla-phase ground surface relatively high in the profile.

The sediment into which Feature 1 had been dug was a fine, homogeneous, yellowish-brown sand with predominantly Locona sherds, along with a few Jocotal and more recent sherds that worked their way down to this level in rodent burrows or by root action. Between 140 and 150 cm depth, the sandy layer gave way to a layer of compact, yellowish-gray, sandy clay that proved to be about 60 cm thick. This clay layer yielded a few sherds at first; lower down it was entirely sterile. Below the clay was a fine compact sand, yellowish gray and mottled with orange, also sterile.

The sand at the bottom of P29 corresponds with that at the bottom of the Mound 14 sounding, though its elevation at P29 seems to have been lower. At P29 there are 150 cm of deposits atop this sand to be accounted for before we arrive at the Cherla-phase ground surface (at the boundary between Levels 3 and 4). The first 60 cm above sand, corresponding to the nearly sterile yellow-gray clay, appears to have been a natural deposit, the surface of which remained lower than that of the yellowish-brown sand in the Mound 14 sounding. Indeed, the location of P29 seems to have been a topographical low point early in the occupation of the site. The clay layer probably accumulated due to rainy-season inundations in this location, beginning before occupation of the site. The surface of this layer was probably the ground surface around the time of initial occupation. By the time the Cherla-phase pit was dug from a surface around Level 3, this location had experienced at least 90 cm of accumulation of sediment.

That accumulation appears to have been achieved through the deposition of fill to construct a platform. The Cherla pit proves that the platform must have been built either during the Cherla phase or earlier. The contents of the layer into which the pit penetrated (isolated only in Level 7) indicate that construction cannot be earlier than the Locona phase. Finally, the nature of the fill—a fine, homogeneous, yellowish-brown sand—is most consistent with Ocós or Cherla fills elsewhere at the site rather than the dramatic mixtures of masses of sediments of different colors and textures that we see in Locona-phase fills, for instance at Mounds 6, 7, and 32.

With these insights from P29, let us now return to the Mound 14 sounding. Here again we have substantial platform construction, and in contrast to the P29 location, we also have a recent loss at the top of the profile through plowing. The lower levels, certainly from 8 onward, are complex Locona domestic deposits. Simply from inspection of the profile, we would have suspected that the sandy clay of lower Level 5 through Level 7 was platform fill; however, as noted above, the cultural materials in Levels 6 and 7 have the character of intact secondary refuse rather than the mixed, broken-up character of tertiary fill. We therefore have 50–100 cm of accumulation from a Locona-phase residential occupation.

The brown sandy clay and the overlying brown clay in the Mound 14 sounding are both probably layers of platform fill. The brown clay layer was Cherla in date, based on the contents of Levels 2 and 3. We are inclined to link the brown sandy clay in the Mound 14 sounding to the homogeneous yellow-brown sand in P29 (they were described by different investigators in different seasons) and propose that these were part of a single, ambitious construction during either the Ocós or Cherla phase, a construction that essentially created the Mound 14 promontory.

Since we are raising the possibility of an artificial earthen construction possibly more than 100 m long, it is obvious that our two small soundings are an insufficient basis for fully understanding the Mound 14 promontory. Still, this review of the available evidence allows us to contribute to the discussion initiated by Clark (2004a) concerning the relations between Mounds 6, 7, and 14. We agree with Clark that much of the Mound 14 promontory is an artificial construction. However, most of that construction appears to date rather late. We suspect that this linear platform was constructed in the Ocós phase, perhaps at the time of a significant expansion also at Mound 6. It was then expanded and reworked in the Cherla phase. One possibility is that the Ocós construction was a long, flat platform and that the Cherla occupants constructed an additional platform at one end of the Ocós mound, thus creating the current difference in elevation between the Mound 14 and P29 locations.

Test Pit 30

Test Pit 30 was located on the larger topographical eminence that is crowned by Mound 6 and that serves also as the location of Mound 2. The pit was some 80 m from both Mound 6 and Mound 2. It was excavated in 20 cm arbitrary levels and screened through a 5 mm mesh (Figure 6.6). A sterile yellow-gray sandy clay—overlying coarse, beach-like gray sand—seems to be the ground surface at the time of initial occupation of the site. Atop this was 60 cm or more of Locona-Ocós occupational accumulation, with the specific processes unidentified but potentially including the construction of an extensive platform associated with Mound 6. The gray layer beneath the plow zone suggests ongoing sediment accumulation since the Initial and Early Formative, probably the result of transfer of sediments from slope wash and plowing.

Mound 13

Two adjacent test units on Mound 13, a medium-size mound some 30 m to the southeast of Mound 12, identified a Cherla refuse deposit and evidence of Locona and Ocós occupations (Figure 6.1; see also Figure 4.1). The stratigraphy indicates a Locona platform in this location with additions to the platform in the Ocós and Cherla phases. Further investigation of this mound is recommended.

Test Pit 1 was a 1 x 2 m sounding on the summit of the mound, excavated in 1990. Test Pit 2, excavated in 1993, was a 2 x 2 m unit, alongside Pit 1. Excavation was by natural layers where these could be identified and by arbitrary 20 cm levels otherwise. All material was screened through a 5 mm mesh.

Stratigraphy

The first 80 cm of Test Pit 1 consisted of a dense concentration of Cherla-phase artifacts in a homogeneous brown silt. At a depth of 80 cm, an abrupt change to a Locona deposit was noted. Along the eastern edge of Test Pit 2 we found fewer sherds than we had in Pit 1, and at a depth of about 40 cm (the bottom of Level 2) we ran into Floor 1, a burnt clay floor sloping slightly off to the east (see Figure 6.7). The floor did not appear in the western portion of the unit. In excavating Level 3, we separated the part of the unit where the floor appeared from that in which it did not (Levels 3B and 3A, respectively) and found that the floor capped mixed Locona and Ocós sherds. In Level 3A, where no floor appeared, we still found Cherla sherds.

These findings helped clarify the stratigraphy. The Cherla materials recovered from Test Pit 1 (Levels 2 through 4) were part of a Cherla refuse pit (Feature 1) that also included portions of Levels 2 and 3A of Test Pit 2. This pit was dug from a surface near the current surface of the mound and intruded through Floor 1. The bottom of the pit was indicated by the radical change between the

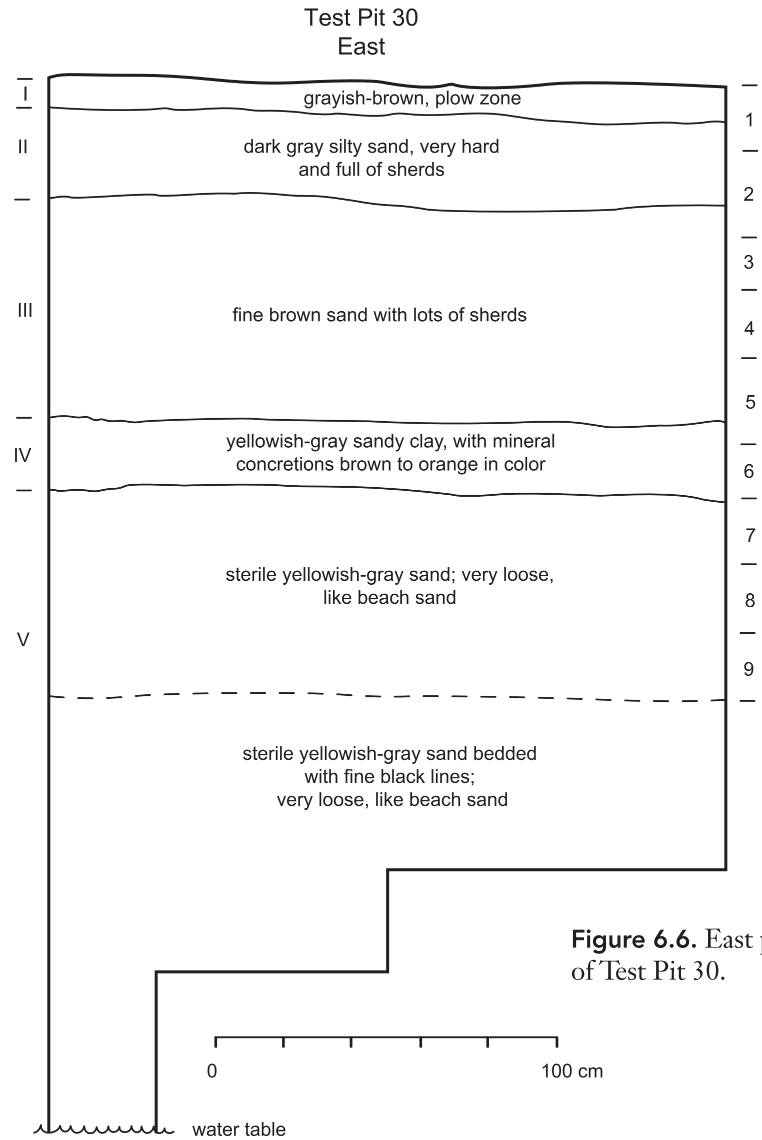


Figure 6.6. East profile of Test Pit 30.

contents of Levels 4 and 5 in Test Pit 1. The pit outline was not visible in profile. We infer its existence from the correspondence between the area where Floor 1 does not occur and the area of concentrated Cherla refuse.

Beneath Floors 1 and 2 in the eastern portion of Test Pit 2 (outside the boundaries of the intrusive Feature 1) were 40 to 50 cm of homogenous brown silt. This layer is platform fill and likely underlies Floor 1 in most of the mound, but our exposure was too limited to allow for a definitive interpretation. The fact that the layer is homogeneous without evidence of intermediary surfaces might suggest a single filling episode that would have created a meter-high platform for the Floor 1 structure. Alternatively, the fact that the materials in this layer showed some cultural stratigraphy, from pure Locona just above Floor 2 (Level 5) to mixed Locona and Ocós beneath Floor 1 (Levels 3B and 4), might suggest a more gradual accumulation of living debris or a series of smaller filling episodes.

At a depth below surface of about 1 m in both Test Pits 1 and 2, we cut through Floor 2. This was not burnt like Floor 1. It appeared as a dark lens 10 to 20 cm thick in profile. It dates to the Locona phase.

Underlying Floor 2 was a 50 to 60 cm layer above sterile sand. This layer was a mixture of masses of yellowish-brown fine clayey sand and of dark grayish-brown clayey silt mottled with bluish-gray clay (Figure 6.7). The deposit yielded sherds dating to the Barra and Locona phases only, as did the level immediately above, which corresponds to Floor 2.

As observed at Mound 32, the mixture of masses of different sediments here is strong evidence of an artificial deposit of platform fill. Further, the mixture of strikingly different colors and textures further supports the Locona phase as the era of construction, as discussed in Chapter 5 for the platform at Mound 32.

Beneath the platform was a natural deposit of fine yel-

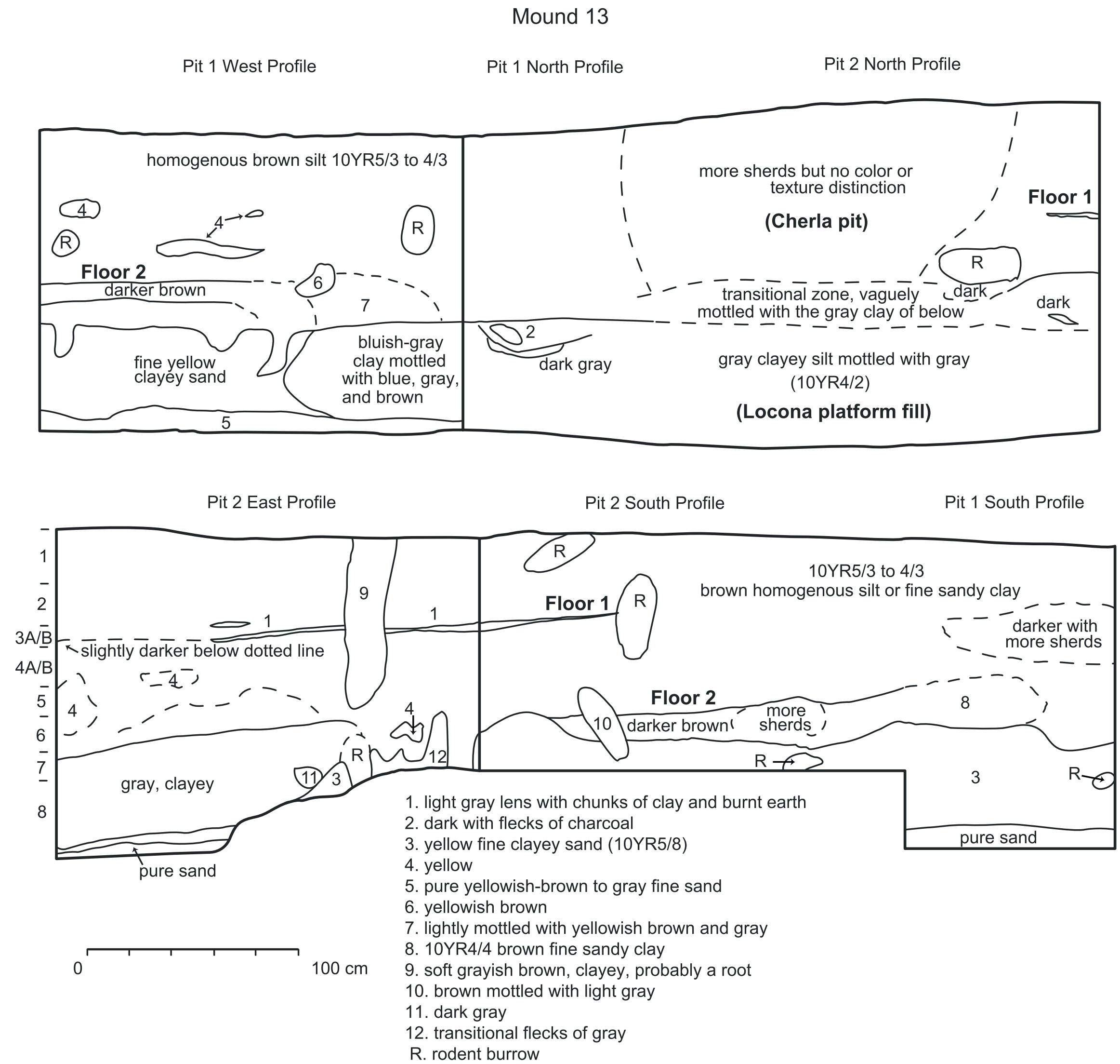


Figure 6.7. Profiles of the combined units in Mound 13.

lowish-brown sand. This sterile level was finer and more compact than the medium-to-coarse sand underlying the cultural deposits of Mound 12, only 30 m to the west; the difference reflects the complexity of the river-lain substrata at the site.

Features

Floors 1 and 2 and the possible Locona platform are discussed above. Feature 1 is an intrusive Cherla-phase pit identifiable stratigraphically only where it cuts through Floor 1 but confirmed by the distribution of cultural material in the upper layers of Test Pits 1 and 2 (see discussion above). The pit was probably filled with sweeping debris: Levels 2, 3, and 4 of Test Pit 1 contain a dense concentration of Cherla material but no sizable reconstructible vessels or vessel fragments. Sherd density ranges from 18.7 to 25.9 kg/m^3, but the average sherd size is low, at 5.5 to 6.2 g/sherd. Some earlier material is mixed into all three levels of the pit. This admixture is primarily Locona rather than Ocós and could derive from the excavation of the pit itself. Levels 2 and 3A of Test Pit 2 contain Cherla material from Feature 1 but were mixed in our excavation with material from outside the pit as well. From Level 2 we recovered an iron ore mirror and a tiny jade bead. Although these were recovered in the screen and their exact proveniences are thus unknown, both came from a portion of the level later identified as part of Feature 1. They are thus probably Cherla ornaments.

Level 5 of Test Pit 2 contained a reasonably high concentration (11.2 kg/m^3) of large Locona sherds (average 11.0 g/sherd). It is probably nevertheless platform fill above Floor 2.

Depositional History

On a natural surface of fine yellowish-gray sand with no evidence of soil formation, inhabitants built a platform 50–60 cm high, most likely during the Locona phase judging from its scant contents: Barra with some Locona, both in the fill layer and underneath it. The platform was likely architectural, judging from the modest size of the mound and the similarities in color and composition of fill to that used for Locona architectural platforms in Mounds 6 and 32. A series of resurfacings may have gradually raised the upper surface by 20 cm or so from the Locona into the Ocós phase, when the previous platform was capped with an additional 50 cm of fill to form the base of a new structure.

Occupation continued into the Cherla phase. with the mound acquiring another 50 cm in height. During the Cherla phase, an intrusive pit was dug into the mound surface and filled with domestic refuse. We have already seen a similar Cherla pit atop Mound 32.

Mound 15

Mound 15 is a small mound on a linear elevation that extends to the northwest from Mound 12 (see Figures 6.1 and 4.1). Immediately across an old oxbow from Mound 7, it is the closest mound to the ballcourt. It was therefore surprising to discover, in the 1997 test excavations, that there appears to be no significant occupation at Mound 15 until the Ocós and Cherla phases—that is, after the main era of use of the ballcourt.

Two 2 x 1 m soundings were excavated, one at the summit of the mound and the other 12 m downslope to the southwest toward the northwestern margin of Mound 7 (Figures 6.8 and 6.9). Excavations were by arbitrary 20 cm levels, and the earth was screened through a 5 mm mesh. Pit 1, on the summit, was almost devoid of artifacts after the second level (only nine sherds in Level 3—mainly Locona-Ocós but including a Cherla earspool fragment—and none thereafter). The plow zone, about 20 cm thick, was a gray clayey silt (10YR6/2). Under that was a deposit 30–40 cm thick of brown silt (10YR6/3–5/3), excavated as Levels 2 and 3. Toward the bottom of Level 3 was a gradual transition to a light gray clayey silt (10YR7/2) devoid of sherds (Levels 4 and 5). The final layer excavated was a fine silty sand (10YR7/2; Levels 5 and 6).

In Pit 2, downslope, were more sherds, indicating an occupation beginning probably in the Ocós phase. The ground surface at the time of initial occupation of the site was probably in the upper part of Level 4. The relatively few sherds in that level (108) plus those in the overlying Level 3 (326) probably accumulated during occupation of the mound. Diagnostics included both Ocós (Mijo Black; four red BR3b bowls) and Cherla (a J1 Cherla jar, a ceramic spatula fragment, and a Pino Black B4 bowl).

The stratigraphy and distribution of artifacts at Mound 15 appear to admit two possible interpretations that only further excavation could definitively resolve, though the second possibility is the more likely. The first is that Mound 15 is an entirely natural elevation that never saw any platform construction. This possibility is suggested by the rapid falloff of sherds in Pit 1.

The second possibility seems to accord better with consideration of the Pit 1 stratigraphy in relation to that of Pit 2 and that of the other mounds at the site. The brown silt of Levels 2 and 3 in Pit 1 resembles Ocós-Cherla platform fills elsewhere at the site and does not appear to link with any of the upper layers of Pit 2. If the brown silt in P1 is platform fill, then the preexisting ground surface would have to have been the light gray clayey silt of Level 4, which corresponds in both color and texture to Level 4 and lower Level 3 of P2, which, as suggested above, appears to be the ground surface at the time of initial occupation. This scenario therefore accords well with the stratigraphy. The only awkwardness is that it posits platform construction in the Ocós or Cherla phase on a surface entirely devoid of sherds. As far as the timing of such a construction, the Ocós sherds to the side of the mound in P2 would indicate that phase, while the earspool fragment in Pit 1 Level 3, low down in the fill or even on the underlying ground surface, would suggest the Cherla phase.

In sum, Mound 15 yielded evidence of possible residential occupation in the Ocós and Cherla phases. It may have been the location of a small platform dating to one of those phases. No other features were identified.

EXCAVATIONS IN THE SOUTHEASTERN SECTOR

Investigations in the southeastern sector of the site included the 1992 extensive excavations at Mound 1, described in Chapter 3, and the 1993 investigations in Mound 4 and 5, to be reported in a future monograph. Minor excavations included the 1992 off-mound Test Pits 31, 32, and 33 and expansions of Pit 32. All three are briefly discussed in Chapter 3, and only the Pit 32 excavations are described here.

Test Pit 32 and Extensions

This off-mound excavation locale is 40 m to the south of the summit of Mound 1. An exposure of 36.5 m^2 revealed four trash-filled pits and three poorly preserved burials. Although no structural remains such as floors or post holes were identifiable, the features discovered here were probably associated with Locona residences somewhere in the vicinity. As noted in Chapter 3, we excavated Test Pit 32 at the same time as Test Pits 31 and 33 to investigate the stratigraphy to the south of Mound 1 and to look for Initial or Early Formative features, especially burials, on this gentle slope descending to the large bajo south of the site. Ceja Tenorio (1985) had found burials in both

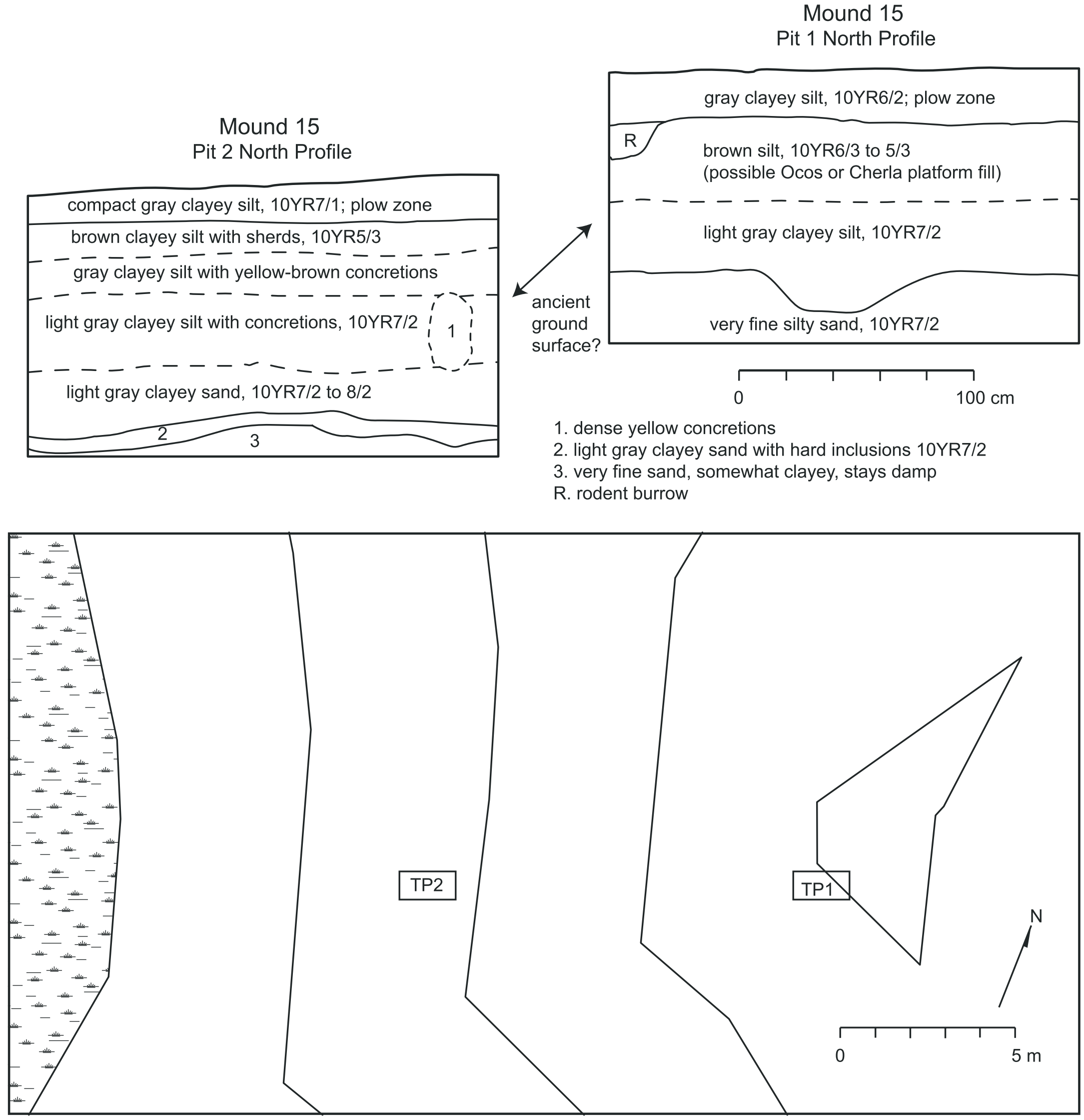


Figure 6.8. Mound 15. Top: profiles of the two soundings, with the vertical relation between them shown to scale. Bottom: contour map with locations of the soundings. Contour interval 20 cm.

Test Pits 4 and 5, which were in this general area, though he does not describe their location precisely. When a dense late Locona midden (Feature 1) appeared in Test Pit 32, we expanded the excavation.

Methods

Tomás Pérez Suárez supervised the excavation of Test Pit 32 and its extensions. The original test was a 1.5 x 1.5 m unit excavated in arbitrary levels of 20 cm. The expansions of Test Pit 32 quickly produced a complex sequence of unit labels and revealed a cluster of features (Figure 6.10).

Effective work in this locale came to a dramatic conclusion on May 14, 1992, with a torrential all-night downpour that filled the excavation to the brim with water, collapsed the profiles, and left the entire unit a sea of mud. At that point Burials 6 through 8 were still in the ground, and in Unit 32D we had still to define and remove most of Feature 3. The burials, carefully protected each night, emerged unscathed from the catastrophe. Feature 3 did not fare as well, and we decided, after removal of the burials, and since more rain was imminent, to simply shut down and backfill these excavations without trying to recover more of Features 2 or 3. The exposed portions of Features 1 and 4 were excavated before the rain, and profiles of Units 32, 32A, 32B1–32B4, and 32C had already been drawn by Pérez.

Stratigraphy

Stratigraphy of the Pit 32 excavations was uniform across the whole extent of our exposure, except for the Locona

Figure 6.9. Work in progress at Mound 15 in 1997. *Photo by R. Lesure.*

features. The weight of evidence indicates a single Locona-Ocós ground surface 25 to 40 cm beneath the present surface.

The plow zone was a brownish-gray clay, Zone I, about 10 cm thick. Zone II was a brown clayey silt about 20 cm thick. It was compact, was difficult to excavate and screen, and contained eroded Locona and Ocós sherds. A gradual transition to the lighter brown, sandier matrix of Zone III generally occurred at a depth below surface of between 30 and 40 cm. In areas that did not correspond to features, the sherd density in this zone was much lower than in Zone II. Zone III was 30 to 40 cm thick, ending with another gradual transition to Zone IV, a pale brown sandy silt with very little cultural debris; this in turn gave way after 10–30 cm or so to a fine sand, mottled pale brown and light gray (Zone V).

Although today the slope to the south of Mound 1 is gentle and unbroken, the Locona features in Pit 32 were dug from a ground surface above the corresponding surface in Pit 31, even though Pit 31 was upslope from Pit 32. As discussed in Chapter 3 and illustrated in Figure 3.1, we interpret the stratigraphy at Pit 32 as a natural profile without an artificial platform. The Locona occupation surface was on a natural elevation that has disappeared during the last 3,000 years of erosion from the even higher elevation of the Mound 1 promontory.

At Pit 32, Zones III, IV, and V appear to be natural, pre-occupation deposits. The Locona pits and burials descended from a single ground surface that remained stable throughout the Locona and Ocós phases. The three burials can be securely dated to this general time period, yet they are shallow: bone appeared between 88 and 94 cm below datum in each case, only 50 to 60 cm below ground surface. No indication of a burial pit could be made out.

Bioturbation, rodent action, and the migration of minerals associated with soil formation have apparently acted to homogenize the stratigraphy of this locale in the last 3,000 years, erasing color and texture distinctions between intrusive pits and the surrounding matrix in the clayey upper meter of the deposits. Color and texture distinctions have been preserved in the sandier Zones IV and V. The original Locona/Ocós ground surface must have been 25 to 40 cm below the modern ground surface, at the point where differential sherd densities signaled that we had entered the trash pits. That means that the burials were just 20 to 30 cm below the Locona occupation surface. It is worth noting that the reconstructed Locona/Ocós ground surface does not correspond precisely to the distinction between Zone II and Zone III. The differentiation of these zones, including color, texture, and hardness differences, appears to be the result of processes of soil formation.

Features and Burials

Feature 1 was a large, trash-filled pit or ditch. It appeared in Zone III of Units 32, 32A, and 32C (Figure 6.11). The pottery was Late Locona. Finds include a number of complete hollow tecomate supports and large vessel fragments; no complete vessels were recovered. Like all ceramics recovered from Pit 32 excavations, the material is very eroded. Other artifacts recovered include the full range of domestic debris encountered at the site, including 15 cy-

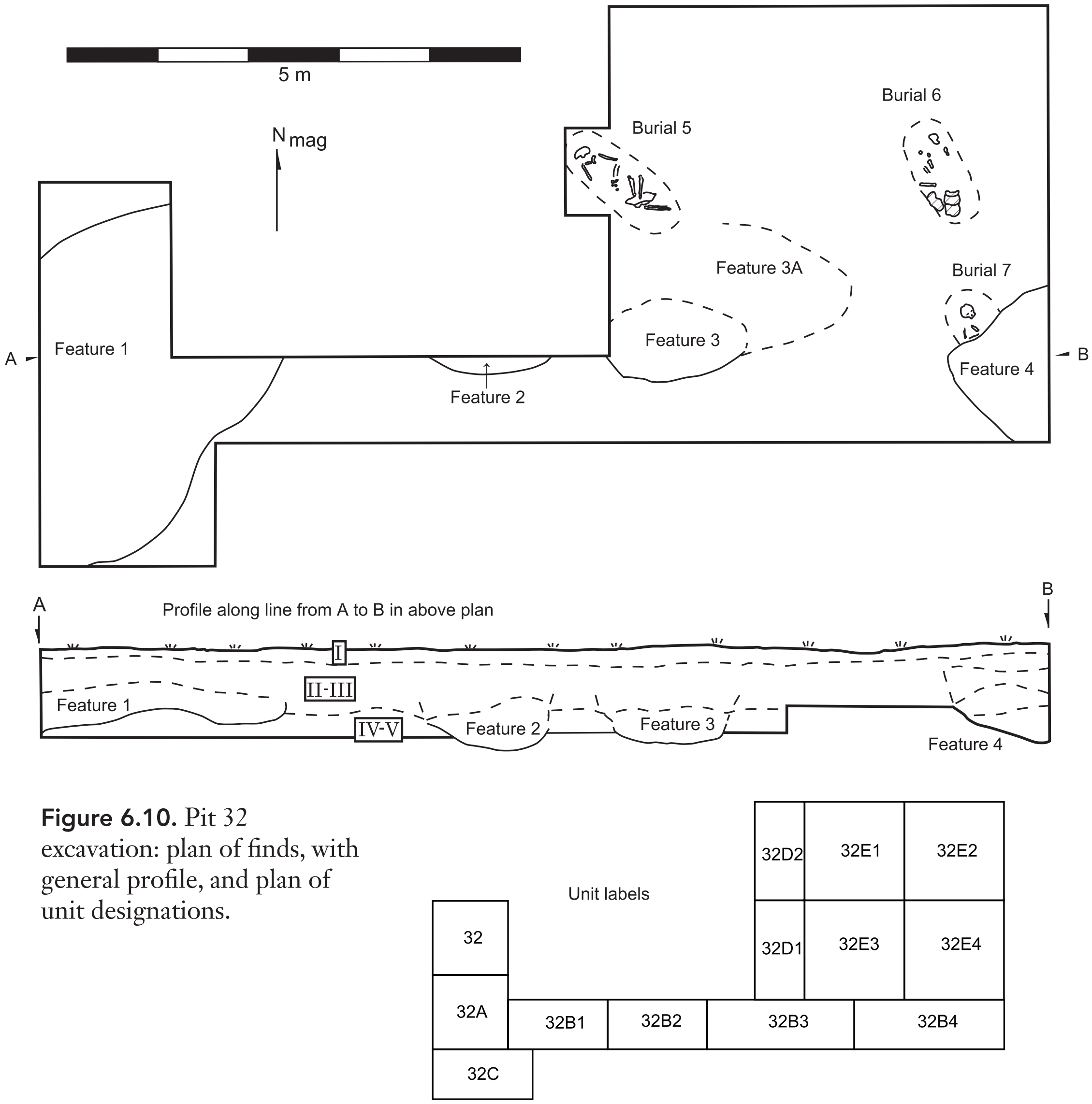


Figure 6.10. Pit 32 excavation: plan of finds, with general profile, and plan of unit designations.

lindrical clay net weights, 41 solid figurine fragments, two hollow figurine fragments, 23 fragments of ceramic rattles, two large censor fragments, one complete miniature tecomate, various ground stone fragments and hammerstones, and numerous obsidian chips and fragments of burnt daub.

Feature 2 appeared in Unit 32B2 as one edge of what was probably a trash-filled pit extending into the northern profile of the trench, either Locona or Ocós in date. Feature 3 was another trash pit extending into the northern profile of Unit 32B3. It was probably transitional Locona-Ocós in date.

Feature 4 was a pit filled with Locona domestic refuse in Units 32B4 and 32E4. Contents included several very large vessel fragments but no completely reconstructible vessels. Other artifacts included four notched sherd net weights, seven solid figurine fragments, one possible hollow figurine fragment, several mano and metate fragments, numerous obsidian chips, fragments of burnt daub, and fire-cracked rock.

Burial 5 was a poorly preserved burial of an articulated adult that appeared between 88 and 92 cm bd, or about 50 cm below surface. The original depth of the interment must have been only 20–30 cm beneath the Locona ground surface. Many bones were not preserved, and those that were preserved were badly deteriorated. The cranium, shafts of most long bones, and some teeth were recovered. The body was placed on its right side, loosely flexed, head to the northwest. Under the knees were two badly deteriorated pieces of a large red-slipped Locona or Ocós bowl. From the neck and face region we recovered two small greenstone beads.

Burial 6 was a poorly preserved articulated adult discovered at a depth of 90 to 95 cm bd, about 50 cm below surface in Units 32E2—32E4. It was probably once an articulated burial, but what bones were present were very fragmentary, and an ancient rodent burrow curved right

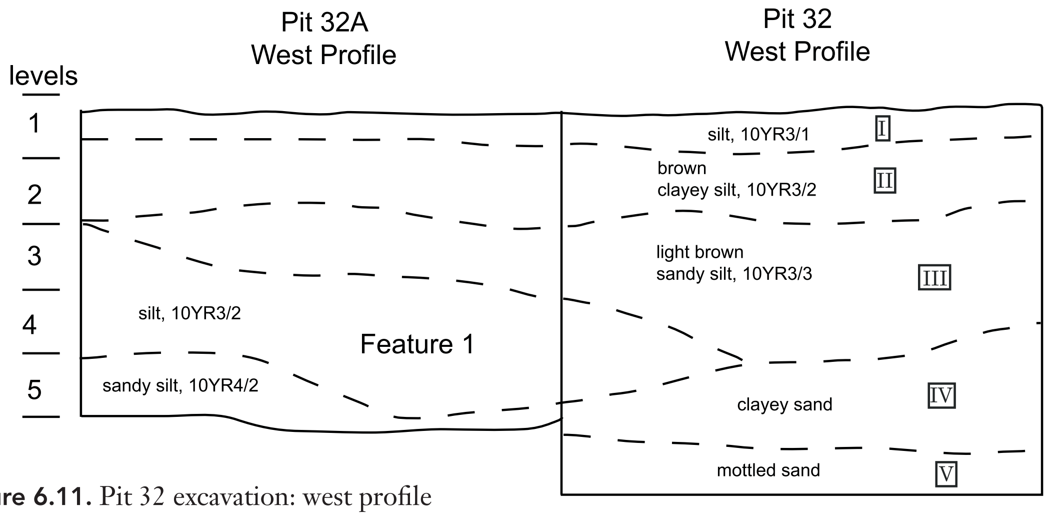


Figure 6.11. Pit 32 excavation: west profile of Pits 32 and 32A. *Illustration by Tomás Pérez Suárez, R. Lesure, and project staff.*

through the burial. A large fragment of a Michis tecomate had been laid, interior side down, over the lower legs of the body, which may have been flexed and lying on its right side with the head toward the northwest.

Burial 7, which appeared at 94 cm bd (nearly 60 cm below surface) in Unit 32E4, was a poorly preserved adult disturbed by Feature 4. The cranium and face were preserved much better than in Burials 5 and 6, but little else remained. To one side of the cranium was what appeared to be an articulated, flexed right arm, but only the shafts of the long bones were preserved. The body was probably placed on its back, with its head toward the west or northwest. Feature 4, together with an ancient rodent burrow that paralleled the feature wall, had removed the rest of the bone. The intrusion of Feature 4 is important, since it demonstrates that Burial 7 is older than the Locona-phase Feature 4; this burial and probably the other two nearby thus date to the Locona phase.

Depositional History

The residential features from the Pit 32 excavations are not associated with any platform. The Locona settlement was on a natural elevation beside the seasonally flooded oxbow that bounds the site to the south. During the Locona phase, three burials were placed in this area. The refuse features seem to follow the burials within the same phase. Feature 4, the earliest of the trash pits, cut through and substantially disturbed Burial 7. The pit features indicate the presence of Locona-era residences in the vicinity, with occupation likely continuing into the Ocós phase. There is no evidence for continued occupation of this area during the Cherla phase, and a single Guamuchal Brushed tecomate sherd in Level 4 of Unit 32C (to which point it probably descended in a rodent burrow) is the only evidence of later occupation.

EXCAVATIONS IN THE NORTHERN SECTOR AND NORTHERN FRINGES OF THE SITE

Excavations in the northern sector of the site include those at Mound 32 (Chapter 5) and Mound 50 (to be reported in a future monograph). Work at Mound 21, tested in 1992, is described in this section. Also reported here is work at Mz-250, a residential location at the northern fringe of Paso de la Amada, which may be considered part of “greater Paso de la Amada.”

Mound 21

Mound 21 is a low promontory measuring approximately 40 m east–west and 30 m north–south and located some 130 m northeast of Mound 32 (Figure 6.12). The mound rises 40 cm or so above land to the east and south. The ground surface descends deeper toward the west into the bajo that borders Mound 32. Five small soundings exposed a total of 10 m^2, revealing Locona and Ocós occupations (Figures 6.13, 6.14). The Locona occupation consisted of a series of surfaces and an associated toss midden. More excavation would be required to work out the nature of the Ocós platform in this mound.

Methods

In November 1992, Lesure excavated five test pits with the help of Deborah Cembellin and a crew of workmen from the *ejido* of Buenos Aires. All five test pits measured 1 x 2 m and were excavated by arbitrary 20 cm levels. All levels were screened through a 5 mm mesh. The soundings were on what appeared to be the highest portion of the promontory, but this whole area was nearly flat for up to 10 m in all directions from Test Pit 2.

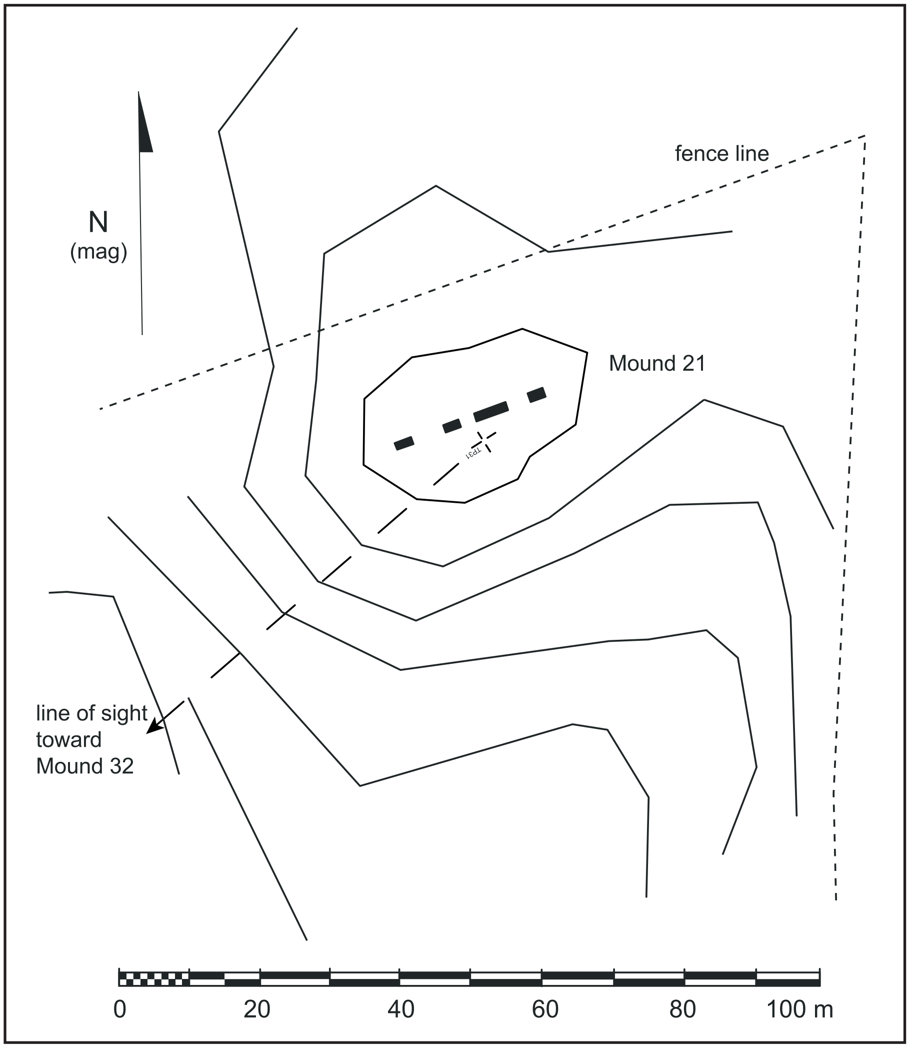


Figure 6.12. Map of Mound 21, showing location of test units. Contour interval is 20 cm. *Base map by Ronald Lowe, illustration composed by R. Lesure and project staff.*

Stratigraphy

The central three units, Test Pits 2, 4, and 5, appear to have crossed a small Ocós platform that was subsequently buried by unidentified processes to form what presently appears on the landscape as a low promontory. Thus both Test Pits 1 and 3, while still on the promontory, were outside this platform. Two superimposed Locona surfaces appeared in Test Pits 1 and 4. Beneath a Locona midden in Test Pits 2 and 5 were fragments of more Locona surfaces. The locations of the pits with respect to each other and general aspects of the stratigraphy are shown in the upper left of Figure 6.13. The rest of the figure illustrates the stratigraphy of the individual pits.

Test Pits 2 and 5 were located 2 m from each other and revealed similar stratigraphic sequences. Levels 2 through 4 of Test Pit 2 were unusually rich in cultural material, with sherd densities of 18.2 to 23.3 kg/m^3. The basic matrix was a homogeneous, moderate brown, fine sandy silt in which masses of gray clayey silt began to appear in Level 2. A large homogeneous mass of the gray clay began in Levels 3 and 4 and descended to the west, ending in Test Pit 4. The first four levels of Test Pit 5 also contained masses of clayey sediment (yellow or mottled yellow and gray), but cultural material was scarcer than in Pit 2.

These upper layers of Test Pits 2 and 5 seem to be the result of a single depositional event in which the prehistoric inhabitants heaped up masses of sediments of differing textures, containing varying amounts of cultural debris, to form a small platform. This platform, Feature 4, yielded predominantly Locona material, consistently mixed with some Ocós sherds. It was probably constructed during the Ocós phase. Cherla or later material was absent.

Beneath the platform in both Test Pits 2 and 5 was a dense concentration of Locona domestic refuse some 20 cm thick, which may have been a sheet midden deposited over a wide area prior to construction of the platform. In Test Pit 2, material from this midden was excavated together with material from the bottom of the fill as Level 4; in Test Pit 5, however, the midden showed up more clearly, and we isolated it in excavation as Level 5. The midden as a whole was designated Feature 3.

Below Feature 3, in both Test Pits 2 and 5, the abundance of cultural material declined precipitously and fragments of poorly preserved Locona surfaces began to appear. A surface of mottled gray clay and yellowish-brown sandy silt appeared at the bottom of Level 6 in Test Pit 5, while a thin dark brown lens visible in the west and north profiles of Level 5 Test Pit 2, but not identified during excavation, was probably another patch of occupation surface. The levels beneath these surfaces consisted of a fine yellowish-brown silty sand practically devoid of cultural material; they were pre-occupation deposits.

Test Pit 4 was a 2 m extension of Test Pit 2 to the east. Here we identified the termination of the clayey mass of fill from the platform (Feature 4). Sloping off to the east, this layer of gray clay ended atop a partially preserved, hardened surface composed of chunks of gray sand in a matrix of yellowish-brown sandy silt (labeled "4" in the Pit 4 profile, Figure 6.13). This surface extended into the eastern profile of the unit and was of a similar color and texture to Floor 1 in Test Pit 1 (see below). These surfaces both appeared at about 110 cm below datum and were probably parts of the same surface. The relation between Floor 1 and the platform is not entirely clear. The descending clay of the platform overlay part of the surface, yet the surface ended only 30 to 40 cm to the west beneath the platform. I believe that Floor 1 was a patio surface associated with use of the platform; however, the cultural material recovered from Floor 1 was Locona rather than Ocós, possibly indicating that Floor 1 was first occupied long before the construction of Feature 4.

Above Floor 1 and the sloping mass of gray clay that marked the upper limit of Feature 4 was a substantial layer of homogeneous brown sandy silt with sherd densities much lower than in the adjacent Pit 2. This deposit and the upper levels of Test Pits 1 and 3 were the enigmatic deposits of Mound 21. They did not appear to be the result of slope wash since—particularly in the case of Test Pit 4—they were not down any appreciable slope from the Feature 4 deposits.

The homogeneous brown in Test Pit 4 clearly overlay the masses of gray clay of Feature 4. It is possible that the former was an extension of the latter composed of homogeneous fill, like that at Mounds 1 and 12, rather than masses of different textures and colors. If it was an extension, however, it was a surprisingly large one, extending up to 15 m both to the east and to the west of Feature 4 and maintaining a depth of 60 to 80 cm. Still, the homogeneous brown need not have been a single episode of construction but rather the result of multiple filling events on and around Feature 4 that gradually created the flattened promontory of Mound 21. This reconstruction requires these fillings and resurfacings to have been done with relatively undifferentiated sediments, with the result that they were invisible stratigraphically in the small cuts we made. This accumulation may date to the Ocós phase; we could identify no later material in these levels, though admittedly the sherds were scant and eroded.

Beneath Floor 1 in the eastern portion of Test Pit 4 appeared a second surface, composed of hardened chunks of weak brown sandy silt in a yellowish-brown matrix. The surface is labeled "2" in the Pit 4 profile in Figure 6.13; it appeared more clearly in the east and south profiles of the unit. This surface was similar in color, texture, and composition to Floor 2 in Test Pit 1 (see below). Both appeared at 130–135 cm below datum and were probably parts of the same surface. In the level beneath Floor 2 we entered pre-occupation deposits.

The upper levels of Test Pit 1 appeared to be part of the same homogeneous brown sandy silt that overlay Feature 4 in Test Pit 4. Cultural material was scarce. At a depth of 65 cm below surface (the bottom of Level 3), Floor 1 appeared. It was a partially preserved surface composed of chunks of hardened grayish-brown sand in a matrix of yellowish-brown, fine sandy silt. What little cultural material we recovered from beneath this floor seems to be Locona.

At a depth below surface of about 90 cm, Floor 2 appeared: patches of very dark grayish-brown sandy silt in a matrix of yellowish-brown fine sandy silt. A strange color pattern appeared above this in profile. Patches of grayish-brown sand appear almost as if they were mirror images of the chunks of darker sandy silt that compose the floor. These patches grade gently into a matrix of the dark brown sandy silt. We do not know what processes would have produced this pattern. Where Floor 2 appeared in Pit 4, such "mirror images" did not appear.

Test Pit 3 was at the opposite end of the line of test pits. The ground surface at the location of this test was only 4 to 6 cm lower than the surface at Test Pit 5; the dark organic layer at the surface, however, was thicker here than in the pits toward the east, possibly indicating a more stable, less plow-damaged ground surface. Thus it seems likely that the area of the platform (Pits 5, 2, and 4) was once higher but has been flattened by plowing. Beneath the organic layer, the profile was generally homogenous in appearance, without distinct changes in color and texture. At 50 to 55 cm below surface, a few fragments of hardened grayish sand may indicate a poorly preserved surface, perhaps equivalent to Floor 1 and associated with the occupation of the Feature 4 platform. Around this level, the homogeneous brown silt became somewhat sandier. Cultural material both above and below this transition was Locona, without any certain Ocós sherds. At a depth of 90 to 110 cm below surface there was a second gradual transition to a sandier, yellower matrix that is culturally sterile.

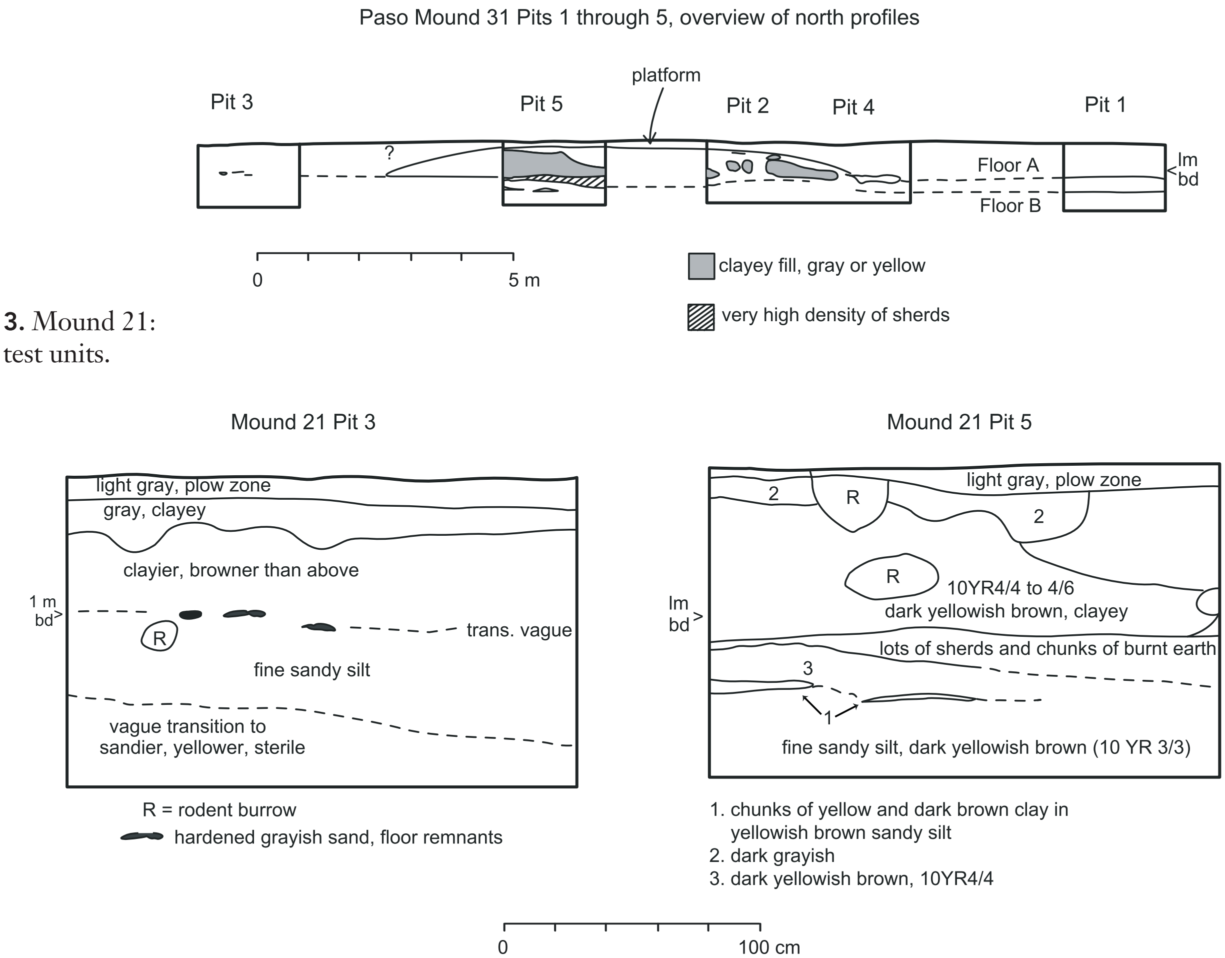


Figure 6.13. Mound 21: profiles of test units.

Features

The platform, dating to the Ocós phase, was 55 to 60 cm high and measured at least 7 m in one dimension. The other dimension is unknown. Since the platform is completely buried beneath the Mound 21 promontory, only more excavation could determine its actual dimensions and orientation. It is possible that our line of test pits crossed one corner of the platform, in which case our single dimension of 7 m gives little indication of its real size. Although no floor was preserved on the surface of the platform, fragments of what was probably a patio surface surrounding it (Floor 1) appeared off the platform to the east. Floor 2, a pre-platform feature, appeared beneath Floor 1 and could have been a house floor or a patio surface.

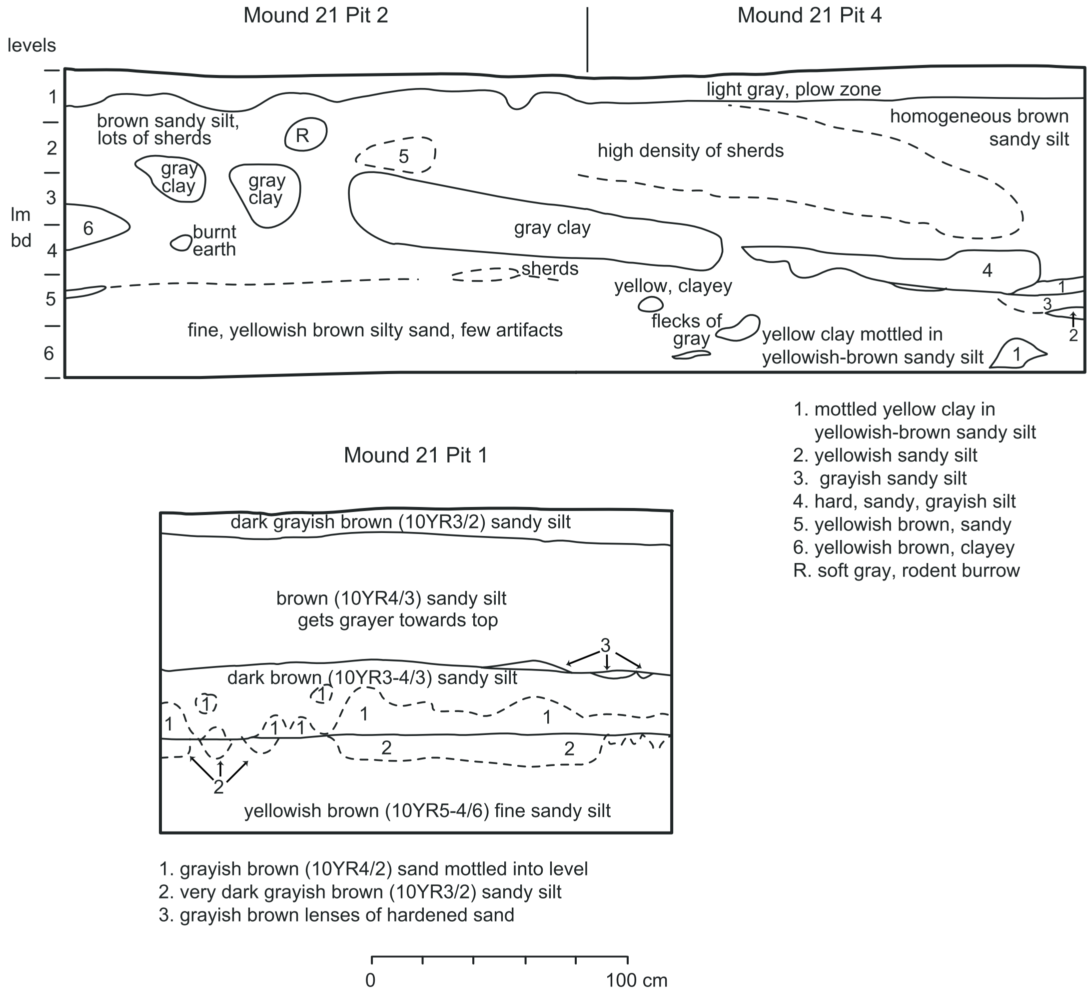
Feature 1 was a small concentration of sherds associated with Floor 2 in Test Pit 4, while Feature 2 turned out to be a fragment of Floor 2 in the same unit. Feature 3, discussed above, was the Locona midden to the west of Floors 1 and 2. This was probably a sheet midden that lay exposed beside the living area. No reconstructible vessels or large vessel fragments were recovered from the small sample we have of this feature, from Test Pit 5 Level 5.

Depositional History

Mound 21 was a low sandy rise above an old oxbow when it was first occupied during the Locona phase. The Locona inhabitants lived on this natural surface without constructing artificial platforms; the domestic refuse in Feature 3 suggests that this was a residential locale. The inhabitants resurfaced their living floors several times and probably shifted the locations of dwellings occasionally. During the Ocós phase they constructed a platform, presumably to support a structure on top. This platform was ultimately buried in the creation of the low promontory, 40 m east to west and 30 m north to south, that is identifiable today as Mound 21. The processes leading to that last event are not clear, but it is difficult to envision how this deposition could be achieved without artificial construction. In other words, it seems likely that there was additional platform construction at Mound 21 in the Ocós or Cherla phases.

Mz-250

At the northeastern fringe of Paso de la Amada is the site Mz-250. Clark (2004a:Figure 2.5a) includes this site in



"greater Paso de la Amada." It lies beneath the modern village of Buenos Aires. Clark discovered a Locona deposit in 1991, when trenches were dug for installation of sewer lines. Clark (1994a:163, Figure 49) mapped in what he interpreted as a floor of red clay in the 80 cm wide sewer trench and recorded the profile in the vicinity. He interpreted the deposit as a series of three small Locona residences capped by a midden. The red clay floor would represent the earliest of the three residences.

Lesure returned to this location in 1997. He is confident that he was working in the same set of features originally explored by Clark because the location was immediately in front of the home of one of our workmen, who witnessed Clark's initial work and participated in the 1997 excavations. Lesure's interpretation of the deposits differs from that originally proposed by Clark. All the Locona strata originally registered by Clark appear to have been layers in a deep pit (Feature 1) dug in the Locona phase to a depth of more than 2 m beneath the ground surface of that era. Feature 1 is thus similar to Feature 11 at Mound 12 (see Chapter 4), though its dimensions, about 5 m in diameter, are smaller than those of Feature 11. A second pit, Feature 2, also Locona in date, was dug into the fill of the first after it was substantially full but still a depression on the landscape.

Setting of the Excavated Locale

Although the excavated locale was not evidently a mound, it was on a somewhat elevated area bordered by a remnant oxbow of the Coatán some 25 m to the southwest and 45 m to the northwest (Figure 6.15). In general, the setting for Locona settlement at Mz-250 seems to have been similar to that at Paso de la Amada itself. We have no definite knowledge of platform construction at Mz-250. It must be borne in mind, however, that the surface layers of the site have been greatly affected by modern settlement.

Methods

Eleven units were excavated by Sheila Egan under the supervision of Lesure (Figure 6.16). A lot system equivalent to that used at Mound 32 (Chapter 5) was employed. In all, 90 lots were assigned; most of them were screened through

Figure 6.14. Work on the original test pits at Mound 32 in 1992. In the distance, indicated by the arrow, work on the Mound 21 test pits is in progress. The volcano in the middle of the picture is Tacaná. *Photo by R. Lesure.*

a 5 mm mesh. Once we began to understand the deposits, lots above the Initial Formative ground surface were not screened.

The deposit of interest was in the middle of a dirt road with regular vehicle traffic, somewhat hampering the investigation. To avoid any possible damage to the sewer line, we never actually linked up our excavations to the original Aguas Negras trench. We first excavated Units 1 through 9 to the south of the sewer line along one side of the road. Both Units 7 and 8 were expansions to either side an original trench consisting of Units 1–6. Most of the Locona refuse appeared in Units 4 and 8. Unit 9 was the designation for Units 4 and 8 together when they were joined at a depth of approximately 185 cm below surface. Upon completion of these units, we backfilled, directed traffic over this area, and excavated Units 10 and 11 on the northern side of the sewer trench, in approximately the middle of the road.

Stratigraphy

The incidence of Locona sherds was highly localized, in Feature 1 and its vicinity. As one moved away from the feature, sherds became scarce and were confined generally to the upper levels (though significant rodent burrowing indicated the likelihood that some sherds could have worked their way well into natural, pre-occupation levels). The natural, pre-occupation stratigraphy in the excavated locale was more complex than was common at Paso de la Amada itself. Instead of the thick layers of sand that immediately underlay the Initial Formative occupational layers at, for instance, Mounds 1 and 12, Unit 1 at Mz-250 revealed a series of layers 15–40 cm thick (Figure 6.17). These layers were generally horizontal, and the sediments varied in texture from one layer to another, becoming sandier as one moved down the profile. Based on the stratigraphy of the Locona features and the incidence of artifacts, it appears that the Locona ground surface was some 30–40 cm beneath the current surface, within a layer of yellowish-brown clayey silt (Zone C) that can be traced through most of the units except where, as in Unit 6, it is heavily disturbed by rodent burrows.

Zone B, the dark brown clay overlying C, was also consistent across the excavation. It was deposited since the Initial Formative as the result of unknown causes; a recent origin at the time the road was constructed needs to be considered. In Unit 1, at the far right in Figure 6.17, Zone C was excavated in Lot 4 and the first part of Lot 6; those two lots together yielded 62 sherds. Beneath Lot 6, in the remaining 1.03 m^3 excavated (screening) in this unit, only eight sherds were recovered. The four layers of sand beneath Zone C all appeared to be natural, pre-occupation deposits of the Coatán delta. All such pre-occupation layers are collectively referred to as Zone G. Table 6.1 correlates lots excavated at Mz-250 with the zones discussed in this section.

In Unit 4, Zone C is unusually thick, and it overlay two grayish clayey layers, collectively labeled Zone D. It was beneath Zone D that the boundaries of Feature 1 (Zone F) and the intrusive Feature 2 (Zone E) could be clearly distinguished, in large part because the mixture of clay and sand in the features retained moisture whereas the surrounding natural deposits of more pure sand dried out rapidly in the sun. The greater thickness of Zone C in Unit 4 compared to Units 2, 3, and 1 suggests that during the accumulation of Zone C, the old pit of Feature 1 still formed a depression on the landscape. Zone D was an organic-rich Locona midden deposit with fairly abundant sherds. Its deposition post-dates the filing of the intrusive pit, Feature 2.

As best we can tell, the large pit, Feature 1, was dug from a ground surface equivalent to the bottom of Zone C in Unit 1. The fill of the feature was a complex in-wash of sand, silt, and clay with some Locona sherds. Feature 2 was dug and filled with sandy clay (Zone E) while Feature 1 was still a distinct depression on the landscape. Deposition continued thereafter (Zone D) still in the Locona phase.

After excavating Unit 7 and finding only a minor continuation of Feature 1, we opened Unit 8, extending 50 cm toward the Aguas Negras trench from Unit 4. The north profile of that unit is shown in Figure 6.18. Both the Feature 1 pit and the intrusive Feature 2 are clearly identifiable. The profile in Figure 6.18 extends deeper than that in Figure 6.17, because at the time that the latter was drawn the bottom of Features 1 and 2 remained unexcavated.

We never definitively identified the "red clay floor"

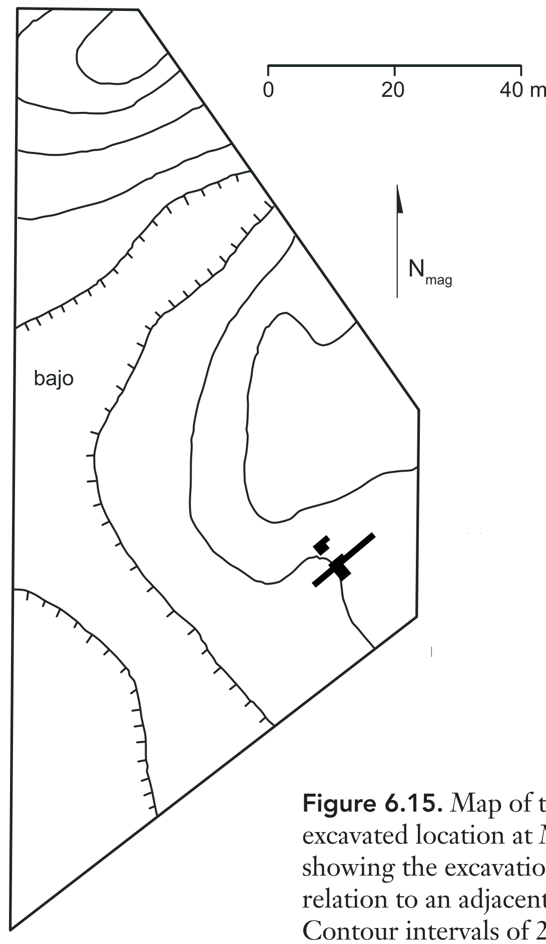


Figure 6.15. Map of the excavated location at Mz-250, showing the excavations in relation to an adjacent oxbow. Contour intervals of 20 cm. *Illustration by R. Lesure and project staff.*

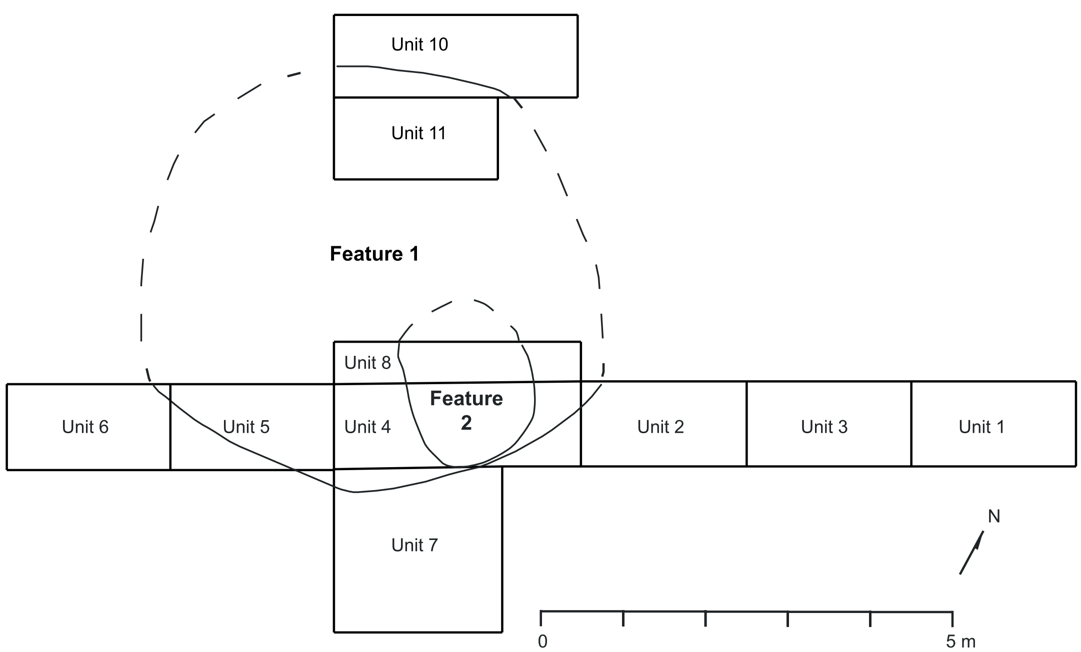


Figure 6.16. Mz-250: plan of units with reconstructed boundaries of features.

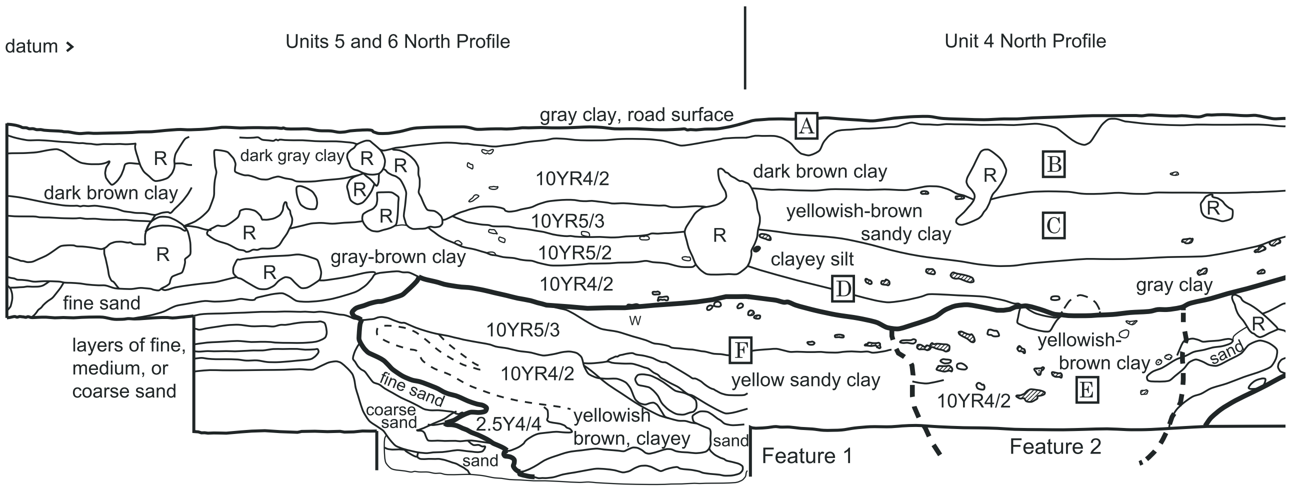


Figure 6.17. North profile of Units 6 through 1 at Mz-250.

Table 6.1. Correlation of lots from the units excavated at Mz-250 with the zones described in the text[a]

Zone	Excavation Units										
	1	2	3	4	5	6	7	8	9	10	11
A, B	1, 4	(2), 3	(12, 26)	(13, 21)	(42, 45)	(33b, 34)	(49, 50)	(61)		(78), 79	(83)
C	4, 6	5, 7, 9	(26, 27), 28	22, 23	46	35	53	(61), 62		79, 80, 81	84
D				23, 24	47		57	62			85
D/E				25, 29				63			
E (Feature 2)				30, 31				64, 65, 66, 67, 71	72		
F (Feature 1)				36, 40, 41, 43, 44	48, 51, 52, 54, 55, 58		60	68, 69, 70	73, 75, 76		86, 87, 88, 89
G	8, 10, 14, 16, 17	9, 11, 15, 18, 19, 20	32, 33a		56, (74)	37, 38, 39, (77)	59			82, (90)	

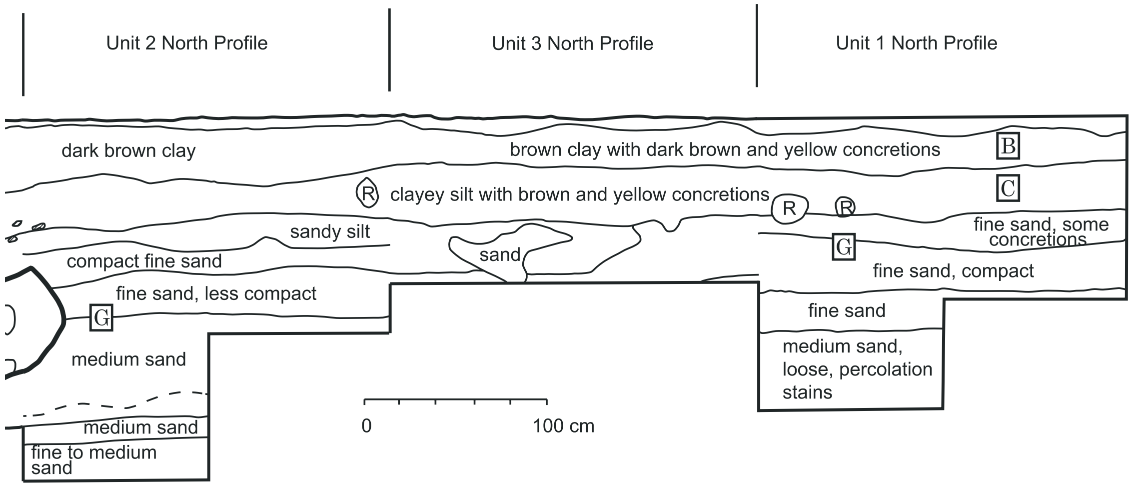
[a] Unscreened lots are in parentheses. All others were screened through a 5 mm mesh.

that Clark (1994a:Figure 49) found in the sewer trench located between our Units 8 and 11. At the northern edge of Unit 9 (the combined 4 and 8), we found a series of reddish clayey layers (2.5YR5/5) along the northern profile of the unit. These began at a depth of about 185 cm below surface and continued intermittently for a distance of 40 cm in some places. They seem too deep for Clark's floor, which appears to have varied between 140 and 160 cm below surface. In Unit 11, in the last two days of excavation at this locale, we found a set of more likely matches for Clark's red clay layer. Beginning at 140 cm below surface and extending to 170 cm, Egan registered a series of shifting patches of hardened clay.

If these clay deposits were purposely laid down by the Locona occupants of Mz-250, one likely possibility is that they were intended to create a kind of cistern that would trap water for use in the dry season. The clay layers appear to have been laid down in a series deep in the Feature 1 pit. Water drains rapidly through the sand into which the pit was dug, but a clay layer at the bottom of the pit might have allowed it to retain water, perhaps for a few weeks after a rainstorm.

The Locona Occupation

Feature 1 may have been a cistern to preserve water between rainstorms. At its deepest part, the pit originally descended at least 2 m below the ground surface from which it was dug. However, at least in the dry season, it would not have functioned as a cistern unless the water table was high (enough that the nearby bajo would also have had standing water) or there was some sort of clay lining on the base and



sides to prevent water seeping rapidly into the pure sand at the base of the pit. That may be the reason for the layers of clay noted in the sewer trench (by Clark) and in our Units 8 and 11. Otherwise, the pit filled mainly with in-washed sediments. Sherds were relatively few. We registered a total of 314, all Locona (except for a couple of possible intrusive post–Early Formative sherds in Unit 11). The overall total sherd density was 0.7 kg/m^3. Average sherd weight was fairly high, 11.5 g/sherd. There were few other artifacts except a scattering of pebbles, a few fragments of grinding stones, and some burnt daub—the last in a couple of cases in concentrations as if dumped into the pit.

At the time the pit of Feature 2 was dug, Feature 1 was still a distinct depression on the landscape, about 5 m across and 40 cm deep in its center. Feature 2 was dug off-center. The pit went about a meter deep; we did not excavate all of it because it extended farther into the profile of Unit 8. The pit was somewhat bell shaped in form (Figure 6.18). This is an unusual form for a pit in this region; the local sediments are not well enough consolidated to retain an in-sloping form if a pit stands open any length of time. We conclude from the form of the pit, then, that it was dug and then rapidly filled in.

The fill of the pit and the bottom part of the overlying Zone D (the latter excavated as Lots 25, 29, and 63) appear to form a single depositional unit. The density of sherds overall was high (16.9 kg/m^3) and the average sherd weight was also high (18.6 g, a value boosted by at least 13 large fragments of vessels).

Several notable fragments of bone, including human bone, were scattered through the deposits. Two long bones, a mandible, and a fragment of cranium were mapped in Lot 25 and the beginning of Lots 30 and 64. In addition, two maxilla fragments and a right shaft fragment of a humerus (young adult) were recovered in the screen from Lot 25. There was much of the neurocranium of a dog in Lot 25. Deeper in Lot 30 was another fragment of cranium. Atop a rock was an articulated segment of vertebrae of a snake, *Psuestes poecilonotus.* (Forty-four thoracic vertebrae were recovered.)

These bones appeared amid items of domestic debris. There were three effigy fragments, a possible fragment of a hollow figurine, 16 fragments of solid figurines (mostly limbs), a fragment of a mortar, a ground stone sphere, and various pebbles and small fragments of grinding stones. Fire-cracked rock was plentiful (3.3 kg), and there were 8.8 kg of burnt daub, some in sizable chunks on the order of 5 cm across. The daub was concentrated in the layer immediately above the pit itself; a lens of daub is identifiable in Figure 6.18.

There were numerous large vessel fragments. The rim sherd completeness index (see Chapter 2) for the deposit is quite high, at 0.16. Still, in light of the presence of human bone, it is worth noting that none of the vessels was reconstructable to a complete state. The two vessels that were most complete were both significantly damaged from use. A Chilo Red bowl with slightly concave but otherwise approximately vertical walls had the entire rim chipped away (see Figure 8.13i). A heavy and less than lovely Papaya Orange bowl, originally with four solid supports, had all four supports broken and ground down to stubs (see Figure 8.17j). If these were "offerings," those making the offering selected pots that were basically ready for discard.

The purpose of the sequence of activities that led to the digging and rapid filling of Feature 2 remains uncertain. On the one hand, some kind of ritual of destruction or renewal seems possible considering the presence of human bone, the large amount of daub (destruction debris?), and the relative completeness of the nevertheless well-used pottery. The deposition of much of a snake is intriguing. There were other dog bones beside the cranium, possibly from one individual; a social event evolving consumption of the dog seems possible.

On the other hand, the human bone was present in

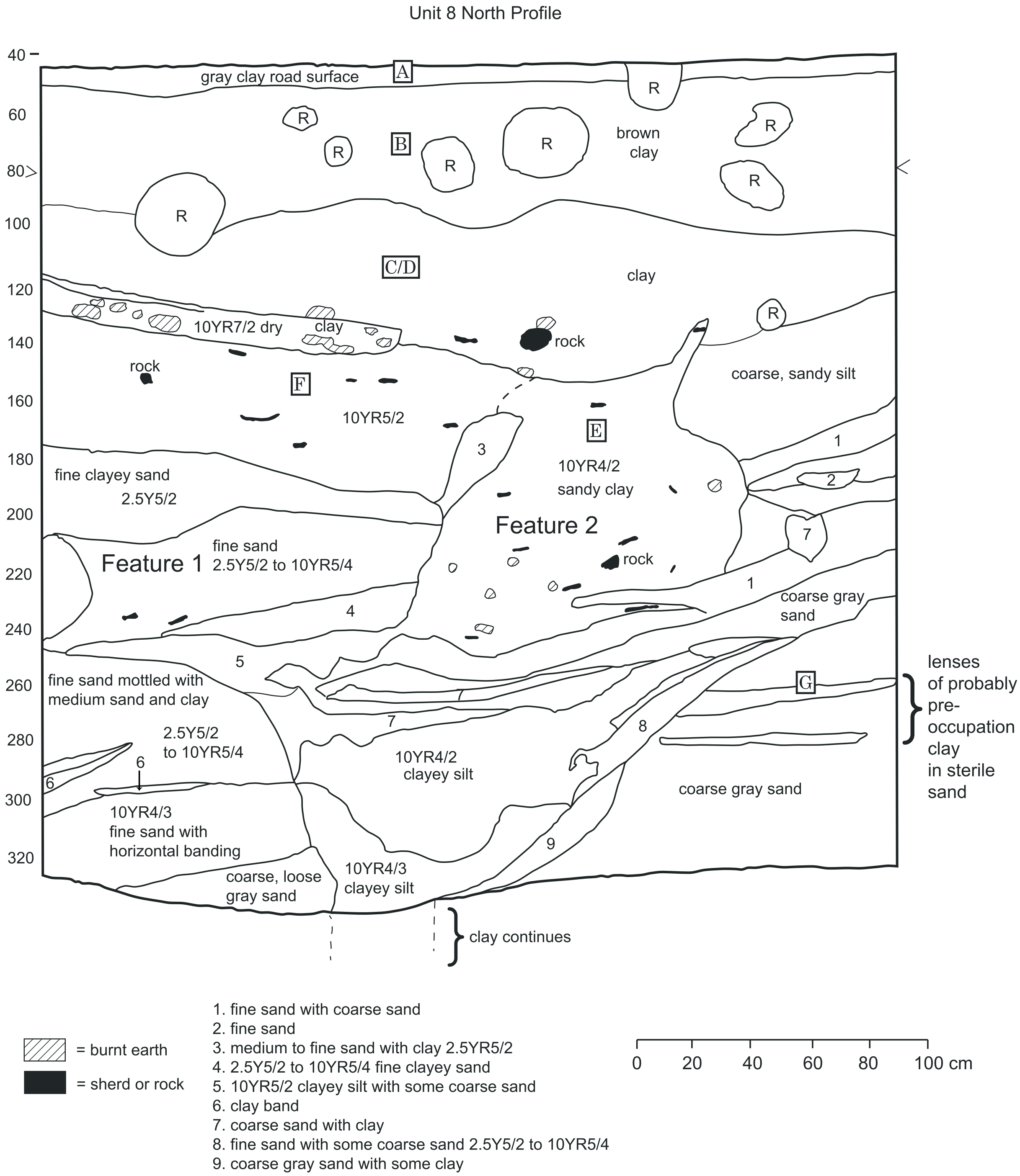


Figure 6.18. Mz-250: profile of Unit 8.

a few fragments only, and the humerus was carnivore-gnawed. Human burials seem to have been placed in quite shallow graves at Paso de la Amada, and it seems possible that dogs could have partially uncovered cadavers, leading to some recirculation of bone. In other words, the inclusion of human bone in the Feature 2 deposit is unusual, but it could potentially have been accidental. Further, while there are various dog bones, they are far from representing a complete individual. Finally, only two of the pots in the deposit were possibly in a usable form, and those were damaged and plausibly ready for discard. Although more complete than usual, the pottery assemblage looks like secondary refuse; it is not an assembly of vessels smashed when they were still in usable condition. Finally, the other objects present (figurine fragments, the ground stone sphere, and so on) appear to relate to a variety of activities and thus would seem to support interpretation of the collection as secondary refuse.

Zone D is the Locona midden that represents the upper fill of Feature 1. The average sherd weight is high (13.3 g/sherd) and the density moderate (4.4 kg sherds/m^3). The contents are typical for Locona domestic refuse. Artifacts include two effigy fragments, four fragments of ceramic rattles, eight pieces of solid figurines, a worked sherd, and various pebbles, small fragments of grinding stones, and fire-cracked rock. There was a fairly large amount of burnt daub. Much of it was from Lot 24 in Unit 4, just above the much greater concentration starting in Lot 25, which we describe above in the discussion of Feature 2.

Depositional History

In the locale excavated, the natural, pre-occupation stratigraphy was complex, involving horizontal layers of silt and sand. At greater depths, these gave way to pure sands similar to those observed in pre-occupation deposits at Paso de la Amada itself. At Mz-250, we recovered a set of Locona features probably quite restricted in time. Feature 1 was a pit some 5 m across, perhaps used as a cistern, with a series of clay floors intended to help it retain water. After the pit had substantially filled, largely through in-washed sediments containing some sherds, a much smaller pit, Feature 2, was dug and then rapidly filled. Further deposition continued in this locale during the Locona phase. There is no hint of Barra, Ocós, Cherla, or Jocotal occupation in this locale.

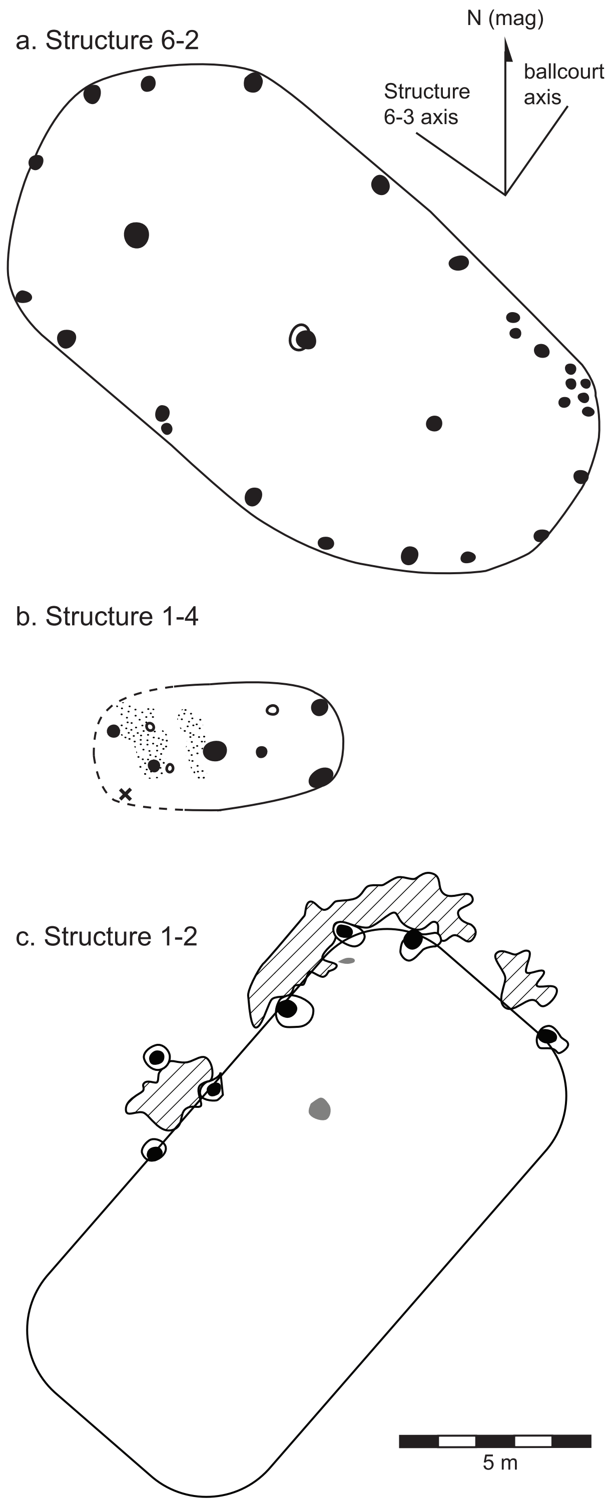


Figure 7.1. Post hole patterns representing traces of perishable building at Paso de la Amada: (a) Structure 6-2; (b) Structure 1-4; (c) Structure 1-2. *Illustration composed by R. Lesure.*

CHAPTER 7

The Constructed Landscape of Paso de la Amada and Its Social Implications: Insights from the Excavations

Richard G. Lesure

THIS CHAPTER SYNTHESIZES what can be learned from the stratigraphy, features, and structures reported in Chapters 3 through 6 concerning human interventions in the landscape at Paso de la Amada. Of particular interest are artificial earthen constructions and their social functions. Those themes emerged gradually during our investigations. Clark (2004a:53–59) describes how, early on, we envisioned the community as an unorganized scatter of domestic residences. Discovery of the existence of other platform-top buildings besides those of Mound 6 helped prompt a change in our thinking. The accumulated evidence reveals that the inhabitants altered and arranged their landscape at sometimes massive scales.

The focus of discussion here is on insights arising from the investigations presented in Chapters 3 through 6. I begin with the natural landscape and move gradually to a consideration of human interventions at greater scales. Among the topics considered are: (1) interpretation of the Cherla-phase platforms in Mounds 1 and 12 as public buildings rather than residences and (2) evidence for coresidential groups living in clusters of dwellings, interpreted as multifamily households.

THE NATURAL SETTING OF THE SITE

To consider human interventions in the landscape, it is helpful to begin by considering what the initial inhabitants had to work with—the natural setting of the site before any major constructions or modifications. This is particularly important at Paso de la Amada because the natural, pre-occupation stratigraphy is complex, and identification of artificial earthen constructions is no trivial matter.

The pre-occupation landscape was formed of Holocene-era, sandy, water-worked deposits of the Coatán River delta. Surface relief was distinctly greater than it is today, as revealed, for instance, in stratigraphy of the test pits to the south of Mound 1 (Figure 3.1) and in Mound 12 and the small off-mound test excavated in 1990. (See Figure 7.13a.) The complex relief may have been the result of overbank deposits crosscut by later channels. The river no longer flowed through the site at the time of earliest settlements (Gutiérrez 2011). Although it is possible that some minor channels were activated seasonally, by the earliest Formative, lower-lying areas generally were locations for the deposition of fine-grained sediments in low-energy settings, a condition that has persisted to the present day. Just to the south of Mound 32, we found evidence of a low-energy depositional context that predated other pre-occupation layers of river-lain sand. The deposit is Zone VI, which was identified in Trench 3 as it descended into the bajo south of the mound (Chapter 5). This layer of light gray clay may mark the location of an ancient lagoon. Significantly older than any identified human activity at the site, the lagoon would have been filled in by the gradually aggrading delta of the Coatán.

The landscape of the site at the time of Barra-phase occupation was apparently at least partially vegetated. That seems the most likely explanation for the gray clayey layer underlying Initial Formative constructions in several locations of varying elevation. Yet in some areas—particularly at Mounds 1, 12, and 13—the earliest settlement was directly on sand, either because a surface layer of incipient soil formation was scraped off or because the sandy peaks of old overbank river deposits remained free of vegetation when settlement was established.

The Initial Formative inhabitants, then, settled on a naturally undulating surface with differences of elevation generally greater than the current topography of the site. Our original idea that people would have favored higher ground for the location of their residences is borne out by the excavation results. The location of Test Pit 32 is a good example. In 1992 it appeared to be part of an unbroken slope descending from the summit of Mound 1 into the old oxbow that forms the southern margin of the site. However, excavation revealed that the Locona-phase settlement in that area was on a localized high point that has subsequently been covered over with slope wash (Figure 3.1).

Still, at least some of what are today topographic high points were low points at the time of initial settlement. Test Pit 29 revealed one such location (Chapter 6). Early in the occupation of the site, this spot was a seasonally flooded low point, whereas today it is part of the linear elevation of Mound 14. Much of that low promontory appears to be an artificial construction. In most other cases, however, earthen platforms were constructed in areas that were already naturally elevated. Cases described in this volume include Mounds 1, 12, and 32.

INTERVENTIONS THAT PENETRATED THE GROUND SURFACE

Clark (2004a:58–59) draws attention to large-scale patterning in the locations of two of the larger bajos at Paso de la Amada and raises the possibility that those were artificially embellished or even fully constructed basins dug out by the inhabitants of the site as part of an ambitious scheme of cultural transformation of the landscape. Excavations described here contribute some new information on dug-out features that penetrated the ancient ground surface. The features were of significantly smaller scale than the bajos discussed by Clark.

Two unusually large, deep pits were identified. Feature 11 at Mound 12 is estimated to have been 12 x 8 m in its horizontal dimensions. The original pit must have been more than 3 m deep; we did not reach the bottom of it in our excavations. The original volume of earth moved would have been on the order of 50 m^3 (estimating the volume as half an ellipsoid). Much of the earth removed was loose sand that would not have been difficult to quarry with hands, digging sticks, and baskets. Feature 1 at Mz-250 was smaller: about 5 m in diameter and at least 2 m deep. The original volume removed would have been approximately 13 m^3. These may have been dry-season wells.

PLATFORMS, RESIDENCES, AND PUBLIC BUILDINGS

At least some—and likely the majority of—residences at Paso de la Amada were built at or near ground level rather than atop an artificial earthen platform of any significant height. The uncertainty concerning the relative proportions of ground-level and platform-top buildings is in large part due to issues of preservation. Actual traces of ground-level dwellings were identifiable only where they were subsequently covered (and thus protected) by a substantial layer of platform fill. In many cases, we infer the former existence of ground-level dwellings from the presence of refuse-filled pit features, burials, and so forth at a distance from any identifiable platform. This section summarizes results concerning platform-top and ground-level buildings.

Platforms and Mounds

One complicating factor is that a building atop a low mound may have been perceived as "ground level" irrespective of whether the mound was natural or artificial in origin. The distinction between an earthen platform and its surroundings would have been difficult to maintain under the effects of torrential seasonal rains. Given a naturally undulating topography, it is possible that the artificial origin of platforms could have been forgotten. Unless they were periodically refurbished and expanded, they could eventually have been perceived as part of the natural topography.

To acknowledge the potential for shifts in status of artificial earthen constructions, it is useful to distinguish between platforms and mounds. *Platforms* were artificial constructions recognized and maintained as such. As these constructions increasingly blended into the natural landscape through the effects of erosion, they eventually became mounds. At Paso de la Amada then, *mounds* are elevated places in the landscape that originate from a variety of accretional processes, including in many cases one or more episodes of platform construction. We observe mounds today at the site, but we also find the term relevant in the effort to understand how the ancient inhabitants perceived their locations of settlement.

My point is not that mounds were necessarily perceived as natural but rather that the way they were perceived at different points in time is a topic for investigation. By the Ocós phase, if not already in late Locona, the slopes of Mound 6 were gently sloping and quite likely vegetated to prevent erosion in rainy-season downpours. Ocós-phase Mound 6 was thus a "mound." However, its status as a human construction was probably maintained by the periodic renovations and expansions that led to the steady expansion of the mound over approximately 250 years. Mound 32 provides a point of contrast. The Locona platform was deliberately maintained as such for several generations, but as it became a mound with gently sloping sides, its artificial origin may have been forgotten.

Thickness of fill deposits at Paso de la Amada was bimodal (Lesure 1997a:Figure 3). It appears that many structure floors were prepared by mounding up 5, 10, or 20 cm of fill. Individual layers of fill 50 cm or more were more unusual, and it is those that I refer to with the term *platform*. There are in addition a few instances of lateral extensions to platforms or mounds (Lesure 2011a:124, 127). In some cases those were more than 50 cm thick but of limited extent relative to the size of the mound on which they were constructed.

This distinction between "platform" and "ground-level" or "non-platform" dwellings is heuristic. It should not be treated as a rigid dichotomy. The earliest two floors at Mound 6 were ground-level dwellings. They were followed by a series of platform-top residences that preserved the same basic shape and floor plan. The sequence at Mound 6 thus had internal integrity even though the earliest buildings were at ground level whereas subsequent ones were platform-top. The sequence at Mound 32 appears to have lacked such integrity. There was a single episode of platform construction. Thereafter, during the Locona phase, activities at the mound were organized in a way that maintained several distinct settings for action (on top of, in front of, and behind the platform). As the sides of the platform eroded, those elements of a formalized organization of activities were abandoned. I think the Ocós-phase residences at Mound 32 were, effectively, non-platform buildings.

Non-Platform Buildings

Actual remains of ground-level or non-platform structures were recovered only at Mounds 1 and 12, in both cases because deposits were protected by a meter or more of Cherla-phase platform fill. Unfortunately, these fragmentary remains—even when combined with the better-understood structures at Mound 6—do not clearly reveal what a "typical" residence at the site would have looked like. The Mound 6 buildings had one or two interior rows of posts, and posts spaced around the perimeter (Figure 7.1a). At Mound 1, the much smaller Structure 1-4 (Figure 7.1b) appears somewhat similar in scheme, particularly to the roughly contemporary Structure 6-2, though the center post was decidedly larger than the other two in the centerline, and there were fewer posts around the perimeter, probably because of the overall small size of the structure. However, Structure 1-2, even though it was significantly larger than 1-4, does not seem to have had a central line of posts (Figure 7.1c). (Note that Structure 1-2 was oriented approximately perpendicular to the buildings at Mound 6, a topic addressed below.)

The palimpsest of post holes in the Locona and Late Locona levels at Mound 12 defied efforts to identify individual structures. If we hit wall lines of buildings located to the southeast of the excavation block, as suggested in Chapter 4, then any centerlines of posts were not preserved. The buildings in that case would likely have been at least 8 m long and potentially longer. In the case of Mz-250, a deposit previously interpreted as a series of floors of ordinary residences (Clark 1994a:163) on further investigation appears to be part of a dry-season well (Mz-250 Feature 1) and not the remains of a building (see Chapter 6). In sum, the information on ground-level or non-platform buildings remains meager. Most houses at Paso de la Amada from the Barra through Cherla phases were probably at ground level and were distinctly smaller than the large buildings at Mound 6.

Platform-Top Buildings and Their Function

The excavations documented several instances of platforms that probably, like the Locona constructions at Mound 6, supported single buildings. I refer to these as "architectural platforms" to distinguish them from earthen constructions that did not support buildings (such as the ballcourt). Statistics on horizontal and vertical dimensions of individual platforms are provided in Table 7.1, including the thicknesses of individual layers of platform expansion. Volume estimates are discussed in the next section.

Available evidence suggests that architectural platforms at Paso de la Amada were most numerous in the Locona phase. The well-documented cases are Mounds 6, 32, and 50. Others identified in limited soundings are Mounds 4 and 13. Of these, only Mound 6 underwent a long series of platform expansions, extending through much of the Locona and Ocós phases. There seem to have been at least two significant episodes of Locona-phase platform construction at Mound 4, and Mound 13 was expanded in the Ocós phase and probably in the Cherla phase, after initial construction in Locona. The platforms at Mounds 1, 12, and 32 were essentially single-phase constructions, though at Mound 32 there was a lateral extension to the platform that expanded the upper surface of the mound without entirely encasing the earlier structure.

Blake and Clark have previously expounded on the interpretation of the Mound 6 buildings as residences (Blake 1991, 2011; Blake and Clark 1999; Blake et al. 2006; Clark 1994a, 2004a; Lesure and Blake 2002). Mound 32 is an important case in that discussion. The Locona midden at the back of the structure yielded, in addition to the stunning statuette, the full range of debris found in domestic refuse deposits throughout the site (Tables 5.2 and 5.3). People lived in the platform-top building at Mound 32 during the Locona phase, yet their daily activities were formalized in a way not evident at typical residences (Chapter 5 and Lesure 1999a, 2011a). The presence of the statuette suggests, in addition, rituals involving large numbers of participants.

When the Cherla-phase platforms in Mounds 1 and 12 (Structures 1-1 and 12-1) were excavated, I considered them to be architectural platforms for elite residences. The principal reason for this interpretation was an analogy with Mound 6. We were confident that people lived in the

Table 7.1. Mound dimensions and volumes at Paso de la Amada

Mound and Structure	Base Length (m)	Base Width (m)	Accumulated Platform Height (m)	Layer Volume (m^3)	Cumulative Volume (m^3)	Phase
Mound 1						
extant mound	22	22				
Str. 1-1	20	19.5	> 1.0 (est. 1.4)	285.9	285.9	Cherla
Mound 6[a]						
Ocós-1	36.0	28.5	4.2	688.5	2256.3	Ocós
Ocós-2	34.0	22.3	3.6	208.4	1567.8	Ocós
Ocós-3	33.5	25.0	3.1	391.8	1359.4	Ocós
Str. 6-1	32.0	21.0	2.8	301.4	967.6	Locona
Str. 6-2	29.7	16.8	2.6	131.8	666.2	Locona
Str. 6-3	28.0	16.2	2.2	397.7	534.4	Locona
Str. 6-4	21.7	10.1	0.8	129.1	136.6	Locona
Str. 6-5	19.2	10.0	> 0.1	7.5	7.54	Locona
Mound 7[b]						
extant mound	110	50				
expanded	82.5–79.6	31.1	1.45	1,135	2364	Locona
original	74.3–77.5	21.5	1.45	1,229	1229	Locona
Mound 12						
extant mound	26–28	20–22				
Str. 12-1	< 26 (est. 24)	21.0	> 0.9 (est. 1.2)	316.7	316.7	Cherla
Mound 13						
extant mound	34	25				
Str. 13-1	< 34 (est. 32)	< 25 (est. 22)	> 1.5 (est. 1.7)	unknown	est. 627	Cherla
Str. 13-2	unknown	unknown	1.0	unknown	unknown	Ocós
Str. 13-3	unknown	unknown	0.5–0.7	unknown	unknown	Locona
Mound 14/P29						
Cherla layer	100?	unknown	unknown	< 400	unknown	Cherla
Ocós layer	100?	unknown (est. 20)	variable	500+	unknown	Ocós
Mound 21						
extant mound	40	30				
Ocós fill	unknown	unknown	0.55–0.60	unknown	unknown	Ocós
Mound 32						
extant mound						
Str. 32-1ext.	30+	2–3?	est. 1.0	60+	248.5	Ocós
Str. 32-1	30	12	> 0.7 (est. 1.0)	188.5	188.5[c]	Locona

[a] Data from Blake et al. 2006:Table 7.1.

[b] Data from Hill 1999:Table 4.15. Note that the length and width measurements here are of the ballcourt as a whole rather than the individual mounds. The volumes are based on detailed calculations provided by Hill to take into account mounds, benches, and playing surface.

[c] If the platform had vertical sides, then the volume of this layer would have been 282.7 m^3.

buildings atop the Mound 6 platforms during the Locona and Ocós phases, therefore people probably lived atop the Mound 1 and Mound 12 platforms during the Cherla phase. That analogy appeared to be bolstered by the *fill* of the Mound 1 platform, which was clearly domestic and which, by several measures, looked elite.

There are problems, however, with that initial assessment of the Cherla platforms. First, there is obviously no necessary relation between the contents of the fill at Mound 1 and the function of the building atop the platform. It seems likely that people living in Structure 1-2 generated much of the refuse that ended up in the platform. To extend the "residence" interpretation to the subsequent platform, one could argue for continuity: the group of people living in Structure 1-2 dismantled that building, constructed the platform, and built a new residence on top. We have used that logic for Mound 6, where numerous continuities from one structure to another support the argument of continuity.

In the case of Mounds 1 and 12, arguments for continuity are not strong. At Mound 1, the platform was *not* constructed directly over the dismantled Structure 1-2 but rather off to one side. Although there appear to have been some prior elements of continuity at Mound 12 in the location of buildings during the Locona and possibly Ocós phases, the Cherla-phase platform construction there was novel in form and offset from the locations of earlier residences. At both Mounds 1 and 12 then, platform construction in the Cherla phase represented a distinct break in the sequence. Rather than representing continuity, the platforms appear to have been something new.

Our original analogy with the Mound 6 platforms—to which we might now add Mound 32—suggested that platform-top buildings generally at Paso de la Amada might have been residences. The Mound 1 and 12 platforms, however, are later than the documented platform-top residences: Cherla rather than Locona-Ocós. Further, they are similar to each other in shape. In each case, maximum length was not much more than width, implying that the original platforms were close to round (or perhaps square). The best documented Locona residential platforms, in contrast, were at least twice as long as they were wide, though it will be noted in Table 7.1 that as Mound 6 grew in size during the Ocós phase, its width began to approach its length. Overall, considering simply the shape of the platforms, a functional interpretation based on an analogy with Mound 6 is weak.

What about evidence of the actual uses of the buildings? Here the data are incomplete because of destruction, through plowing, of the original surfaces of the platforms and because we conducted only limited excavations beyond the margins of the platforms themselves. Still, two observations are consistent with a *lack* of domestic occupation atop these two platforms. First, in the (limited) excavations at the margins of both mounds, no Cherla-phase domestic middens were identified. Second, despite the significant areal exposures atop both platforms, no Cherla-phase refuse pits were discovered. The absence of such pits contrasts with the frequency of Cherla refuse pits atop other mounds, even in much smaller exposures. Cherla pits with domestic refuse were identified in Mounds 11, 13, and 32 and Pit 29. The frequency of such features suggests that pit storage in the vicinity of or even within the residence was a common Cherla-phase practice that was absent from platform-top activities at Mounds 1 and 12, raising the possibility that there was no residential occupation of these platforms.

Finally, there is some positive evidence of possible ritual activity atop the Mound 1 and Mound 12 platforms. The mixed deposits immediately beside the platforms—sampled in Trenches 1, 2, and 3 at Mound 1 and in Pits 2 and 5 at Mound 12—appear to be primarily the result of slope wash. Although artifacts are abundant, they are generally small and chronologically mixed. These are definitively not secondary deposits of domestic refuse. However, censers and possible censers are unusually frequent in these deposits, as demonstrated in Figure 7.2. Plausibly, these censers represent pieces of objects used in the platform-top public buildings, broken up and mixed into the background noise of slope-washed artifacts. A note of caution is that no large pieces of censers were recovered; the pieces are similar in size to the other sherds interpreted as mixed slope wash. Yet if these are simply part of the slope wash, why is the concentration of censers so high? The proposed ritual assemblage includes typical Cherla-phase ritual vessels (Figure 7.3a–d) as well as some more unusual forms (Figure 7.3e–h).

Identification of the Cherla-phase platforms as public/ritual rather than residential in function should be considered a hypothesis requiring evaluation with additional excavations, in particular larger exposures to the sides of the mounds.

Labor Requirements for Platform Construction

Estimates of volumes of construction fill in platforms at Paso de la Amada provide a basis for considering the labor that went into creating mounds at the site. Here we consider only labor inputs into earthen platforms. It needs to be remembered that the buildings atop the platforms may have required greater labor inputs than the platforms themselves.

Estimates of volumes of fill both cumulatively and by construction layer are provided in Table 7.1. Data from Mound 6 are from Blake et al. (2006:Table 7.1), and those from Mound 7 are from Hill (1999:Table 4.15). Following Blake et al. (2006), volumes for platforms in Mounds 1, 12, and 32 were calculated under the assumption that the form was half of an ellipsoid. Formula: $(0.5)*(4/3)*\pi*(\text{length}/2)*(\text{width}/2)*(\text{height})$. Note that the volume for the Structure 6-4 platform was calculated in a different way

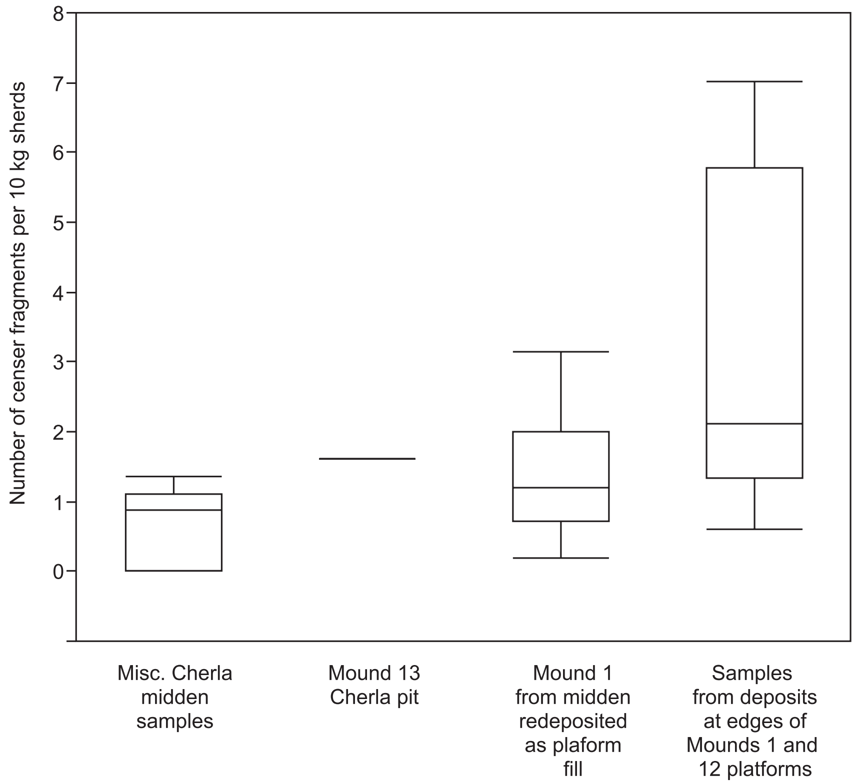


Figure 7.2. Evidence supporting a ritual function for the Cherla-phase structures atop the Mound 1 and Mound 12 platforms: censer fragments per 10 kg of sherds in four sets of Cherla deposits. Left to right: miscellaneous Cherla midden samples; the Cherla pit atop Mound 13 (with high-status refuse); the redeposited high-status Cherla midden in Zone IV of Mound 1; the edges of the Cherla platforms in Mounds 1 and 12, possibly corresponding to activities conducted atop the platforms. (See text for caveats.) *Illustration by R. Lesure.*

because we know for sure that the walls were vertical rather than sloped. It is possible that the walls of the rather similar platform for Structure 32-1 were also vertical. If that were the case, the estimated volume for that platform would increase significantly (from 188.5 to 282.7 m^3). Values for Mounds 1, 6, 12, and 32 are based on significant excavation that yielded reasonable estimates of both the height and the areal extension of the platforms. (Our volume calculations use estimated original heights of the mounds before plowing; those values are, in our opinion, conservative in that actual values are likely to have been somewhat higher.) In the case of Mounds 4, 13, 14, and 21, we have good estimates of the thickness of fill layers (with the uppermost one again requiring an assessment of what has been lost to plowing) but little to no excavation evidence of the areal extent of the layers. For those mounds, an estimated individual construction layer is provided only in the case of Mound 14 and Pit 29 to illustrate implications of the hypothesis that a linear mound 100 m or more in length was built there as part of an ambitious Ocós-phase reworking of the Southern Plaza.

One notable aspect of the data on layer volumes presented in Table 7.1 is that, if we set aside Mounds 7 and 14, then individual construction episodes range between 130 and 400 m^3, the exceptions being the final Ocós stage at Mound 6 (688.5 m^3) and the lateral extensions at Mounds 1 and 32 (both less than 100 m^3). Hill (1999:115) drew on Abrams's (1994) estimates to calculate the labor requirements for construction of the ballcourt. I use the same source but modify the calculation. Considering the energetics of earth procurement only (2.6 m^3 per person per day; Abrams 1994:Table 3), the bare minimum labor requirements for typical construction episodes would be 50 to 150 person-days (130/2.6 = 50; 400/2.6 = 153.8). A more reasonable estimate would include transport costs as well, estimated at 1.9 m^3/person-day by Abrams (1994:53, Table 4) for distances of approximately 100 m, a figure that seems inflated for Paso de la Amada. Halving that distance would double the output, to 3.8 m^3/person-day, based on the formula provided by Abrams (1994:Table 3).

Hill (1999:115–16), again following Abrams (1994:Table 3), included construction costs, estimated at 4.8 m^3 per

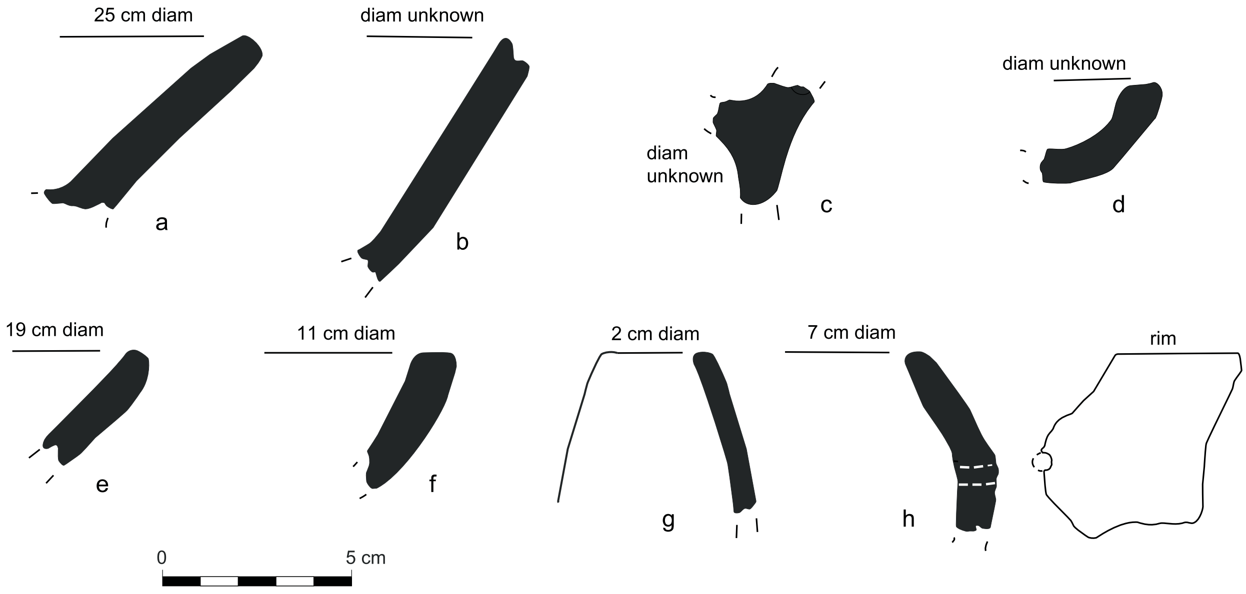


Figure 7.3. Examples of the ritual assemblage from mixed deposits at the edges of the Cherla platforms in Mounds 1 and 12: (a–c) domed censers, Form C4; (d) crude plate, Form P1; (e–f) roughly finished vessels with rounded sides; form of walls below break unknown; (g) ceramic tube from vessel such as that in Figure 8.28p; (h) incurving-walled vessel with small, round perforations in the walls. Surface finish notes: (a) interior roughly scraped, exterior roughly wiped, with reddish-orange wash on both surfaces; (b) scraped interior with red wash, roughly wiped exterior; (d–e): scraped both sides; (f) roughly wiped or scraped on both sides; (g) roughly finished surface; (h) rough wiped surface, both sides. Proveniences: (a) Md. 12 P5/4; (b) Md. 1 T2/6; (c) Md. 1 T3/3; (d–g) Md. 1 T1/4; (h) Md. 1 T2/5. *Illustration by R. Lesure and Anna Bishop.*

person per day. That is reasonable particularly for the ballcourt, with its mounds, benches, and prepared court surface. Abrams (1994:50), however, observed that the dumping of earthen fill took very little time. He therefore did not assign construction costs to the fill of substructural platforms.

Adjusting our estimates of minimal construction costs to include transport over 50 m would yield a range of 80 to 260 person-days for total costs for most observed episodes of platform construction (that is, 130–400 m^3). Using instead a distance of 100 m would yield total costs of 120 to 360 person-days. Judging from observations on probable sources of fill at Mounds 1 and 32 (see Chapters 3 and 5), the lower figure is probably more accurate and itself may be too high for part of the fill in both of those cases. Assuming 10 days for the construction project, typical required work crews for architectural platforms at Paso de la Amada would have been between eight and 26 people. For construction of residential platforms, the crew required was thus most likely beyond the number of future residents of the structure but much smaller than the population of the site as a whole.

Hill (1999:Table 5.2) estimates 1,375 person-days for initial construction of the ballcourt. A similar calculation for expansion of the court would be 1,270 person-days. Those calculations include 2.6 m^3/person-day for earth procurement, 1.9 m^3/person-day for transport across a distance of 100 m, and 4.8 m^3/person-day for construction. Based on observations by Abrams (1994:50), the figure representing construction is likely to be exaggerated. Also, while transport over 100 m seems possible for at least part of the fill (given the larger amounts involved), I suspect that substantial material would have been available at shorter distances in the bajos bordering Mound 7 to the north and west. More conservative estimates based on transport over 50 m and construction costs for only the fill of the benches and alley (165 m^3 for initial construction and 35 m^3 for expansion [Hill 1999:Table 4.15]) yield total construction costs of 830 person-days for the initial construction and 742 person-days for the expansion.

In sum, the initial ballcourt would have required a crew of between 83 and 138 if it was built in 10 days, with the expansion requiring a crew of between 75 and 127. If construction was instead by a set crew of 50, the work would have required between 17 and 28 days for the initial court and between 15 and 26 for the expansion. Hill (1999:116) estimated a potential workforce of 410, representing 25 percent of the total Locona-phase population

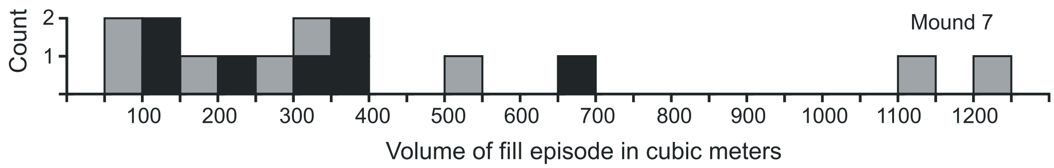


Figure 7.4. Volumes of fill in individual construction episodes in platforms at Paso de la Amada. Construction episodes at Mound 6 are in black; all other mounds in gray. *Illustration by R. Lesure.*

estimated by Clark (1994a) for the site. Clark has more recently revised those population figures somewhat higher (Clark 2004a:54; Clark et al. 2010:222). Thus we would now estimate the maximum potential adult workforce at between 500 and 750 (25 percent of a population of 2,000 to 3,000). The initial ballcourt could have been constructed by a tenth of the theoretically available workforce laboring between 17 and 28 days. Even if they stretched the job out to one to two months, the crew would have needed to be fed during that time, thus requiring contributions from people well beyond the actual work crew. In terms of labor cost, the ballcourt really looks like a collective effort by the community as a whole, whereas most architectural platforms do not.

There are two other cases that seem to have gone beyond the 400 m^3 upper limit for most episodes of platform construction. The final documented stage of expansion at Mound 6 involved 688.5 m^3 of fill, which would represent 446 person-days (including procurement and transport across 50 m but not construction costs). If sources of earth within 50 m were exhausted by that time and transport distance was instead 100 m, then labor costs would rise to 627 person-days. Both of those seem beyond the capacity of not simply the occupants of the Mound 6 residence but also any extended coresidential group. In this episode of platform expansion, the residents of Mound 6 were able to draw on a labor force well beyond their kin. It is possible that they did so also for previous expansions of the mound, but what Figure 7.4 shows is that those previous expansions did not differ in scale (and labor costs) from construction episodes in other mounds.

The final outlier in Figure 7.4 is the postulated Ocós-phase construction of the Mound 14 promontory. I am extrapolating here from surface topography and the stratigraphy of two test units separated by 80 m. I include a guess at the scale of the proposed Ocós and Cherla episodes. Mound 14 should be a high priority for future investigations. There may actually have been more than one construction episode involving more than 400 m^3 of earth, potentially including a Cherla-phase episode. My suggestion, however, is that the major construction episode was during the Ocós phase and that the Cherla construction was within the more typical range of 130–400 m^3.

To conclude, the inhabitants of Paso de la Amada were repeatedly able to recruit and manage sufficient labor to build platforms in the range of 130 to 400 m^3, with work crews perhaps in the range of eight to 26 people. The inhabitants of Mound 6 achieved that feat repeatedly. Most other mounds underwent far fewer (one to three) episodes of construction/expansion. Still, all but the last documented construction at Mound 6 were of a similar scale to those observed in other mounds. The ballcourt was the most outstanding exception to typical levels of labor recruitment, and it seems truly a community-wide project. The other episodes of construction above the norm are both in the southwestern corner of the site (Mounds 6 and 14) and may have enhanced another public space, the southern plaza, discussed below.

The Platforms of Paso de la Amada in Comparative Perspective

Mound 6 is impressive within the context of other Initial Formative Mesoamerican sites, but how does it compare to earthen constructions in pre-state complex societies more broadly? I consider the topic briefly, using data from Blitz and Livingood (2004) on Mississippian platform mounds. The results indicate that, while the number of mounds at Paso de la Amada is impressive by Mississippian standards, the mound volumes are modest even in comparison to small Mississippian sites.

Blitz and Livingood (2004) consider the number of episodes of expansion, the length of occupation, and the mound volume index (MVI), defined as basal length times basal width times height, divided by 1,000. The authors provide data on 35 Mississippian mounds from sites ranging in size from a single mound to 100 mounds (Blitz and Livingood 2004:Table 1). MVI in those cases varies from 1.0 to 51.4.

Mound volume indices for Mounds 6, 12, 1, and 32 at Paso de la Amada are 4.3, 0.6, 0.5, and 0.4, respectively. In other words, MVIs for most Paso de la Amada mounds are below the lowest observations in Blitz and Livingood's Mississippian sample. Paso Mound 6 falls around the median: 17 cases in Blitz and Livingood's table are higher and 18 cases are lower.

The comparatively modest size of Mound 6 is underscored when occupation spans are taken into account. Figure 7.5 is a version of Blitz and Livingood's Figure 5, with Mound 6 included. The dashed line represents the best fit line for small Mississippian sites (with fewer than nine mounds). The MVI for Mound 6 falls below the expected value for an occupation span of 250 years at small Mississippian sites.

This analysis emphasizes the point that Paso de la Amada is an instance of "emergent" rather than "developed" complexity. The main pyramid at the nearby site of La Blanca, built approximately 500 years after the final construction episode at Mound 6, is estimated to have measured 150 x 100 m, with a height of 25 m before it was destroyed in the 1970s (Love and Guernsey 2011:174). Those dimensions yield an MVI of 375, two orders of magnitude greater than that of Paso de la Amada Mound 6 and off the chart in terms of Blitz and Livingood's observations.

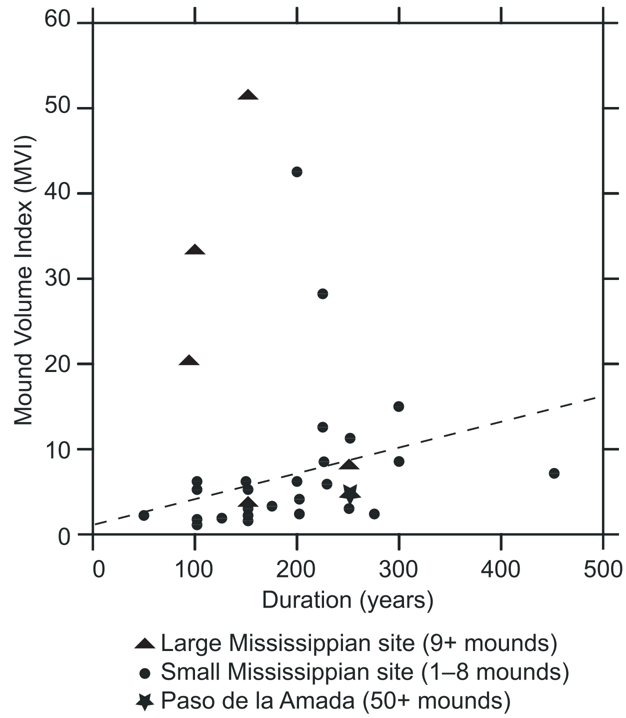


Figure 7.5. Mound volume index (MVI) by duration of occupation for a sample of Mississippian mounds, after Blitz and Livingood (2004:Figure 5), with Mound 6 at Paso de la Amada added for comparison. The dashed line is the best fit line for mounds from small Mississippian sites. By Mississippian standards, Mound 6 is of modest size. *Illustration composed by R. Lesure.*

The History of Platform Construction at Paso de la Amada

In Figure 7.6, the sequences of the mound and off-mound locations described in Chapters 3 through 6 are assembled along with those of Mounds 6 and 7. I have tried to assess the temporal relationships between the sequences based on the available data. The assignments of features, structures, and so forth to phase are pretty secure; however, it should be borne in mind that all the relative assignments within phases involve a lot of guesswork.

Points to be noted in the figure are the proliferation of platforms during the Locona phase, the repeated enlargements particularly at Mound 6, and the dramatic discrepancy by late Locona and Ocós between the accumulated platform at Mound 6 and all other mounds. Also of note is the break in tradition in late Ocós or early Cherla involving the abandonment of Mounds 6 and 7 and a new focus for construction in the central part of the site (Mounds 1, 12, and 14).

LARGER-SCALE ORDER: ORIENTATIONS AND UNITS OF MEASURE

An important issue in the identification of Paso de la Amada as a ceremonial center is evidence of arrangement and planning in the construction of platforms, buildings, and features. This section considers two previously suggested sources of patterning: units of measure and orientations of buildings and features.

Units of Measure

Based on a study of post hole patterns and building dimensions, Clark (2004a:59, 2004b:164–65, 183–85) proposes that the Initial Formative inhabitants of the Soconusco used two units of measure, a standard unit (SU) of 1.666 m and a standard macro-unit (SMU) of 52 SUs or 86.63 m. By this measure, the ballcourt at Paso de la Amada was approximately 1 SMU long. Figure 7.7 shows the spacing of post holes (center to center) in Structure 1-2 and Structure 1-4 (and a few other post holes exposed at the same level) and a line of post holes protected under Floor 1 on Floor 2 at Mound 12. The palimpsest of post holes on Floor 1 and much of Floor 2 at Mound 12 was not considered measurable. Note that the horizontal scale in the figure is in SUs—that is, units of 1.666 m. There is no convincing tendency for the clustering of post hole–to–post hole distances at multiples of SUs.

The situation with building size is mixed. The Mound 32 Locona platform is estimated at 30 x 12 m, approximately 18 x 7 SUs (29.99 x 11.66 m), though the width really appears to have been at least 7.3 SUs. The estimated width of 7 m for Structure 1-2 is hard to reconcile with the scheme. It was between 4 and 5 SUs (6.66 and 8.33 m, respectively).

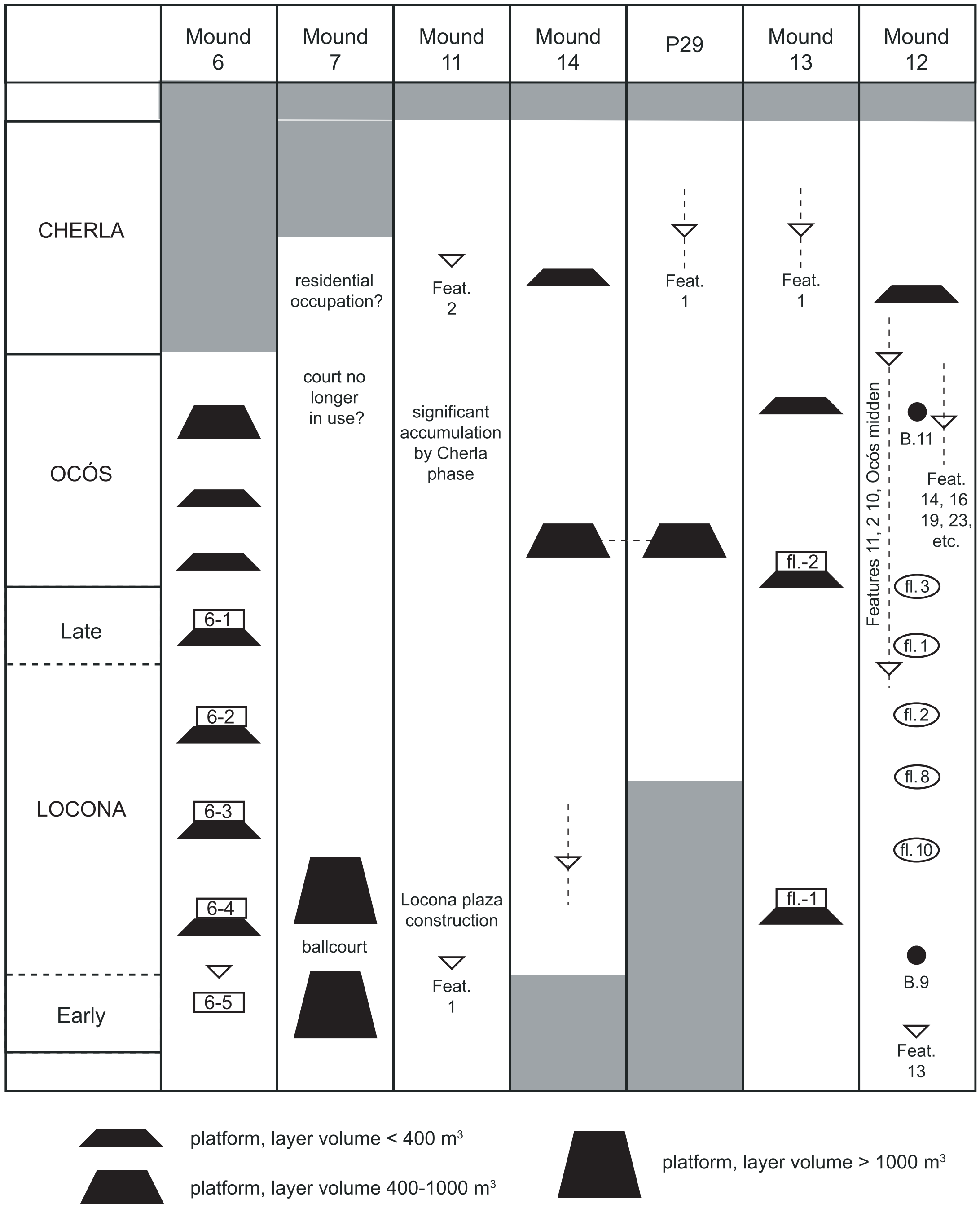
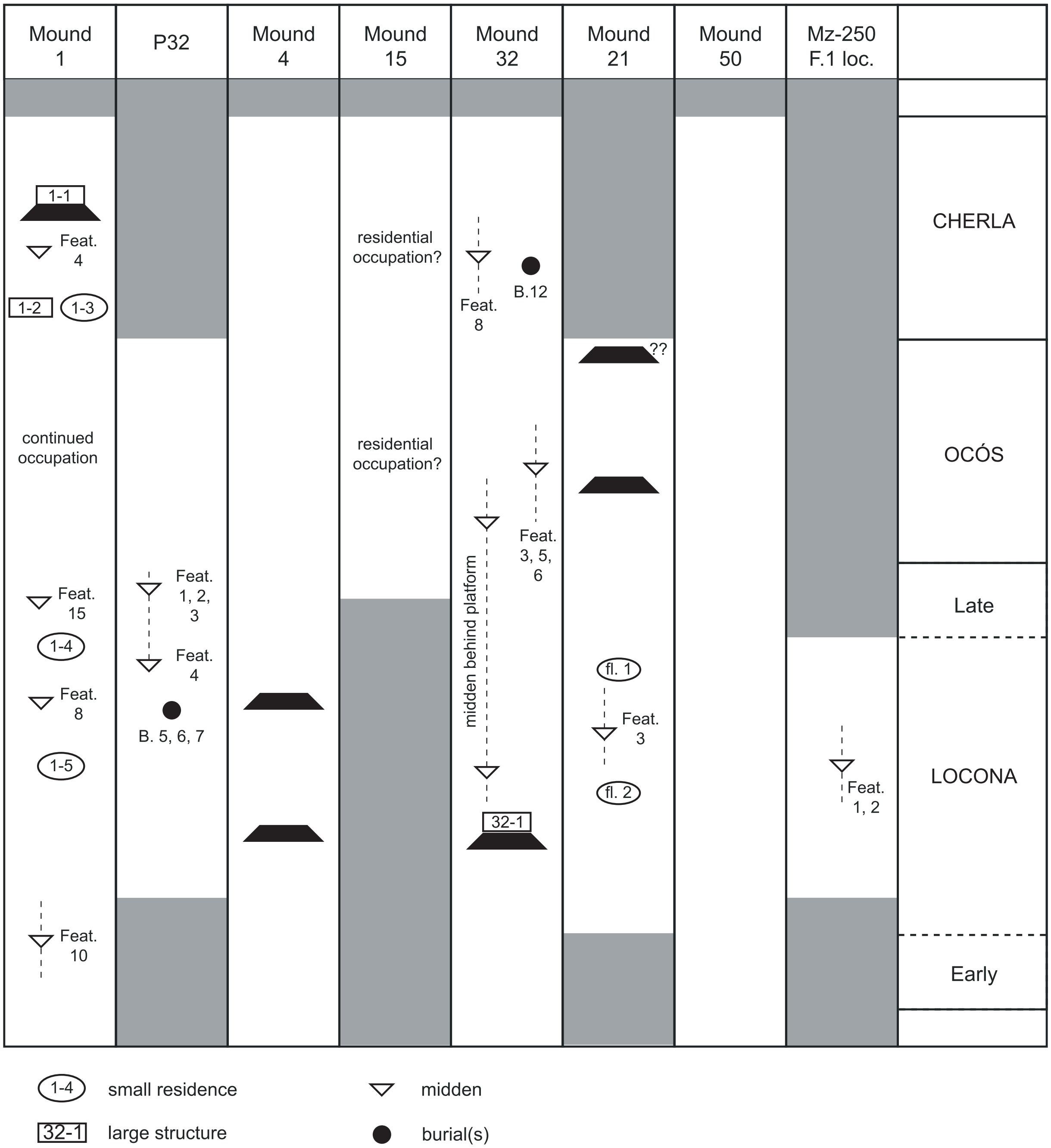


Figure 7.6. Comparison of occupation sequences in multiple locations at Paso de la Amada. *Illustration by R. Lesure.*

Orientations of Platforms and Buildings

Clark (2004a), noting the perpendicular orientations of the ballcourt (30–35 degrees east of north) and the long axis of the buildings at Mound 6 (approximately 55 degrees west of north, varying somewhat among successive buildings), reoriented the map of the site to follow the axis of the ballcourt. The claim is that the site was originally laid out in that way. Patterning at such large spatial scales, involving consistency in the orientation of buildings hundreds of meters apart, helps bolster the idea that Paso de la Amada should be considered a ceremonial center. The excavations reported here yield significant supporting evidence.

The most striking support for site planning at a large scale comes from evidence of the orientations of large buildings (Figure 7.8a). Two large buildings for which an



orientation can be estimated are Structures 1-2 and 32-1. The long axis of both those buildings was oriented approximately parallel to the ballcourt and thus perpendicular to the long axes of the structures at Mound 6. Structure 32-1 is known only from its platform of 30 x 12 m. It was probably a household head's residence contemporary with the ballcourt and with one of the Locona-phase structures in Mound 6. The orientation in Figure 7.8a is that of its long axis. Structure 1-2 was a ground-level building that was probably a leader's residence for a high-ranking multifamily household. Although only partially preserved, it was significantly longer that it was wide. Again, the orientation registered in Figure 7.8 is that of the long axis (see Figure 7.1c). This second case is particularly important because it documents persistence of elements of Locona-era site planning into the early Cherla phase and thus over a total span of approximately 300 years. Adherence to the orientation scheme therefore persisted after the ballcourt was no longer in use and possibly after the abandonment of Mound 6 as an elite residence.

While larger ground-level residences seem to have followed a standard orientation, the evidence for small-

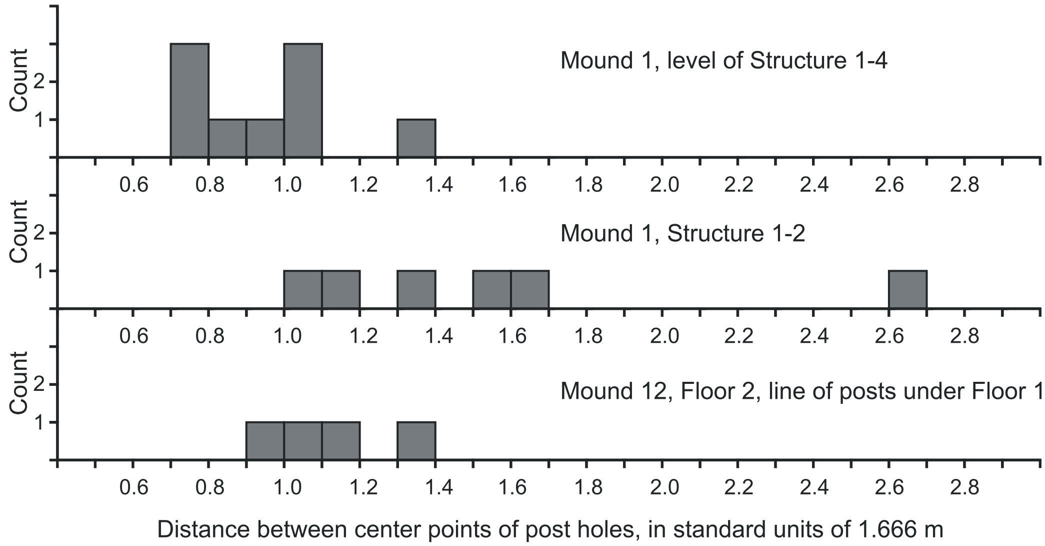


Figure 7.7. Distances between the center points of post holes on three exposed surfaces at Paso de la Amada. Units are standard units (SUs) of 1.666 m (after Clark 2004a) rather than meters. Top: Mound 1, level of Structure 1-4 (Figure 3.12); middle: Mound 1, Structure 1-2 (Figure 3.16); bottom: Mound 12, Floor 2, line of posts under Floor 1 (Figure 4.12). *Illustration by R. Lesure.*

er residences is not particularly supportive (Figure 7.8b). Small, late Locona Structure 1-4, oriented 84 degrees east of north, did not follow the site-wide scheme. Among the palimpsest of post holes in the surface at Mound 12, there was a repeated pattern of lines of posts *approximately* in alignment with the axes of the ballcourt. The ditch, Feature 28, between Floors 10 and 11 had a similar orientation. Whether these were intended to match the orientation of the ballcourt is debatable.

Orientations of Burials

The orientation of adult burials is an intriguing addition to the picture (Figure 7.8c). The distribution is distinctly nonrandom, with orientations approximating that of the long axis of the Mound 6 buildings. In other words, burial orientation may have been included in a larger scheme of site planning, or perhaps site planning and burial orientation were both governed by a directional cosmology. The orientations of burials are more variable than those of the buildings. Yet a rough fit is perhaps not such a surprise if one imagines the circumstances in which people would have oriented corpses in graves scattered across the site. Further, burials were often loosely flexed rather than fully extended, perhaps indicating that a highly precise orientation was not an important goal of the mourners; certainly, the flexed positions meant that, for the archaeologist, the exact orientation of a given burial was open to some debate.

Overview

In sum, the excavations yield several sources of support for Clark's (2004a) suggestion that a site-wide scheme at Paso de la Amada governed the orientation at least of larger buildings, which approximated either 35 degrees east of north or 55 degrees west of north. The case of Structure 1-2 is important because it suggests that adherence to the scheme persisted through the early Cherla phase. It may be that adult burials were laid out using the same orientation scheme, though the fit in that case is more debatable. Investigations described here did not produce clear support for a system of measurement based on an SU of 1.666 m and an SMU of 52 SUs.

MULTIFAMILY HOUSEHOLDS AT PASO DE LA AMADA

The large residential structures may have each been associated with a cluster of smaller, ground-level dwellings. The pattern appears to persist from Locona through at least the early part of the Cherla phase. The implication is that the large dwellings were not necessarily autonomous units. Their inhabitants would have been part of a larger coresidential group manifested as a large (and sometimes platform-top) house and a cluster of smaller dwellings. As a hypothesis for further investigation, I go further, proposing that social organization at the site involved *multifamily households*. Large structures were the residences of household heads. This suggestion complicates identification of elite and non-elite residences, a point discussed in the conclusions to this chapter.

Definitions

Donald Bender (1967) offers the term *coresidential group* as a broader and less specific notion than *household*. It refers to a social group defined analytically by propinquity (people living together) without functional connotations. Nested sets or even distinct types of coresidential groups may be present in the same society. For instance, among the Mundurucu (Brazil), adult males living in men's houses and groups of women and children living in other residences constitute two different sorts of coresidential groups (Bender 1967:495). It is not surprising that this term has been taken up in archaeology (Ashmore and Wilk 1988:6), given that we can readily observe traces of propinquity in the archaeological record.

Households are identified in terms of both propinquity and a shared sets of activities, minimally the production and consumption of food and the bearing and raising of children (Yanagisako 1979:162–66). Broader definitions of the shared activities that constitute households include a polythetic set of themes such as "production, consumption, pooling of resources, reproduction, coresidence, and shared ownership," which may or may not all be present in any particular instance (Ashmore and Wilk 1988:6; Wilk and Netting 1984:5–19).

Hammel and Laslet (1974:92–93) propose the concepts of a *simple family household* (a single conjugal family unit living on its own), an *extended family household* (additional members but still only one conjugal pair), and a *multiple family household*, comprising two or more conjugal family units. Multiple family households can live all under one roof or in separate dwellings close together. Wilk (1988:138–42) summarizes ethnographic and historical evidence for both types in the Maya region, countering the assumed pervasiveness of the simple/extended family household.

Both cross-culturally and within any particular society, the number of members of multiple family households varies considerably. A 1615 mission census in Campeche recorded a wide range of residence types, from solitary to multiple family; group size varied from one to 30 individuals (Weeks 1988:Table 4.4). In the Kongoussi region of Burkina Faso, West (2009:Figure 4) reports averages of nine and 16 members for simple/extended and multiple family households, respectively. On the Northwest Coast of North America, multifamily households could range in size from 80 to 150 or more members (Ames 1995:159).

Multiple Dwelling Coresidential Groups at Paso de la Amada

During the Locona phase, platforms we identify as architectural traces of large residences were dispersed across

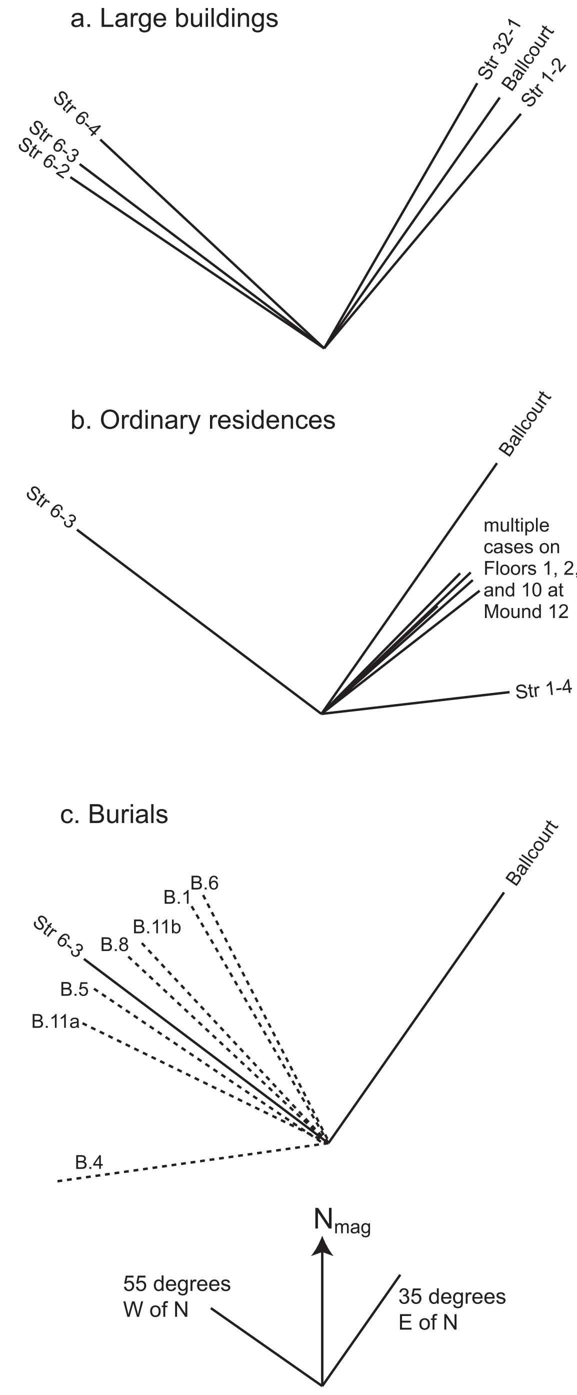


Figure 7.8. Orientations of buildings, burials, and features at Paso de la Amada: (a) large buildings compared to the ballcourt; (b) several possible post hole alignments on Floors 1 and 2 and the Feature 28 ditch between Floors 10 and 11, all at Mound 12, compared to the ballcourt and Structure 6-3; (c) adult burials, again compared to the ballcourt and Structure 6-3. *Illustration by R. Lesure.*

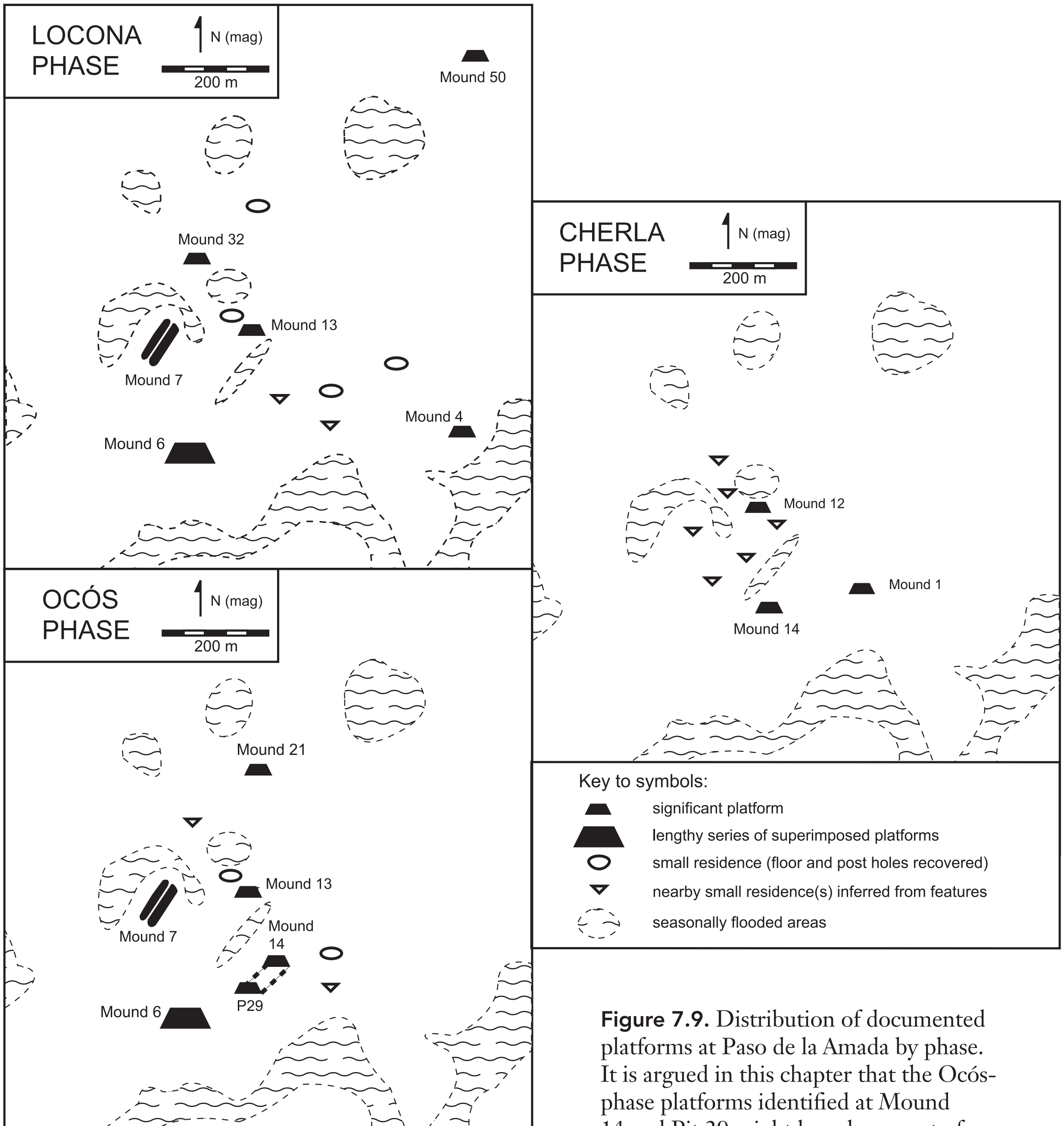


Figure 7.9. Distribution of documented platforms at Paso de la Amada by phase. It is argued in this chapter that the Ocós-phase platforms identified at Mound 14 and Pit 29 might have been part of a single lengthy construction bordering one side of the Southern Plaza. *Illustration composed by R. Lesure.*

much of Paso de la Amada (Figure 7.9). That observation prompted Clark (1994a:375–84) and Lesure (1995:73–79, 1997a:229–31) to suggest that, at least during the Locona phase, Paso de la Amada was divided into settlement clusters or neighborhoods, each with a single large structure.

The proposal offered here focuses on a smaller scale of organization and complicates previous suggestions concerning neighborhoods. The 1997 excavations at Mound 32 yielded evidence of similarities in the organization of space at Structure 32-1 and the large buildings at Mound 6. Arguments for identifying a front and a back to Structure 32-1 are noted in Chapter 5. To the front of the building was an open patio and beyond that, apparently, no construction. The ground surface descended from the patio into a seasonally flooded bajo. As suggested in Chapter 5, the back of the building was an area for informal activities, such as the discard of rubbish in small pits. However, Structure 32-1 was located toward one side of a natural promontory; from the summit of Mound 32, the ground descends more rapidly to the southeast but only gently to the northwest. An area of still relatively elevated land extended some 20 m to the north of Structure 32-1. This seems a likely location for smaller residences not atop any significant platform.

Such observations resonate in several ways with the situation at Mound 6, where there was also an open patio to the front of the building (Clark 2004a:Figure 2.4). Elevated terrain to the back and to the southeast of the building (that is, toward Mound 2) would have provided suitable locations for several smaller residences.

The Mound 1 excavations yielded further suggestive evidence. The single post hole and associated patches of floor at the northern edge of the excavated area appear to be the surviving traces of a small building (Structure 1-3). It would have been a mere 8.5 m from Structure 1-2. Also suggestive is the size estimated for the social group that would have been necessary to produce the elite midden quarried for fill for the platform. Markers of high status were homogeneously distributed in the fill, suggesting that contributors to the midden shared the same high social status. They were probably part of a single group, estimated at 17 to 18 and perhaps 30 or more people based on the number of pots discarded in approximately 50 years (see Chapter 3). A group of that size would be larger than expected for a simple or even an extended family household, but in the range for a multiple family household.

In Figure 7.10, these various strands of evidence are built into an idealized model of a coresidential group cluster of multiple dwellings at Paso de la Amada. The head of the group lived in a large residence with, at least in some cases, a patio to both the front and the back. The frontal patio was the group's public face. The rear patio was an area shared with residents of a cluster of smaller dwellings. Up for debate is whether a group of this sort would have constituted a "household." The hypothesis proposed here is that it did—that at least some residents of Paso de la Amada were members of relatively large households inhabiting multiple dwellings and that at least some of those groups maintained a large central residence for the household head.

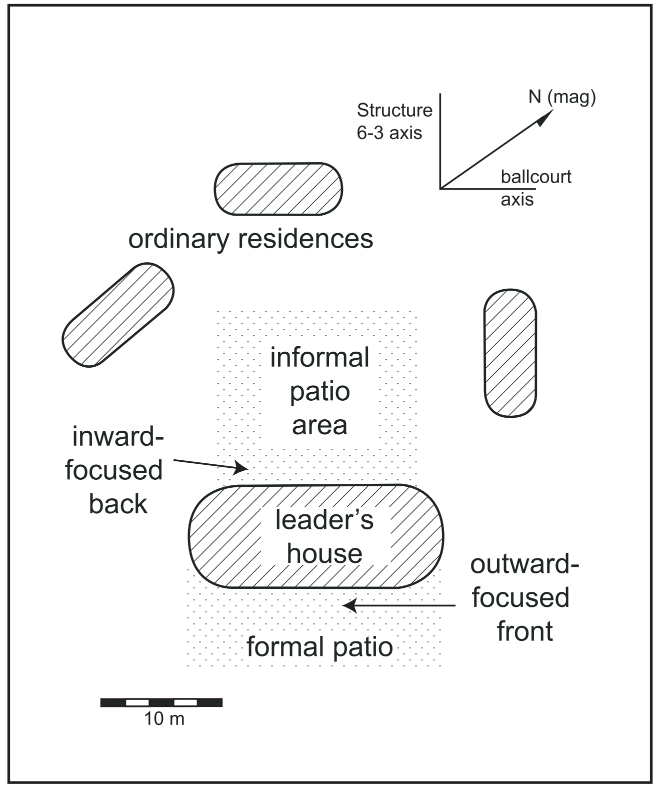


Figure 7.10. Proposed model of settlement cluster organization at Paso de la Amada during the Locona phase. The headman's house, oriented approximately 35 degrees east of north or 55 degrees west of north, opens out onto a formal patio to the front and, to the back, on an open space shared with other residences of the settlement cluster. *Illustration by R. Lesure.*

The Excavations Interpreted in Light of the Multifamily Household Model

Given our goal of investigating residential differentiation and social inequality by comparing refuse deposits from different excavation locales, an additional issue is the nature of the social group or groups that generated refuse concentrations. Are the refuse deposits we recovered attributable to the inhabitants of an individual dwelling? A multifamily household? Multiple households? The community as a whole?

Such issues require an investigation of disposal practices (e.g., Arnold 2000; Stark 2003). Three general considerations seem relevant. First, there is likely to be differential treatment of refuse based on characteristics of the objects involved—differences of value, hazard, size of pieces, and potential for reuse (Hayden and Cannon 1983; Wilson 1994). Second, an important topic is the organization of activities around dwellings. One approach, pursued by Wendt (2005) and Pool (1997), is to attempt to fit archaeological patterns to models generated from ethnographic or ethnoarchaeological case studies, such as Santley and Hirth's (1993) typology of house lot, house compound, and dwelling unit or idealizations based on observed house lot structure in the Tuxtla Mountains of Veracruz (Killion 1990) and highland Chiapas (Hayden and Cannon 1983). A third consideration, raised by Hutson and Stanton (2007), is whether the role of cultural as opposed to practical logic can be perceived in discard practices.

Settlement at Paso de la Amada appears to have been generally dispersed and most productively considered in relation to the lowest-density model in Santley and Hirth's (1993) typology, the *house lot*. Two rather similar manifestations of the house lot model have been observed by Killion (1990:Figures 6 and 8) in Veracruz and by Hayden and Cannon (1983:Figure 5) in Chiapas. Those are shown in schematized form in Figures 7.11a and 7.11b, respectively. I use Hayden and Cannon's terminology, but as Wendt

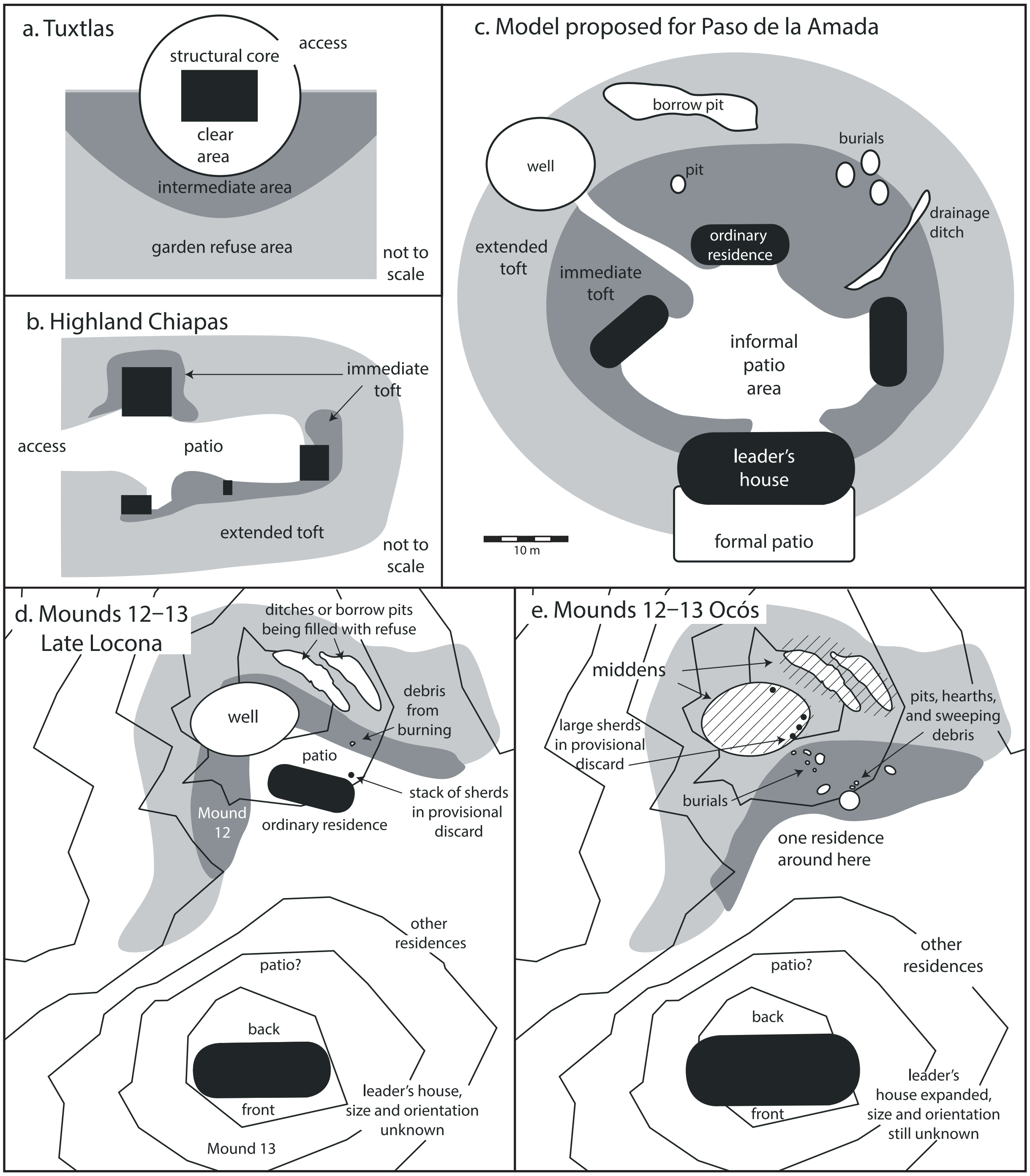
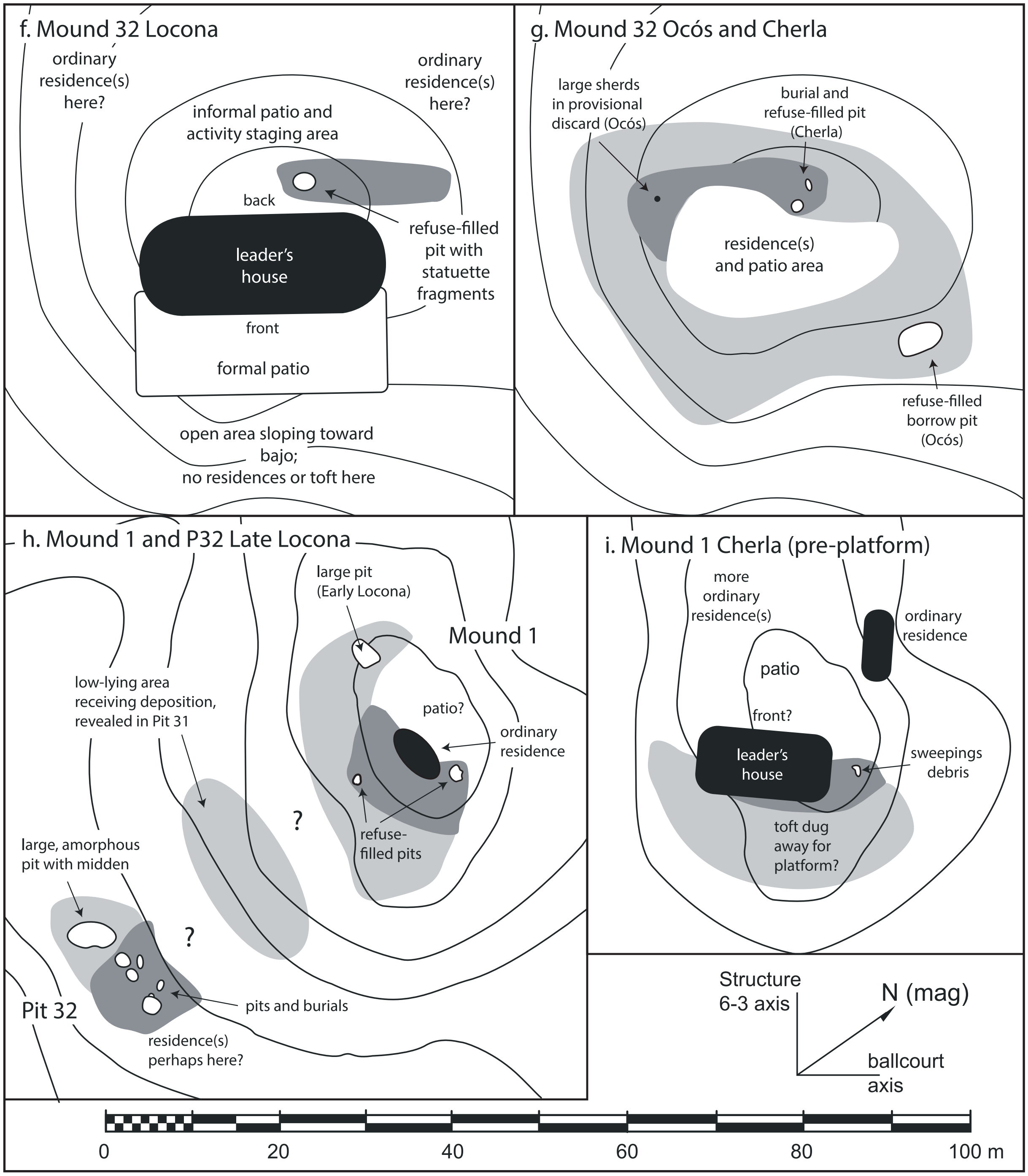


Figure 7.11. Primary excavation areas, interpreted as settlement clusters with activity and discard areas: (a–b) ethnoarchaeological house lot models from Tuxtlas Mountains and highland Chiapas, after Killion (1990) and Hayden and Cannon (1983), respectively; (c) the model proposed here for Paso de la Amada settlement clusters; (d–i) individual cases from the small-mound excavations, interpreted according to the model. All individual cases are at the scale and orientation shown in the lower right. Contour intervals are 20 cm. *Illustration composed by R. Lesure.*



(2005:Figure 3) shows, the two sets of terms are basically equivalent.

Wendt (2005:454) finds subtle differences between the models in terms of whether the buildings are at the center or at the edges of the swept-clean patio area. That issue seems less relevant here in part because of our general lack of evidence concerning the areas between adjacent buildings but also, more interestingly, due to consideration of our model of the spatial arrangement of dwellings (Figure 7.10). In Figure 7.11c, that model is elaborated in relation to the classification of space in house lots (Figure 7.11a–b). The arrangements illustrated in Figure 7.11c are in large part hypothetical. I have drawn on proposals concerning the organization of settlement clusters and the cultural logic involved (Figure 7.10) but also taken into consideration excavations at Mounds 12 and 13 (Figure 7.11d–e) as well as those at Mound 32, Mound 1, and Pit 32 (Figure 7.11f–i).

I first describe the basic proposal (Figure 7.11c) and then discuss individual cases. An immediate difference between Paso de la Amada and the two house lot models is that our unit includes two different kinds of residences in which cultural logic may have prescribed distinct modalities of practice and comportment (see Lesure 2011a and Chapter 27 of this volume). Daily activities in and around the leader's residence were formalized in ways that did not characterize activity in and around ordinary residences. For this reason, disposal practices need to be considered at the coresidential group level rather than at the level of the individual residence.

Based on observations in the preceding section, the leader's residence was the household's face toward the larger community. Its front patio was open and visible, a place to receive guests and conduct rituals. It was assiduously swept clean. The rear of the leader's house also probably looked out on a patio but in this case a more informal setting. It is this second patio that was the more direct equivalent of the clear areas in the house lot models, and it is probable that at least some of the ordinary residences that composed the settlement cluster opened out on this patio, as suggested in Figure 7.11c. Shown in darker gray in the figure is the *immediate toft*, expected to be the site of sweepings dumps and provisional discard. It probably began at the edges of the rear patio, around the ordinary residences, and extended some distance beyond the structures themselves. Burials, storage pits, and sometimes drainage ditches were located in this area, as were some activities involving burning (perhaps including the firing of pottery). The immediate toft tended to include elevated areas not far from dwellings. Downslope areas correspond to the *extended toft* of the house lot models, shown in lighter gray in the figure. In this location, there were larger-scale pits (borrow pits, ditches, and wells) and sustained, concentrated dumping of refuse.

Figures 7.11d through 7.11i present individual excavated cases as manifestations of the model of 7.11c. Toft areas, features, and so forth are extrapolated beyond the boundaries of our excavations, but in no case have I simply made up features. When I write "other residences" or "patio?" rather than drawing in the corresponding features, that means that I am inferring their existence but have no concrete evidence of an actual feature.

The excavations in Mound 12 mainly sampled toft areas of what was probably a multifamily household that also included Mound 13. Reconstructions for Late Locona and Ocós levels are shown in Figure 7.11d–e. Mound 13 was the location of the household head's residence, built on a modest Locona-phase platform that was expanded in Ocós. Although we know there was a platform here, we have no excavated evidence of the size or orientation in successive phases; my guesses concerning those characteristics, including orientation parallel to the ballcourt, are based on tendencies toward an orientation observed in the 20 cm–interval contour map of the mound made in 1993. The orientation of the Mound 13 platform has implications for understanding the proposed Southern Plaza, a topic that will be considered below. One final point to note is that the "mound" of Mound 12 derives from the Cherla-phase platform in that location. Prior to the Cherla phase, the spot that would become Mound 12 was at the edge of a broad elevated area, approximately 30 by 50 m, that extended to Mound 13. This is the area I propose as the location of multiple dwellings of a single large household during the Locona through Ocós phases.

In the Locona levels of the 1993 excavation block at Mound 12, we identified an area repeatedly used for placement of ordinary residences. These would have been approximately 25 m from the headman's house at Mound 13. The immediate toft to the west and northwest of the residential location included, at different times, dark organic stains (Features 29A and 29B), sweepings debris (Features 18 and 27), stacks of large sherds in provisional discard (Feature 21D), and a drainage ditch (Features 28 and 28A). A few meters farther is an area characterized by larger, deeper pits and more intensive dumping. This is best understood as an extended toft at the edges of the cluster of residences. In this area, there was the deep well (Feature 11) and two somewhat amorphous ditches (Features 2 and 10), all dug in the Locona phase and subsequently used for intensive dumping of domestic refuse.

The Ocós levels at Mound 12 yielded a richer sampling of traces of diverse activities in the immediate toft, including small concentrations of sweepings debris (Features 14 and 16), traces of burning (Features 15, 25A, and 25B), and burials. A large pit, probably originally for storage (Feature 19), was filled by dumping of materials from the southeast, the postulated direction from which household residents would have arrived at the pit walking directly from their homes. Finally, there are the numerous instances of stacks or concentrations of large fragments of ceramic vessels (Features 3, 4, 21A, 21B, 21C, and 21E) around the edge of the well (Feature 11). One suggestion from the ethnoarchaeological literature would be that these were vessels actually broken at the water source (e.g., Beck 2006:40–41). However, they appear rather late in the filling of the feature, when it was probably purely a dump and not a water source. Further, while tecomates do predominate, there is a diversity of vessel forms, and the tecomates themselves are far from fully reconstructable. These concentrations of large vessel fragments were probably placed here in provisional discard, left around the edges of the Feature 11 pit on the chance that they might prove useful.

The remainder of Figure 7.11 provides interpretations of Mound 32 (Locona and Ocós), Mound 1 and Pit 32 (Late Locona), and Mound 1 (Cherla) according to the model presented in Figure 7.11c. The Mound 32 Locona and Ocós exposures were important sources in formulation of the basic coresidential group model of Figure 7.10. The midden to the back of the Locona platform (Figure 7.11f) suggests that this area should be considered part of the immediate toft.

The Ocós occupation at Mound 32 (Figure 7.11g) has more the concentric character of the house lot of Figure 7.11b, without the elements of formality (for example, sweeping of a front patio) of Figure 7.11c. There must have been at least one residence (and perhaps more) on the upper surface of the mound. The cluster of sherds in Feature 13 may have been reserved in provisional discard in the immediate toft. Farther downslope was the extended toft, where refuse was dumped in permanent discard. Feature 6 was a large pit, possibly a borrow pit created when the upper surface of the mound was extended. Its size recalls Features 2 and 10 at Mound 12, also postulated as part of the extended toft.

Interpretations of Mounds 12 and 13 and Mound 32 draw on the topography surrounding those mounds, in both cases consistent with a cluster of residences on an elevated area, surrounded by bajos into which refuse could be dumped. Excavation revealed that the extant, gently sloping terrain between Mound 1 and the off-mound Pit 32 conceals an undulating Locona-era ground surface (see Figure 3.1). The Late Locona level at Mound 1 revealed a small residence, an adjacent patio area, and parts of the immediate and extended tofts (Figure 7.11h).

My initial understanding of the cluster of features at Pit 32 was that it was an area of communal middens at the edge of the settled zone of the site. The recognition that the excavated area was a local topographic elevation makes it more likely that the features derive from a single nearby residence or cluster of residences. The features identified suggest that we hit the immediate toft and the beginning of the extended toft of this homestead or settlement cluster. The amorphous, ditch-like Feature 1 compares to Features 2 and 10 at Mound 12; the medium-size pits, Features 2, 3, and 4, compare to Feature 19 at Mound 12, and the cluster of burials compares to that in the Ocós level at Mound 12.

For the Late Locona occupation at both Mound 1 and Pit 32, no likely location for a large household leader's residence presents itself. Settlement in these locales thus may not have conformed to the settlement cluster model (Figure 7.11c); it may have been closer to the simpler house lot models (Figure 7.11a–b). Even a superficial review of ethnographic cases of complex household structures makes clear that intra-societal variability is to be expected. It would not be surprising if settlement at Paso de la Amada involved a mixture of simple/extended and multiple family households. Further, a platform-top leader's house may have been a mark of status that households aspired to achieve. Under that logic, it is not possible to rule out the nearby presence of a relatively modest (ground-level) leader's house in one or both of these cases. So the late Locona occupations in these areas may represent single-dwelling households or multi-dwelling households of modest means.

The pre-platform Cherla occupation at Mound 1 provides general support but also an interesting possible divergence from the model of Figure 7.11c. A reasonable interpretation of the Structure 1-2 and Structure 1-3 remains is that they represent the residence of the household head, a smaller residence 8.5 m away, and a shared patio area (Figure 7.11i). The rapid descent of the ground surface in Trench 1 (Figure 3.17), in an area where there should have been further remains of Structure 1-2, raises the possibility that earth from this area was dug away at the time that Structure 1-2 was dismantled and the platform built. Since the platform was built up through redeposition of an elite Cherla-phase midden, it is likely that the midden began here, immediately to the southeast of Structure 1-2. This would have been the toft for the Cherla-phase settlement cluster. Such suggestions conform with the settlement cluster model of Figure 7.11c except for one point: the absence of the distinction (proposed in Figure 7.10) between a formal front open to the outside world and an informal back opening onto a more restricted space shared with other residences of the settlement cluster. In the reconstruction of Figure 7.11i, Structure 1-2 fronted onto the patio shared with other residences. Missing, in other words, it is the theme of the headman's house as the settlement cluster's formal self-presentation to the rest of the community observed at Mound 32 (Figure 7.11f) and Mound 6.

How should we respond to the question posed at the outset of this section: What was the nature of the social unit or units that generated the accumulations of domestic refuse recovered in the excavations? Given the size of Paso de la Amada and observed discard practices in contemporary villages, it would seem unreasonable to envision the refuse samples as truly communal products, with catchments extending across the entire site. In Kalinga Province in the Philippines, for instance, transport distance for communal middens (receiving refuse from six or more households) was generally between 20 and 50 m and always less than 100 m (Beck 2006:Figure 4). Because settlement at Paso de la Amada extended across hundreds of meters, catchment zones for our middens were probably some localized segment of the entire community.

Very few of our refuse deposits, however, seem likely to be the product of a single identifiable dwelling. A conservative position is that most of our middens were created by several dwellings or in some instances several dwellings located within a distance of 50 m (probably often less than that). A somewhat more daring but still reasonable suggestion would be that they were generally each the product of a single multifamily household.

ORGANIZATION OF THE SITE ITSELF

Discussion has moved from an examination of structures as individual entities to consideration of relations between structures, including patterns in the orientation and clustering of residences into what may have been multifamily households inhabiting clusters of dwellings. A final topic is the organization of the site itself. I first discuss the Southern Plaza and then briefly consider patterns of site organization beyond that.

The Southern Plaza

Clark (2004a), elaborating on suggestions by Lowe (1977:211), proposes that the southwestern sector of Paso de la Amada was laid out as a Southern Plaza, delimited by Mound 6 to the southwest, Mound 7 to the northwest, and Mound 14 to the southeast (Figure 7.12a). The 215 m–long Trench 1 from Mound 6 crossed the southwestern part of the proposed plaza. The trench revealed that the Locona ground surface in this area was flat and devoid of features. Further, the orientations of the Mound 6 buildings and the Mound 7 ballcourt—approximately perpendicular to each other—are consistent with a larger organization around a plaza. In other words, Mounds 7, 6, and 14 may have formed a single complex.

In an initial effort to synthesize the results of the excavations reported here, I supported the idea of a Southern Plaza but proposed that its form and scale changed over time (Lesure 2011a). In particular, the integration of Mound 14 into the plaza may have been late Locona or Ocós and thus well after construction of the ballcourt. My proposals are shown in Figure 7.12b–c.

Figure 7.13 assembles evidence relevant to considering the northeastern and southeastern sides of the Southern Plaza, based on stratigraphic profiles in Clark et al. (1990) and/or this volume. The relevant excavations for the moment are the original Test Pit 1 in Mound 7; the single test pits in Mounds 10, 11, 12, and 14; and two soundings, Pits 29 and 30, in the low ridge between Mounds 6 and 14. All of those except the Mound 14 pit were excavated in late March 1990, and at that time we augured down to the water table from the bottom of each sounding, thus providing a way of correlating the stratigraphy of the different pits. An off-mound test in the bajo between Mounds 11 and 12 was correlated with the Mound 12 stratigraphic column by stretching out a level line in stages. The Mound 14 sounding was excavated three years later, in the spring of 1993, and its stratigraphy was correlated with those of the 1990 pits using the topographic map.

Figure 7.13 assembles three schematic profiles relevant to consideration of the Southern Plaza. They are labeled “a” through “c” and their locations are shown in the inset map in the upper left of the figure; in that map, the 215 m Trench 1 from Mound 6 is labeled “d.” The first profile (7.13a) runs from Mound 12 to Mound 10, through Mound 11 and the shallow off-mound test in the bajo. The second (7.13b) runs from Mound 12 to Pit 30, through Mound 14 and Pit 29. The third (7.13c) goes from Mound 7 to Mound 14 through Mounds 10 and 11. I regret that it did not occur to me to dig more pits in the bajos. In Figure 7.13c, I put in the modern ground surface in the bajos based on the topographic map.

The overall conclusion from these profiles is that modern topography is useful for assessing the configuration of the Southern Plaza and generally indicates something smaller than originally proposed by Clark (2004a). It is worth noting first that the surface topography along the 215 m of Trench 1 (Figure 7.13d) is consistent with Clark’s (2004a) stratigraphic finding of a flat, clear area here in the Locona phase.

In Figure 7.13a, the pit in the bajo between Mounds 11 and 12 reveals significant recent accumulation. Traces of volcanic ash characteristic of the 1902 eruption of Santa María Volcano were noted at a depth of 60–65 cm below ground surface. The whole profile in this pit represents accumulation *subsequent* to the Early Formative. (The pit was excavated on the last day of fieldwork in 1990; excavation stopped at a depth of 110 cm below surface because time ran out.) What is suggested in this profile is that the elevated spur of land on which Mounds 10 and 11 are located is in large part natural, but, as suggested in the discussion of Mound 11 in Chapter 6, the plaza may have been extended to the northeast by dumping of earth at the edges of the naturally elevated surface. As suggested by the stratigraphy of the Mound 11 sounding and by the modern topography, Mound 11 would represent the extreme northern edge of the plaza.

Let us next consider Figure 7.13c, the profile between Mounds 7 and 14. It is obviously unfortunate that we do not have tests in the bajos here, but significant recent accumulation, as observed in the test near Mound 12, seems likely. The public space of the Southern Plaza must have overlooked low-lying, seasonally flooded areas between Mounds 7 and 12 and Mounds 11 and 14. Thus the northwestern and northeastern corners of the shaded square in the map inset of Figure 7.13 would not have been part of the Southern Plaza.

Finally, let us turn to Figure 7.13b. The topic of interest here is the history of Mound 14 and the linear promontory on which the mound is located. Like all the other mounds shown, Mound 14 represents a series of artificial constructions on a natural elevation. As discussed in Chapter 6, there are Locona layers of secondary refuse, followed by at least two episodes of platform construction, one likely Ocós and the other Cherla. Pit 29 is 80 m away, downslope from the summit of Mound 14, but still on the linear spur of land that projects toward Mound 6 and seems to form a southeastern boundary to the Southern Plaza. There has been some 40–50 cm of deposition through slope wash in this location since the Early Formative. However, the Cherla refuse pit allows us to identify a ground surface late in the occupation of the site. The assessment of the profile presented in Chapter 6 is that there was significant filling here during the Ocós phase. It may have been that at that time, a platform more than 100 m long was constructed along this margin of the Southern Plaza. However, one thing that is clear from Figure 7.13b is that the Ocós construction between Pit 29 and Mound 14 was not level.

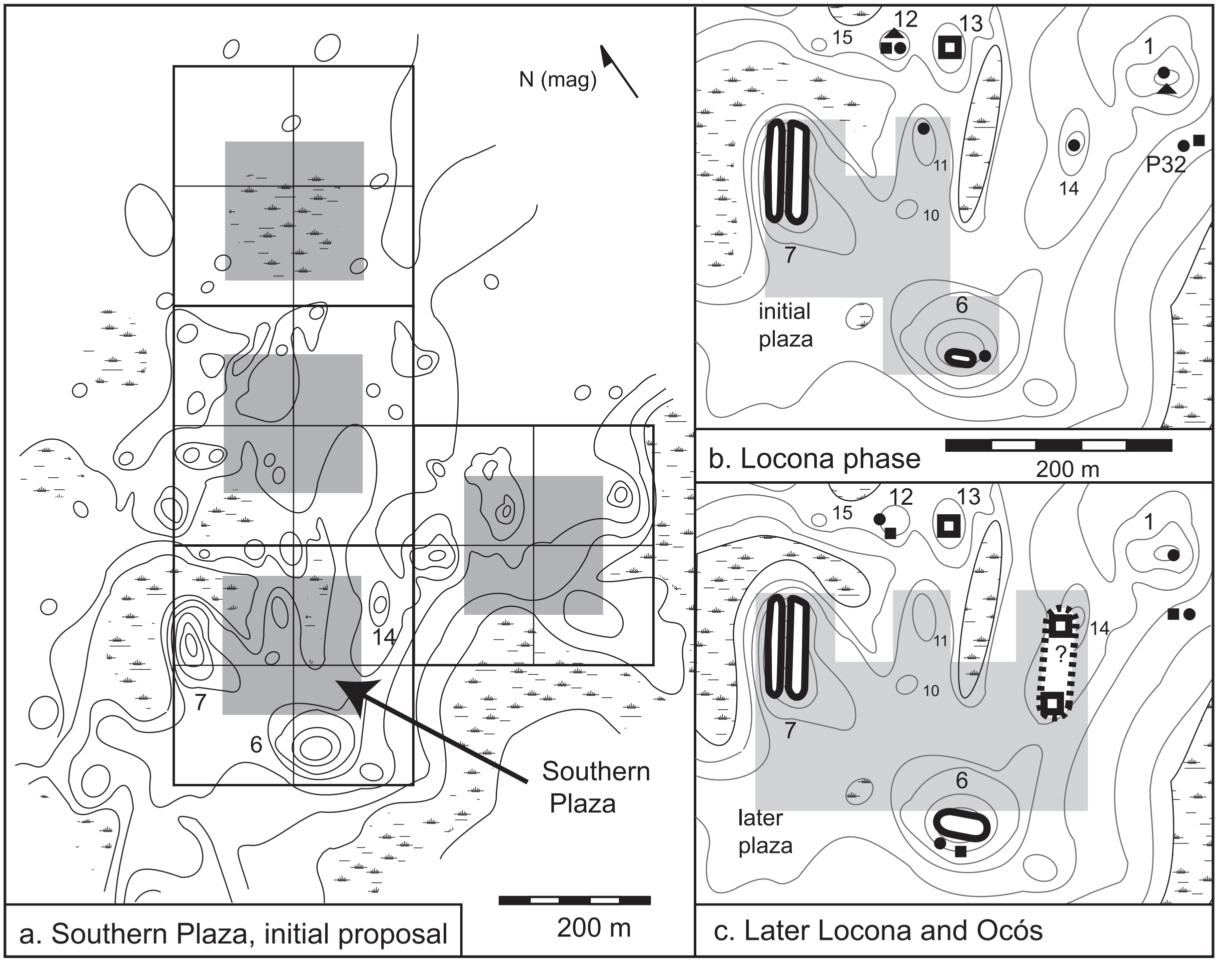


Figure 7.12. The Southern Plaza at Paso de la Amada: (a) original proposal by Clark (2004a:Figure 2.5b); (b–c) revisions proposed by Lesure (2011a:Figures 6.5–6.6). *Illustration composed by R. Lesure.*

Mound 14 remained higher even after significant deposition of fill at Pit 29. The promontory on which Mound 14 is located looks to be substantially artificial, but its history is also complex. It is worth noting that no Locona middens such as that recovered in Mound 14 underlay the earliest constructions at Mounds 6 and 7. That point supports the suggestion that Mound 14 may have been incorporated into an expanded Southern Plaza well after initial construction of the ballcourt.

Organization beyond the Southern Plaza

The excavations revealed several buildings with the same orientation as the ballcourt but *no* cases of orientations perpendicular to that, as observed at Mound 6. It would be fascinating to see what further excavations at Mounds 4, 13, and 14 might reveal. I speculatively reconstruct the Mound 13 platform as parallel to the ballcourt (Figure 7.11d–e), which would mean that this building did not face the Southern Plaza. (Compare the different reconstruction in Clark et al. 2010:Figure 11.6.)

CONCLUSIONS

This chapter has drawn insights from the excavations considered together. The emphasis has been on human interventions in the landscape of Paso de la Amada and their social import. Topics have ranged from earthen platforms and buildings of perishable materials to orientations of buildings and burials. I noted evidence for groups of structures involving a single large residence and a cluster of smaller dwellings, interpreted as the archaeological signature of multifamily households with a large dwelling for the group leader. In Chapter 27, I offer suggestions as to why multifamily households may have arisen in the early sedentary villages of the Soconusco.

The proposals concerning household structure complicate investigation of social inequality at the site. The topic of inequality *within* multifamily households would be

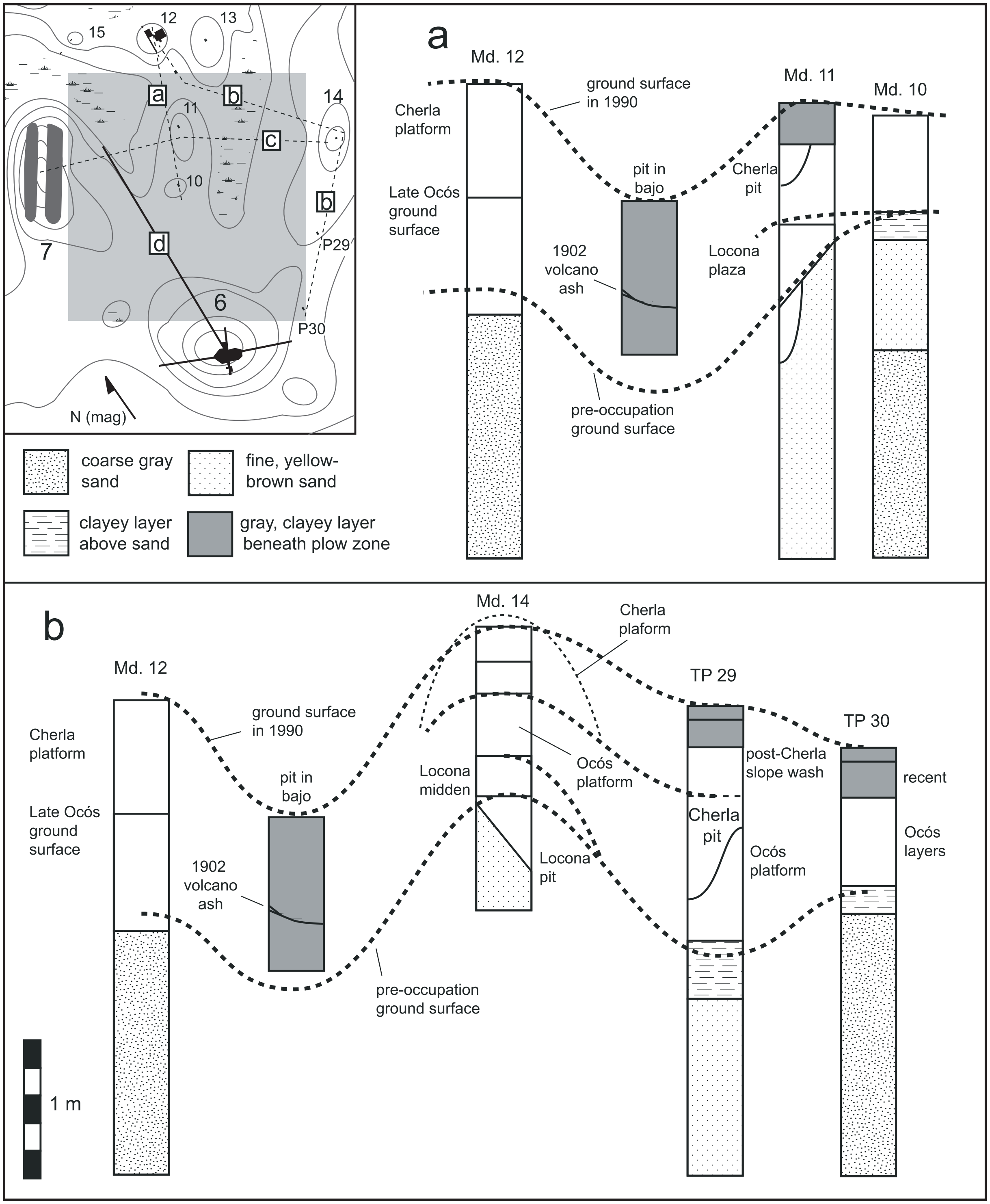
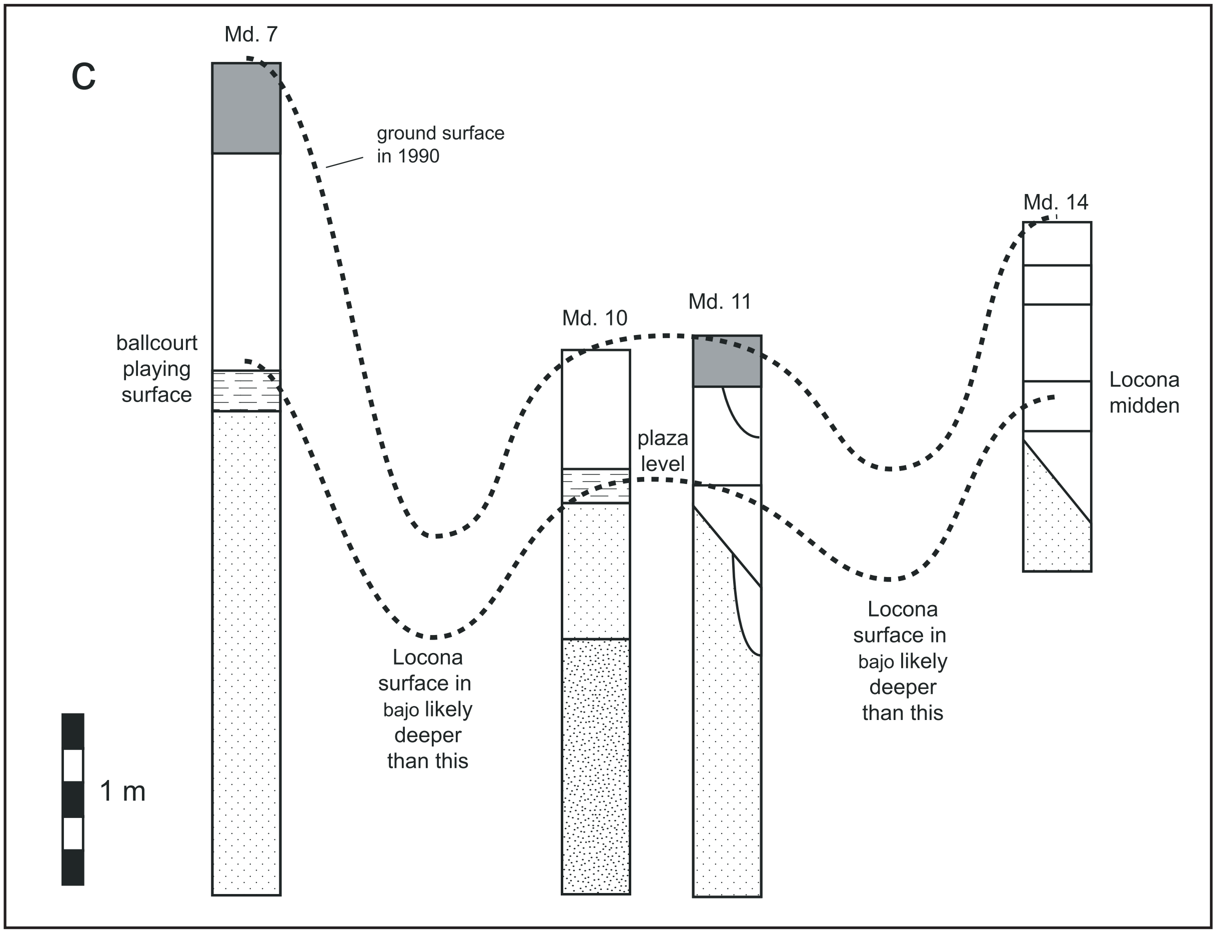


Figure 7.13. Three schematic profiles reconstructed from test pits in and around the proposed Southern Plaza: (a) Mound 12 to Mound 10; (b) Mound 12 through Mound 14 to Pit 30; (c) Mound 7 to Mound 14 through Mounds 10 and 11. In the map inset, the profiles are located, along with (d), the 215 m Trench 1 extending from Mound 6 toward Mound 7. The shaded rectangle in the map is the Southern Plaza as originally proposed (see Figure 7.10a). *Illustration by R. Lesure.*



of considerable interest, but we have little basis for pursuing it with the available evidence (though the Locona midden on the back slope of Mound 32 proves to be of interest in this regard; see Chapter 25). Emphasis instead is on evidence for inequality *between* households (or, more conservatively, between "coresidential groups"). Even that investigation is complicated by the proposals in this chapter. I originally took the Locona-phase building at Mound 32 to be an elite residence, but that designation no longer seems particularly convincing. It does seem likely that construction of a large, platform-top residence was a bid for higher status by members of the Locona-phase household, and the results would have been impressive compared to more humble dwellings or clusters thereof in the later Locona phase at Mound 1 and Pit 32. But the lack of follow-through at Mound 32 is notable, especially in comparison to the repeated construction episodes at Mound 6. The Mound 6 household converted its bid for status into a position of hereditary rank. The inhabitants of Mound 32 did not. In Chapter 25, Mound 6 is considered the only "elite" household in the Locona and Ocós phases. For the Cherla phase, the pre-platform occupation at Mound 1 is considered elite; a small sample from a Cherla trash pit in Mound 13 has similar characteristics and is also treated as a likely elite refuse deposit.

PART III
THE ARTIFACTS

Table 8.1. Types described in this chapter (in order of presentation)

Type Class	Type
Decorated Rim Plain	Michis Red Rim
	Michis Specular Red Rim
	Michis Burnished Rim and “Modified Michis” variants
	Mavi Buff
	Mavi Red and Buff
Red	Chilo Red
	Paso Red
	Gallo Pink on Red
	Tusta Red
	Cotan Red
Brown-Orange-Pink	Papaya Orange-Pink
	Aquiles Orange
	Colona Brown
	Bala Brown
Black-White-Gray	Mijo Black and White
	Bala White
	Pino Black and White
	Pino Black
	Extranjero Black and White
	Extranjero Grayish White
	Extranjero Glossy Gray
	Imported Kaolin
Stamped	Guijarra Stamped
	Amada Black-to-Brown
Coarse	Coarse
Miscellaneous Bichromes	Alba Red and White

CHAPTER 8

Pottery

Richard G. Lesure

THIS CHAPTER IS one of six in which analyses of ceramics are presented. Chapter 2 describes levels of analysis of the ceramic assemblage (A through E: see Table 2.2) and the units of analysis for the study of domestic refuse (Tables 2.3 and 2.4). Also, formation processes are assessed based on characteristics of the sherd assemblages (Tables 2.5 through 2.8). Seriation of refuse samples is presented in Chapter 20, along with tables tracing types and vessel forms over time. Chapter 21 reports on a residue analysis of sherds. A micro-stylistic analysis of beveled-rim bowls is described in Chapter 22. Residential differentiation in access to decorated pots and large feasting vessels is considered in Chapter 25. The present chapter is devoted to typology.

More than 810,000 sherds were recovered. The majority are from Mound 1 (59.2 percent), followed by Mound 12 (23.1 percent), Mound 32 (8.0 percent), the Pit 32 excavations (4.0 percent), Mound 21 (1.5 percent), Mound 13 (1.4 percent), and other locations (each 1 percent or less). Sherds were all weighed (Level E analysis) and in most cases also counted (Level D). More detailed analyses focused primarily on rim sherds and secondarily on non-rims that bore information on form and decoration (supports and other appendages, bases, decorated sherds, and so on). Analysis to Level A involved an individual data record for each rim sherd; Level B involved counts by type and form; Level C involved counts by type and an abbreviated form classification (Table 2.2). I personally conducted the analyses to Levels A and B (at different times over the course of 20 years). Much of the analysis to Level C was done in 2011 under my direction by a team of archaeology students from the Universidad de Ciencias y Artes de Chiapas (UNICACH). The present chapter is based primarily on materials from units analyzed to Levels A or B, a total of 17,852 rims.

ANALYTICAL ORIENTATION

Five basic principles structure the classification of pottery presented in this chapter. The first is a conservatism toward precedents established by previous investigators, to the extent that those are compatible with my own convictions concerning artifact classification and my finite competency as an analyst of broken pottery. This principle proves somewhat difficult to follow in this case partly because the huge analytical effort of John Clark over the course of 30 years remains only summarily published.

Ceja Tenorio (1985) provides a good basic description of the pottery of Paso de la Amada, and related material is described by Coe (1961), Coe and Flannery (1967), Ekholm (1969), Green and Lowe (1967), Lesure and Rodríguez López (2009), and Lowe (1975). Clark's work is described at greatest length in Clark and Cheetham (2005). I learned the sequence from Clark in the field and at the New World Archaeological Foundation (NWAF) lab in San Cristóbal de Las Casas during 1990 through 1992, based on his approach at that time and with reference to an NWAF-type collection that has since been considerably rearranged. I never saw any written version of Clark's typology as it existed at the time. At that point it had already diverged from Ceja Tenorio (1985) in terms of nomenclature. Thereafter it continued to develop such that the logic of the system presented by Clark and Cheetham (2005) is distinct in important ways from what I was exposed to in

1990–1992. In particular, it is more formalized in terms of the attributes used to make distinctions at different levels of the typology.

I did most of the analyses of ceramics to Level A between 1992 and 1998 when I was alone (or with a couple of students) at the San Cristóbal lab—in other words, before Clark and Cheetham's (2005) publication was available and without the possibility of consulting Clark himself. My type and form classifications are broadly compatible with previously published or now-published precedents, but they do not precisely match any of them. The form codes described here are essentially those of my dissertation (Lesure 1995:139–68). The type descriptions, however, were written in 2011–2012. For the latter, I relied primarily on Clark and Cheetham (2005) and secondarily Ceja Tenorio (1985) as precedents. I also draw on my experience with the Formative ceramic typologies of Central Mexico (Lesure et al. 2014c, 2014d).

The work in Tlaxcala prompted me to clarify an analytical orientation toward ceramic typology that I had in effect been using in Chiapas since the early 1990s. The additional principles to be mentioned here all relate to that general orientation and are a source of certain divergence from precedents in the study of Initial and Early Formative pottery of the Soconusco.

The second principle is that, to promote replicability, classification should emphasize readily recognizable material distinctions. The principle itself is easily acceded to; opinions diverge over what implications are to be drawn therefrom. In my opinion, one implication is that the analyst should avoid a priori decisions about the "proper" structure of a typology. Decisions on structure should instead emerge on the sorting table; they should be based on the experience of sorting the materials being classified. Of course, one could hardly pretend to be following precedents (from Coe 1961 to Clark and Cheetham 2005) were one to reject a classification that distinguished "types" based on attributes of surface finish, decoration, and paste. The classification presented here accepts all of that, as well as the privileging of surface finish—especially slip color—as the most salient criterion at the level of the "type." However, I have avoided certain other a priori decisions about typological structure, such as that decoration should necessarily be a varietal rather than a type-level criterion (Clark and Cheetham 2005:291). I have also generally avoided using form as a basis for classifying sherds to types (see Lesure et al. 2014c:184–85 for commentary). Finally, I have tried to avoid allowing information not observable on the objects themselves—for instance, stratigraphy or other aspects of archaeological context—to influence classification. Adhering to these various corollaries of the principle of recognizability creates typological challenges. In the study of the assemblage from Paso de la Amada, those challenges are associated particularly with the classification of brown-slipped pottery.

A third principle concerns the level of classification above that of the type. Types are not grouped into "wares" (defined according to paste, firing conditions, or what have you) but rather into "type classes." When I came upon that concept in Gifford (1976) while working on the pottery of central Tlaxcala, I realized that I had in effect been grouping types into type classes (rather than wares) ever since my dissertation work at Paso de la Amada. Here is how we characterize the concept in the Tlaxcala report (Lesure et al. 2014c:186):

> What we find particularly helpful is Gifford's attention to the situation of the analyst in front of the sorting table and to analysis itself as a differentiated series of concrete steps. A *type-class* is "an opening or preliminary move in ceramic classification" in which the analyst recognizes the "general overall markers" of types (Gifford 1976:16). Type-classes are based on obtrusive characteristics of *a particular collection of sherds*. . . . Features that will constitute the type-classes—which may be attributes of paste, surface finish, or decoration—emerge as salient divisions of a particular assemblage during the process of sherd sorting. Thus, by definition, they have high replicability—or at least as high replicability as it is possible to establish for a given assemblage.

Unlike wares, type classes are claims concerning the salient features of particular collections of sherds; whether or not they "existed" in the past is not at issue. It is the type alone (rather than ware plus type) that is postulated to have existed as a culture-historical entity. Some rough equivalents of the types identified here were probably recognized by the original makers and users of the pottery, yet other criteria beyond the experiences of maker/users are also relevant For instance, the changing frequencies of the types should typically take the form of battleship curves, often at temporal scales longer than a human life.

For Gifford (1976), the type class was used only in the initial stages of analysis. The later stages of analysis involved classification of sherds according to the (in my opinion) unwieldy and overly formalized type:variety–mode system. The classification presented here is much simpler. The type class is retained through the end of the analysis. It provides a basis for organizing the types and (hopefully) promotes replicability in the study of similar collections.

The remaining principles relate to how the concept of type class is employed. The fourth principle concerns varying levels of certainty in the identification of sherds. Rim sherds may be assigned to type class *only*, without receiving any type designation. Thus a particular sherd not convincingly identifiable as Papaya Orange may be assigned to the type class Brown-Orange-Pink or given some intermediary descriptive designation such as "orange" or "brown." My basic orientation to the classification of individual sherds is that the types identified by previous investigators *exist* as spatiotemporally extended clusters of attributes but that the analyst approaches individual sherds with considerable uncertainties. I assigned individual sherds as closely as possible to a type based on material properties of the sherd and my necessarily imperfect understanding of the range of possible categories. I tried to avoid forcing individual sherds into categories that could not be justified by their observable material properties.

The fifth principle represents a significant departure from anything Gifford (1976) envisioned for the use of type classes. I allow individual types to crosscut type classes when patterns in a particular collection warrant such a move. Thus a few types appear as possible classifications within more than one type class. I make this move in an effort to grapple with competing principles: conservatism toward types as previously defined and attention to what emerges on the sorting table as salient divisions within the collection. In the collection from Paso de la Amada, this proves relevant particularly for stamped sherds. Stamping of several varieties—shell-edge, shell-back, string-wrapped paddle, and so on—is salient on the sorting table. It is an obtrusive characteristic in collections particularly of the Locona and Ocós phases. I identify a Stamped type class and describe two types under that designation. However, I also note several other types—described under different type classes—in which stamping is present. The idea here is that different analysts might legitimately make different initial decisions concerning type class but end by assigning a given sherd to the same type.

To sum up, the ceramic classification presented in this chapter is the result of an effort to mediate between "previously defined" types for which full descriptions were not available at the time of the analysis, my own observational abilities and convictions concerning typological principles, and the practical experience of classifying individual sherds.

PASTE

The pottery recovered in the small-mound excavations was manufactured over a period of just 400 years, and, as previously reported by Ceja Tenorio (1985), pastes and firing conditions appear to have been pretty consistent across types. The overwhelming bulk of the collection was locally manufactured. Pastes are sandy with flecks of mica and other crystals (Ceja Tenorio 1985:42–43). Texture is generally compact, though porosity varies and the typical local paste is more porous than that of several imported types. Ceja Tenorio (1985:42) found the typical hardness to be between 1 and 2 on the Mohs scale, but I found it typically between 2 and 3, ranging perhaps up to 4 in the case of some Cherla sherds of the types Pino Black and White and Aquiles Orange.

Some notes on variability in firing conditions (presence or absence of gray cores and so on) are provided in the type descriptions. One particular variant bears mention here. Smudging or differential firing occurs in two local types: Pino Black and White and Pino Black. The case of Pino Black and White is particularly dramatic. Pots of that type are smudged so that the surface color varies from white to black on a single vessel. Differential firing is identifiable by inspection of the paste, the color of which varies according to the closest associated surface color. Paste beneath blackened portions of the vessel is black to dark gray, whereas the paste beneath lighter portions of the vessel is light gray to brown. The most distinctive mode of differentially fired pottery consists of white-rimmed black bowls. These have black interiors with a white band around the rim. Exteriors are white, black, clouded grayish brown, or white-rimmed black. Coe and Flannery (1967:33) discuss ways in which this result might have been achieved through differential firing techniques. The type Pino Black designates cases in which the entire vessel is smudged black.

A tiny proportion of the assemblage—1.0 percent of identified rims in the Cherla-phase collection or 0.4 percent of identified rims overall—is probably imported. Those are described here in four types in the Black-White-Gray type class. Vessel walls are thin and the sherds well fired, ranging in hardness from 3.0 to 4.5 on the Mohs scale.

CODES FOR VESSEL FORM

Vessel form codes used in ceramic analyses to Levels A and B are presented in Figure 8.1. The codes are designed to get at both functional and time-sensitive stylistic aspects of the assemblage. (The next section presents a functional synthesis of the vessel form assemblage and a simplified classification that attempts to set aside stylistic variability.)

A single basic set of vessel forms characterizes the Locona, Ocós, and Cherla phases. Assemblages from all three phases consist primarily of tecomates (neckless jars) and bowls or dishes with outflaring sides and flat bases. While the majority of bowls and dishes have direct rims, plastic modification of the rim is common, including beveled rims, wedge rims, gadrooned rims, scalloped rims, and a variety of other styles. Less common and minor forms include rounded-walled bowls, vertical-walled bowls, crude plates, tecomate lids, jars with low outflaring necks, and censers.

In Figure 8.1, each form is designated by a letter and number code. The most important categories are bowls or dishes (B) and tecomates (T). The majority of bowls have outsloping or outcurving walls, slipped interiors, and flat bases. Their dimensions appear to generally fit Sabloff's (1975:23) definition of a dish rather than a bowl. Because height-to-diameter ratios are so rarely measurable on sherds, I use the term *bowl* without any implications of vessel dimensions. A basic three-way division is made among bowls based on form and wall profile. Bowls with simple silhouettes and direct rims are indicated with a B; simple silhouette bowls with plastic rim modification are designated BR, while composite silhouette bowls are designated BC. Form B1 is the most common single form in the as-

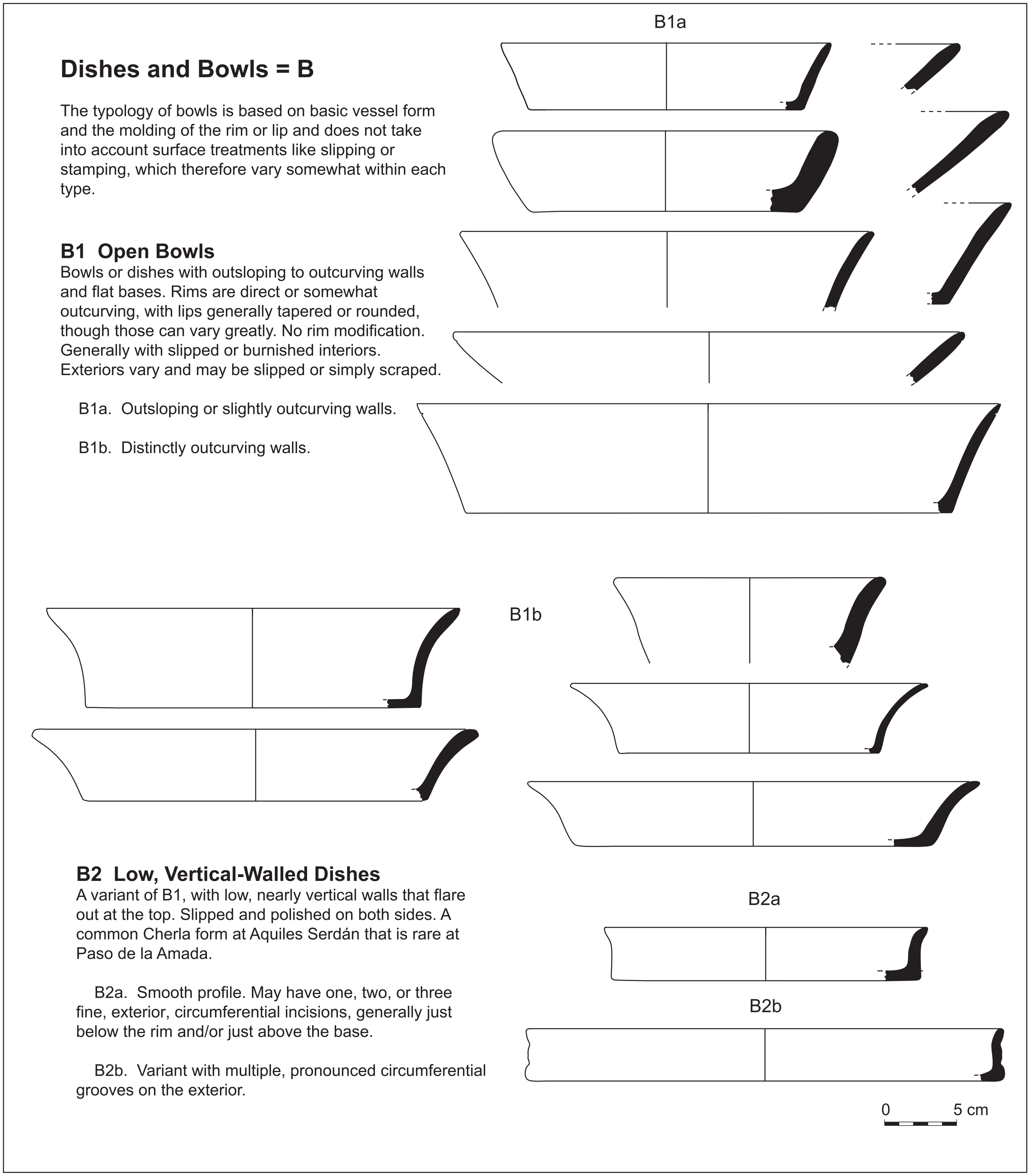


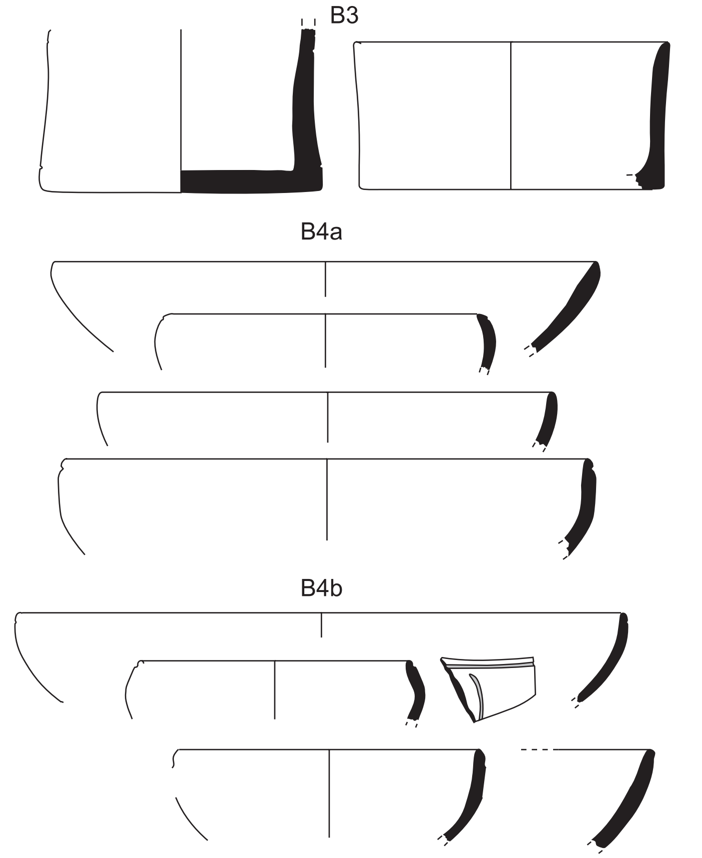
Figure 8.1. Vessel form codes. Note that the figure continues for eight additional pages. *Illustrations in this chapter by R. Lesure, Katelyn Jo Bishop, Courtney Cook, and project staff, with other contributions as noted.*

B3 Vertical-Walled Bowls
Bowls or dishes with vertical or near-vertical walls and flat bases. Not common and a diverse category in the details of form.

B4 Rounded-Walled Bowls
Open bowls with rounded walls and unrestricted orifices (or orifices only slightly restricted).

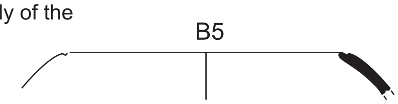
B4a. Round-Bottomed Bowls. Bowls with rounded walls and rounded bases. Direct rims.

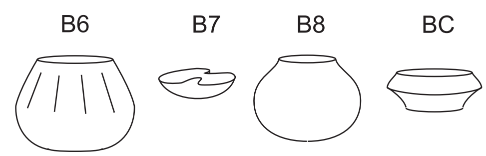
B4b. Convex-Walled Dishes. Dishes with rounded, convex walls and flat bases. A Cherla form in black, brown, white, and occasionally red slip. Walls are thin with an exterior circumferential groove just below the rim and another just above the base. Often with spaced vertical grooves between these two boundaries.



B5 Incurving-Walled Bowls
Bowls or dishes with incurving walls. Bases uncertain. Orifice restricted in comparison to maximum diameter of the vessel. The slipped interior distinguishes these from tecomates.

B6 Large Incurving-Walled Bowls
Large incurving-walled bowls with wide vertical grooves spaced around the exterior body of the vessel. Slipped on both sides.

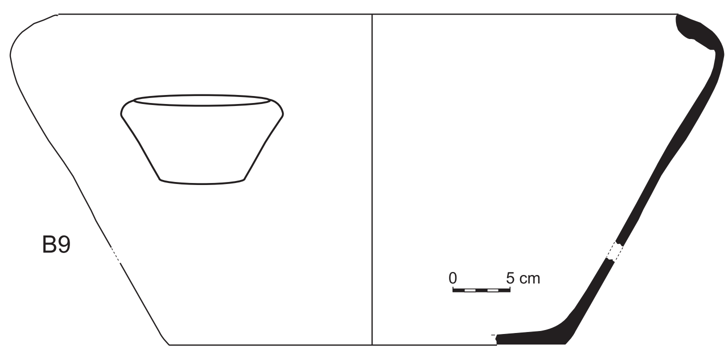




B7 Bowls with Pinched Sides
Variant of hemispherical bowls with pinched-in sides.

B8 Necked Bowls with Rounded Bodies
Vessels with globular bodies and short necks. Distinguished from jars because they are slipped on the interior as well as exterior.

B9 Shouldered Basins
Very large and thick basins with large rim diameters. Marked shoulder.



BC Bowls with Composite Silhouettes
Rare in Initial and Early Formative deposits.

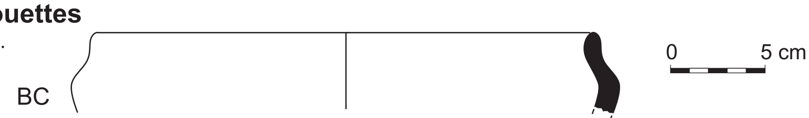


Figure 8.1. *continued.*

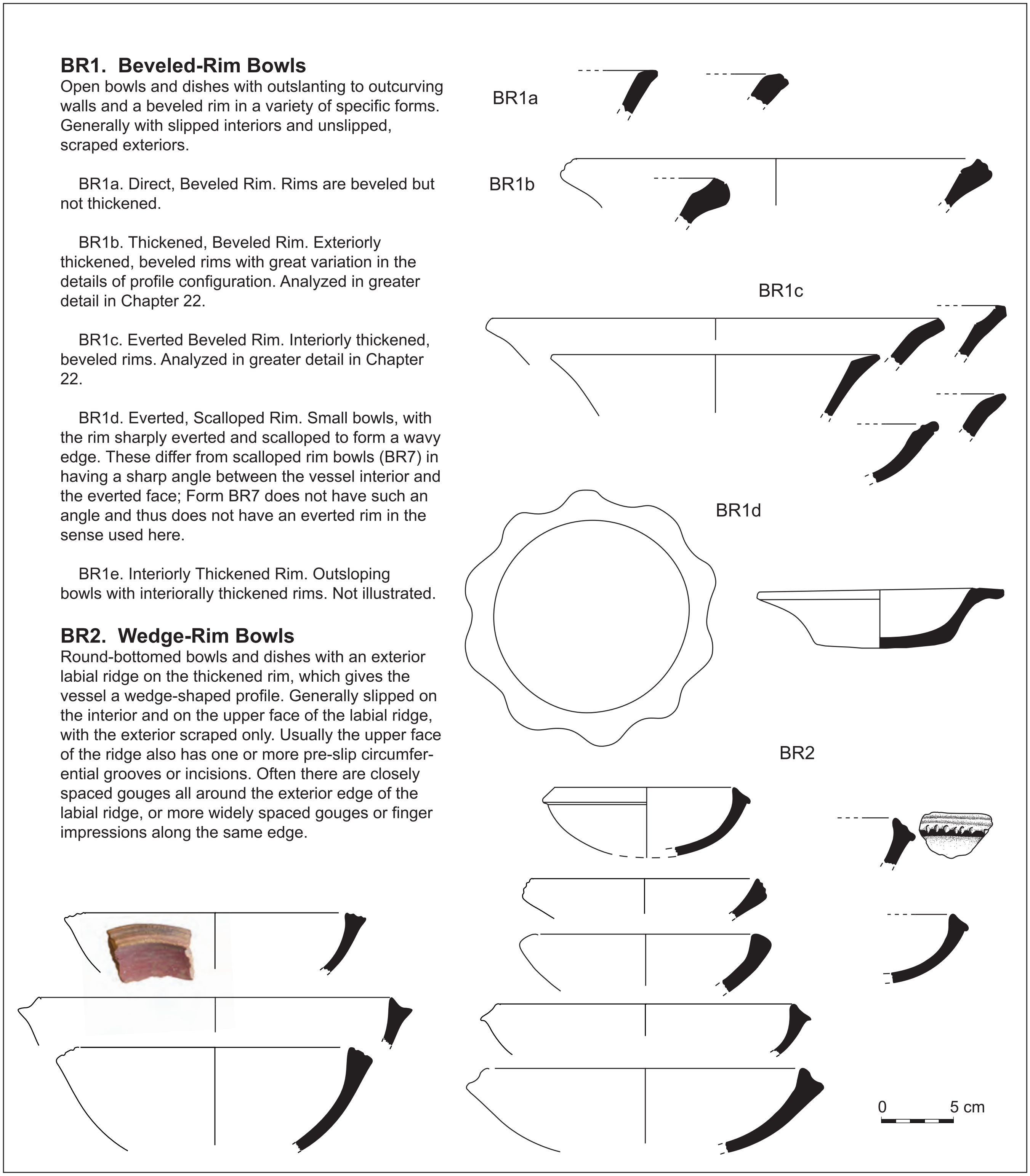


Figure 8.1. *continued.*

BR3 Piecrust Rim Bowls

Open bowls with outslanting walls and thickened, rounded rims. The rounded rim/lip surface is marked with closely spaced impressions, ridges, flutes, or grooves to form the piecrust appearance. Sometimes the lip surface is more flattened than rounded. Generally slipped interiors and unslipped, scraped exteriors. Varieties distinguish different types or degrees of ridges or impressions.

BR3a. Exaggerated Piecrust Rim. Radial ridges or impressions on rim.

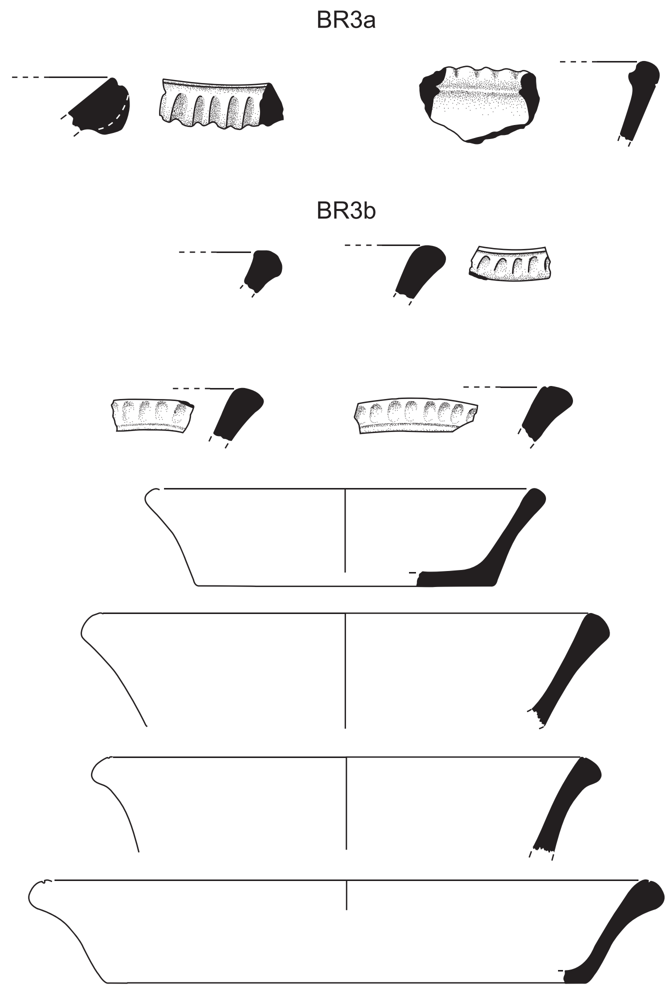
BR3b. Common Piecrust Rim. Subtle, radial gadrooning, impressions, or ridges.

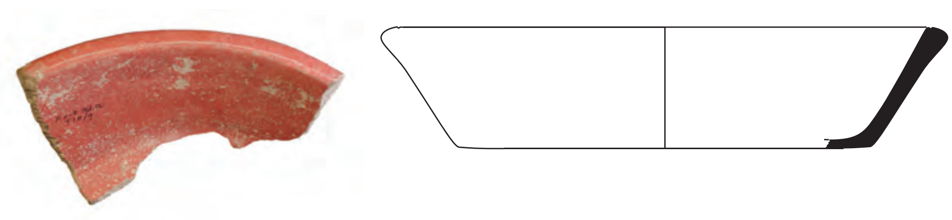
BR3c. Piecrust Rim with Angled Gadrooning. Gadrooning is not radial but rather at an angle to the circumference.

BR3d. Piecrust Rim with Grooves or Incisions. In this variant of the piecrust rim bowl, which is in all other respects like BR3b, short radial incisions or grooves have been substituted for gadrooning, impressions, or ridges.

BR4 Thickened-Rim Bowls

Open bowls with thickened rims and the same basic silhouette as BR3, but without gadrooning. Not illustrated.





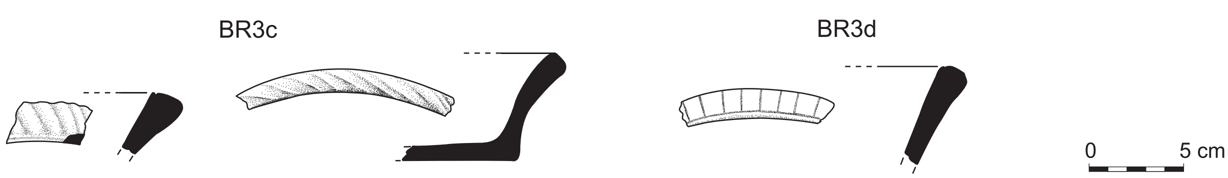


Figure 8.1. *continued.*

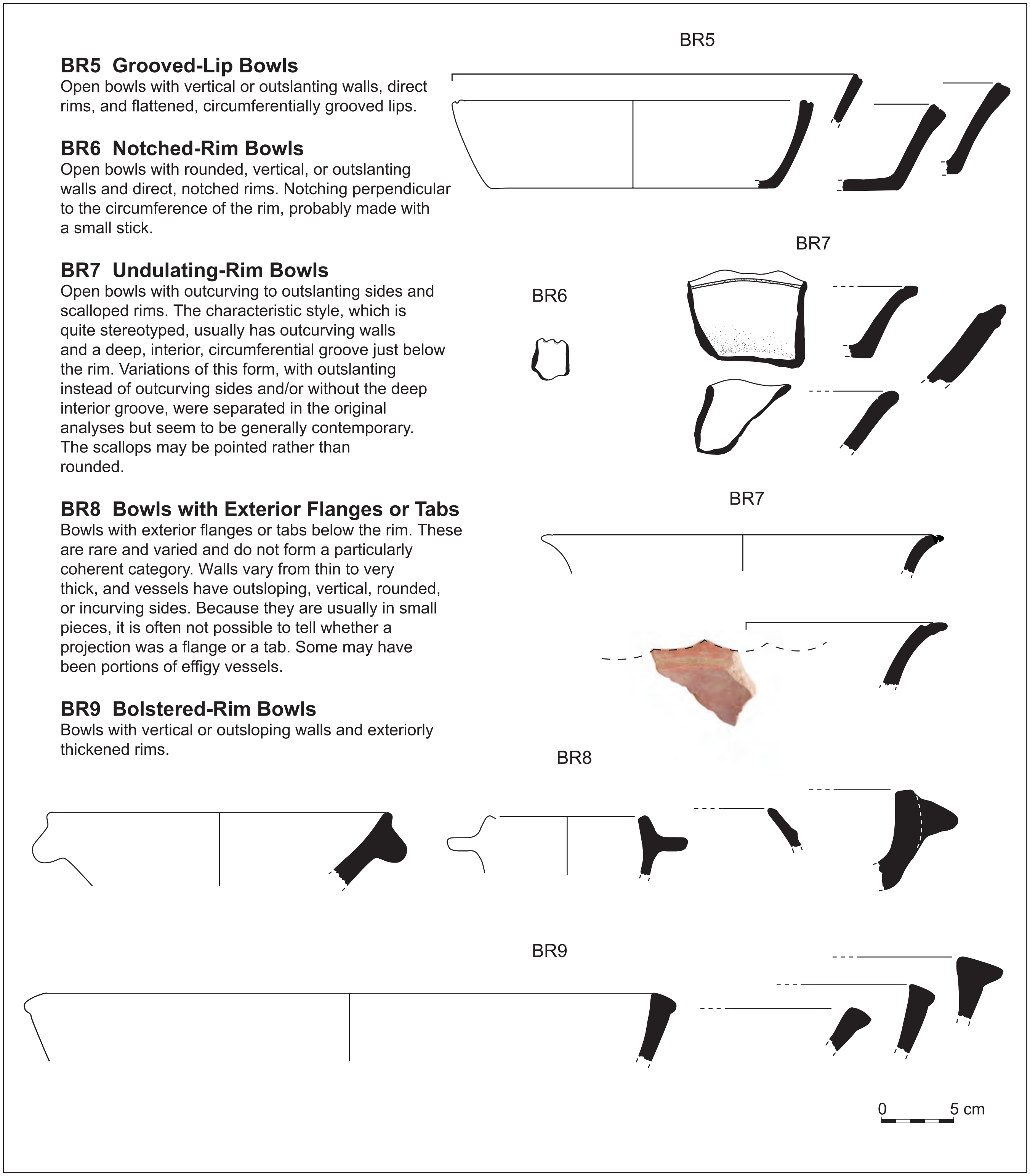


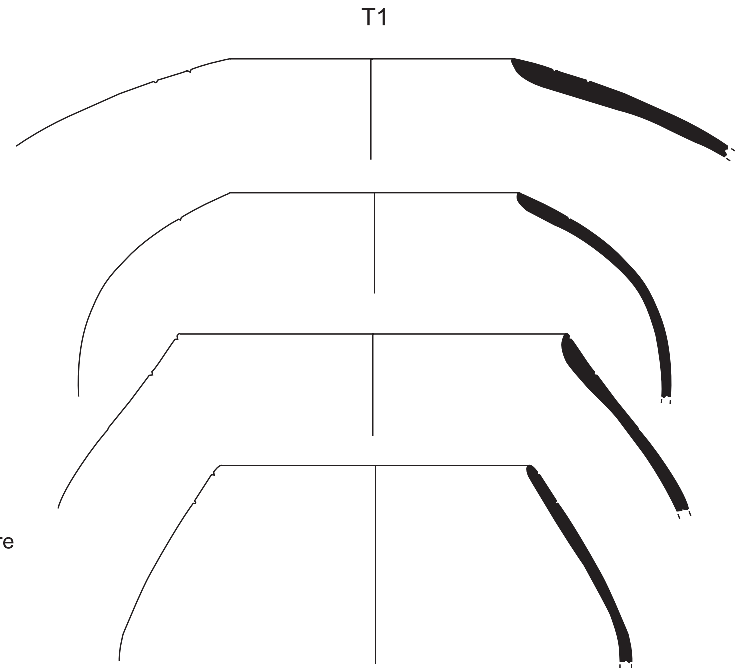
Figure 8.1. *continued.*

Tecomates = T

Neckless jars, typically globular or subglobular in shape, though other shapes also occur (see T4). All tecomates are unfinished on the interior; restricted-mouth vessels with slipped and/or burnished interiors are considered bowls (B5). Tecomates with unslipped bodies (T1) are distinguished from those with slipped and/or burnished bodies (T2–T4). Unslipped tecomates with shell-edge stamping are included with plain-bodied forms in T1.

T1 Plain, Thin-Walled Tecomates

Globular or subglobular tecomates, nearly always with a decorated band around the rim. Rim decoration consists of slip and/or burnishing, with one to four circumferential grooves. An undetermined number had tripod supports in various styles. Solid supports included plain rectangular slabs, thin cones, the and twisted fillets. Hollow mammiform supports are most abundant. Such supports are found only with these plain-bodied tecomates, but the low frequency of supports relative to rims suggests that many plain tecomates did not have them.



Supports

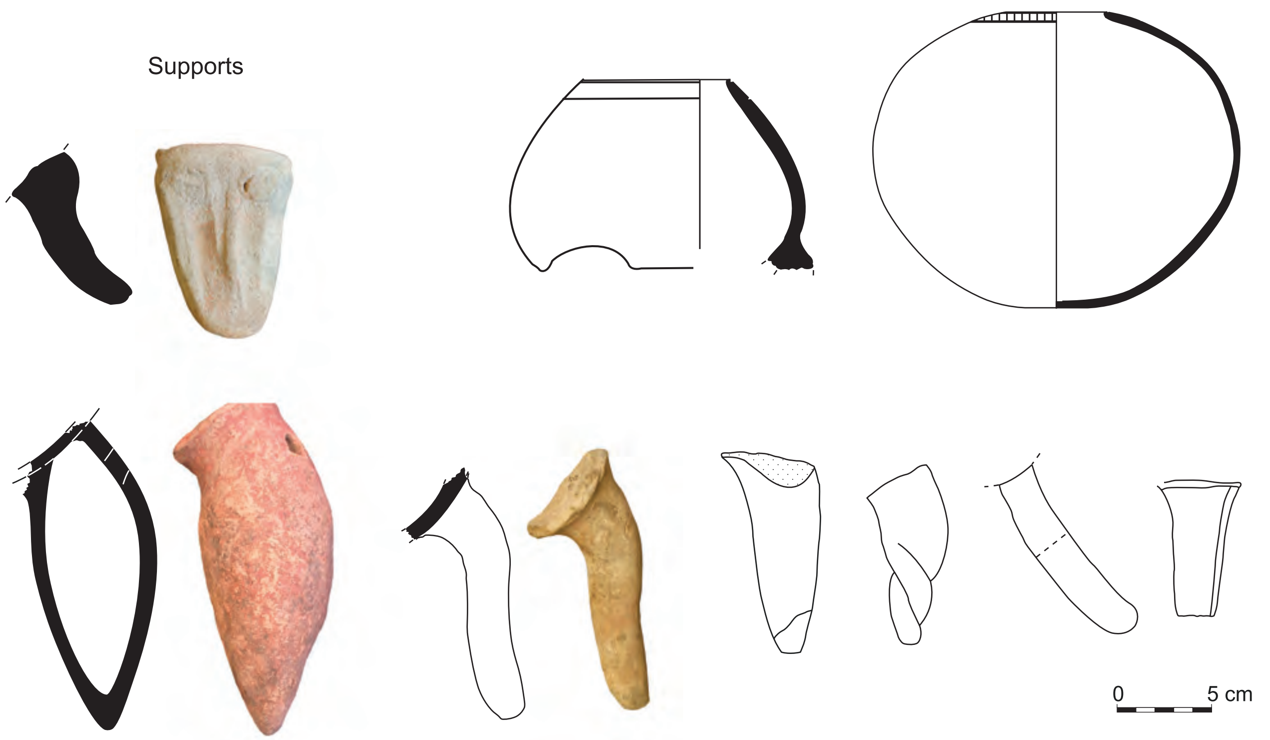
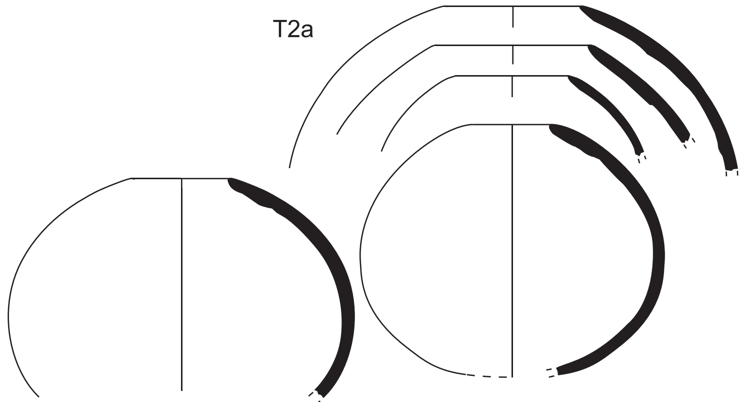


Figure 8.1. *continued.*

T2 Thin-Walled, Slipped Tecomates

Tecomates, generally globular in shape, with rim diameters usually smaller than the plain-bodied tecomates. Bodies slipped and burnished. Interiors scraped only.

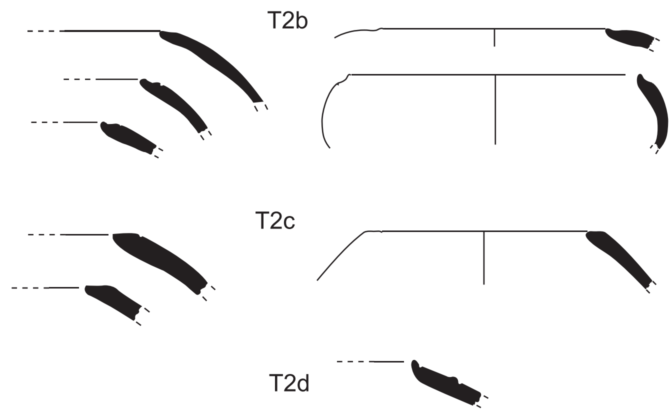
T2a. Simple Slipped Tecomates. Thin-walled, slipped tecomates with no particular rim elaboration. May have a single circumferential incision or shallow groove at a varying distance below the rim.



T2b. Slipped Tecomates with Grooved Rim. Thin-walled, slipped tecomates with a groove right at the lip, giving the rim a distinctive profile.

T2c. Slipped Tecomates with Beveled Rim. Thin-walled, slipped tecomates with flattened, beveled rims that form a horizontal shelf around mouth.

T2d. Slipped Tecomates with Raised Lip. Thin-walled, slipped tecomates with a rounded, slightly raised lip.

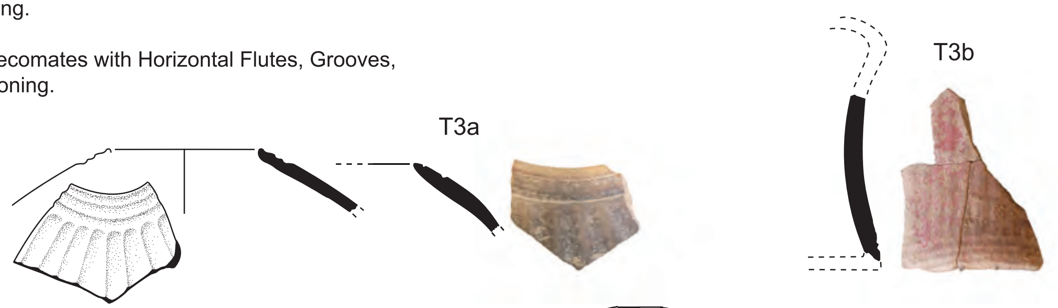


T3 Slipped Tecomates with Fluting, Gadrooning, or Parallel Grooving

Thin-walled, slipped tecomates with fluting, gadrooning, or parallel grooving. Decoration ranges from faintly defined to very exaggerated.

T3a. Tecomates with Vertical Flutes, Grooves, or Gadrooning.

T3b. Tecomates with Horizontal Flutes, Grooves, or Gadrooning.



T4 Large, Egg-Shaped Tecomates with Tiny Mouths

Slipped and/or burnished, thin-walled tecomates with very tiny mouths and highly decorated bodies. Sometimes the rim is slightly upturned. Fabric or cord stamping appears on 92 percent of the rims. Others are decorated with closely spaced parallel grooves. Burnishing and/or grooving delineates zones of stamping or parallel grooves and creates a curvilinear design.

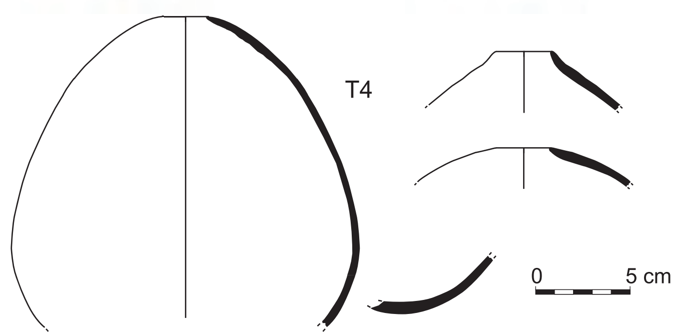
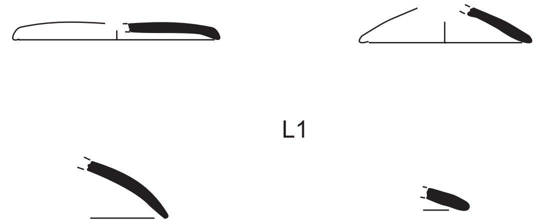


Figure 8.1. *continued*.

Lids = L

Lids are flat or slightly convex ceramic disks that are more carefully finished on the upper surface or exterior than on the interior or lower surface.



L1 Undecorated Lids

Thin convex or nearly flat round slabs that apparently were tecomate lids. Lips rounded or beveled. Slipped or carefully scraped on the upper surface and scraped, unslipped underneath. Rim diameters of 22 examples range from 8 to 23 cm.

L2 Grooved Lids

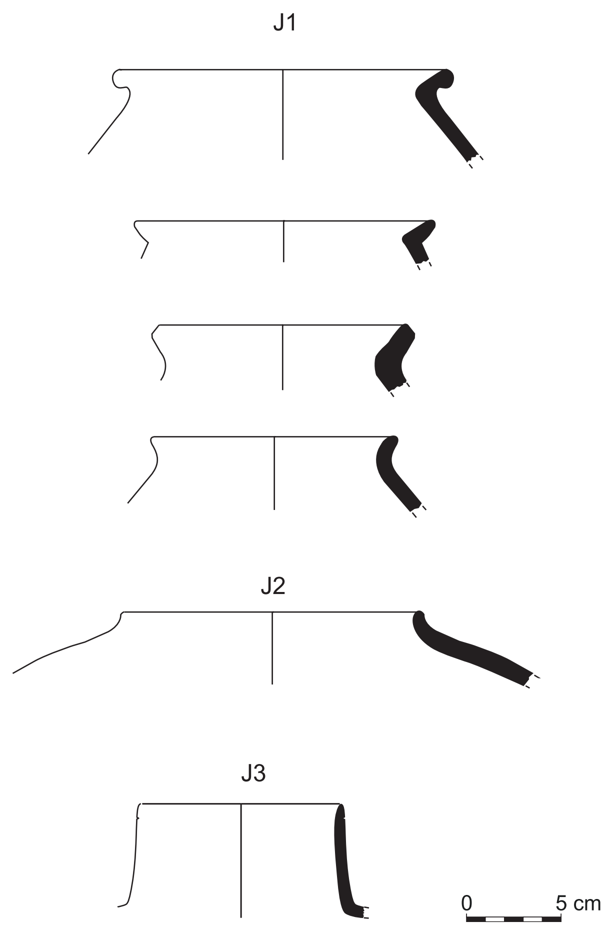
Same as L1, but with circumferential grooves on the upper surface. Not illustrated.

L3 Decorated Lids

Same as L1 but with finger gouging on the upper surface. Not illustrated.

Jars = J

Restricted-mouth vessels with necks. The necks distinguish them from tecomates. Rare at Paso de la Amada.



J1 Plain Jar with Low, Outflaring Neck

Unslipped jars with the paste of Michis Red Rim tecomates. These have low, outflaring necks. The interior face of the neck is usually burnished. Rim diameters of 16 examples range from 10 to 23 cm with a mean of 16 cm.

J2 "Necked Tecomates"

Jars that are in the style of Locona, Ocós, and Cherla tecomates but with very low, vertical necks.

J2a. Shell-Stamped Tecomates with Low Necks. Necks are slipped or burnished.

J2b. Slipped Tecomates with Low Necks.

J2c. Plain-walled tecomates with constriction in upper profile creating a convex neck and restricted mouth. See Figures 8.10f, 8.10h.

J3 Slipped Jar

Globular vessels with short, vertical, or outsloping necks. Exteriors are slipped and burnished.

J5 Jar with Tall, Vertical Neck

A form typical of the Cuadros and Jocotal phases. Not illustrated.

Figure 8.1. *continued.*

Plates = P

Plates, with heights less than one-fifth of diameter, are rare in the assemblage and may have had a non-alimentary function.

P1

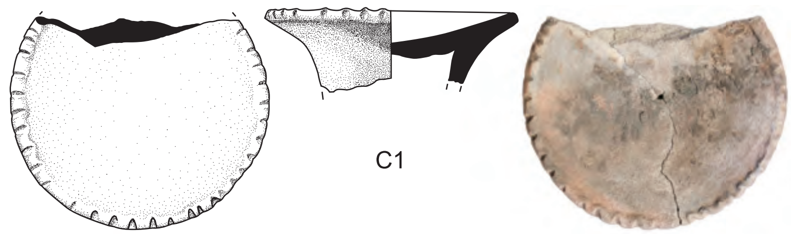
P1 Crude Plates
Crudely formed plates with short, nearly vertical walls; these look like modern ashtrays. Unslipped with scraped interiors and roughly wiped exteriors. Some have beveled or notched rims. The join between base and sides is gently rounded on the exterior and sharply angled inside. Rim diameters of 46 examples range from 9 to 23 cm, with a mean of 14 cm.

P2 Round-Walled Plates
Unslipped plates with rounded sides. No sharp interior angle between base and sides as in P1; otherwise similar to P1. Not illustrated.

P3 Slipped Plates
Other simple, round plates that are slipped or painted (unlike P1 or P2). Rim diameter varies greatly. Not illustrated.

Censers = C

Censers appear in a variety of roughly finished, eccentric forms with evidence of fire clouding.

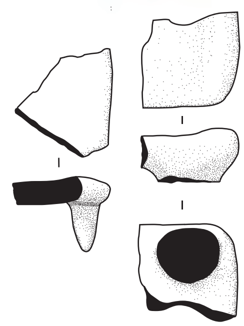


C1 Round Platform Censers
A round, flat to slightly concave platform attached to a vertical tube. Scraped and unslipped. Usually heavily burned on the upper surface.

C1

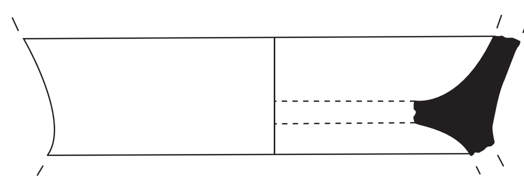
C2 Rectangular Platform Censers
Rectangular, flat platform that rested on four solid conical supports. Scraped and unslipped. Heavily burned upper surface.

C2

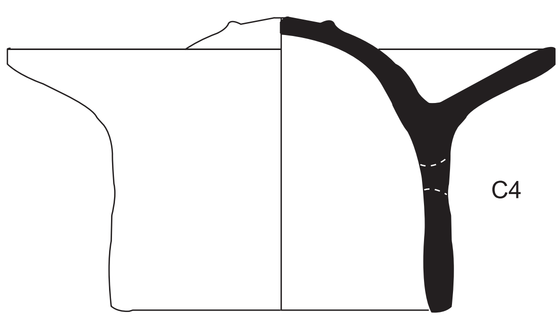


C3 Pedestaled Bowl-Shaped Censers
Open bowls with tall pedestal bases. Bases have round or rectangular holes, apparently to emit smoke, suggesting that these were placed over hot coals. Surfaces scraped and unslipped. The interior of the pedestal generally shows evidence of burning.

C3



C4 Pedestaled, Domed Censers
Censer with distinctly convex central dome.



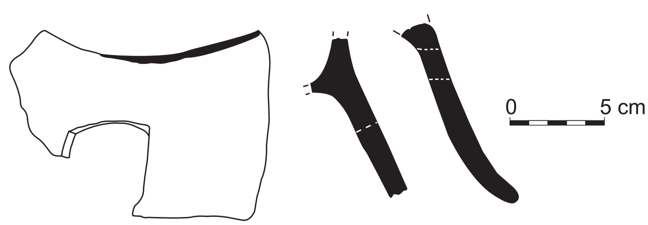


Figure 8.1. *continued.*

semblage. Forms B6, B7, B8, and BC are quite rare. Form B9 is something of an anomaly. These deep, shouldered vessels are slipped on the exterior and not on the interior (like tecomates) but have relatively open profiles (like bowls). The possible functions of this Locona-Ocós form are considered in the next section. Among the modified-rim bowls, BR1, BR2, BR3, and BR7 are relatively common and temporally diagnostic. The occurrence of effigies and supports crosscuts the bowl forms; the former are particular common on B4.

After bowls, the most common vessel form is the tecomate. These are typically globular or subglobular in shape, though other forms also occur (form T4). All tecomates are unfinished on the interior. Restricted-mouth vessels with slipped and/or burnished interiors are considered bowls (B5). The classification separates tecomates with unslipped bodies (T1) from those with slipped and/or burnished bodies (T2–T4). Unslipped tecomates with shell stamping are included with plain-bodied forms in T1. Nearly all fabric and string stamping occurs on tecomates with highly restricted orifices, form T4.

Other forms include lids (L), jars (J), plates (P), and censers (C). Lids are flat or slightly convex ceramic disks that are more carefully finished on the upper surface or exterior than on the interior or lower surface. Jars are distinguished from tecomates by the presence of necks. Plates have heights less than one-fifth of diameter. They are rare and differ significantly in terms of surface treatment from bowls. Censers are plain, eccentric forms with evidence of fire clouding.

FUNCTIONAL CLASSIFICATION OF VESSEL FORMS

This section considers the vessel forms of Paso de la Amada as a functionally differentiated set. Fragmentation of the collection prompts a two-pronged approach involving (1) attention to larger vessel fragments that provide key information on function and (2) use of a simplified classification that emphasizes attributes observable on more typical rim sherds. The discussion draws heavily on Lesure (1995:Chapter 6) and Lesure (1998a). I reference those works only when referring to specific figures not reproduced here.

It is useful to briefly set the topic in a larger context of discussions of vessel function during the Initial and Early Formative periods. The focus of attention has been the tecomate. Arnold's (1999:158) characterization of that form as a "multipurpose container" associated with "a settlement-subsistence system" that was not a "year-round, permanent site occupation" resonates with the Soconusco record but needs to be qualified. First, there is the significant divide between tecomates with broad, flat bottoms and those with rounded bottoms. In the Soconusco, the former are associated with the Barra phase. They are often fluted, grooved, slipped, and/or polished and were most likely beverage service containers (Clark and Blake 1994; Clark and Gosser 1995). Rounded-bottom tecomates appear in significant numbers only with the Locona phase. It is this latter form that appears to be truly multipurpose.

Second, in the Soconusco, the function of the rounded-bottom tecomate needs to be considered with reference to a pattern of inter-site variability in vessel-form assemblages. Assemblages at certain estuary sites were overwhelmingly composed of rounded-bottom tecomates with abundant associated evidence of fire. At contemporaneous sites a few kilometers inland, bowls and dishes are more prominent in the vessel assemblages. It appears that the latter are permanent habitation sites and the former special-purpose resource-extraction locales occupied for parts of the year by people who maintained permanent residences elsewhere (Chapter 26). The rounded-bottom tecomate seems to have been used for a variety of not completely overlapping functions at both special-purpose estuary sites and permanent villages.

Third, from the early second to early first millennium BC, there was a general temporal shift away from the tecomate in typical residential assemblages, even as the distinction between tecomate-dominant estuary assemblages and dish-dominant inland assemblages persisted. This may have involved substitution of new or alternative vessel forms for some of the functions previously fulfilled by tecomates. Specifically, jars (with necks) appeared in small numbers during the Cherla phase and thereafter became more common.

Although these larger patterns and processes need to be kept in mind, the problem of vessel function here is relatively narrow. The Locona through Cherla assemblage under consideration covers a relatively short (400-year) segment of the Soconusco Formative sequence. It begins when flat-bottomed, Barra-phase tecomates have largely faded from the vessel assemblage. Further, the uses of tecomates at estuary sites is not under consideration. The topic here is the functional interpretation of the vessel-form assemblage from a single large village site of the mid–second millennium BC. Discussion is organized by form.

TECOMATES

Tecomates are neckless jars with rounded sides and restricted rims. In a sample of 16 from the Locona through Cherla phases for which all crucial dimensions (volume, maximum diameter, rim diameter, and height) are known or can be estimated with a fair degree of certainty, observed tecomate volumes range from 1.5 to 16.9 liters. Since vessel volume could not be measured for most sherds, relations between volume and more easily measurable variables were sought in this small sample. Although there is a tendency for larger tecomates to have larger orifices, volume and rim diameter are not highly correlated ($R^2 = 0.26$). However, the square of the maximum diameter turns out to be a good estimator of volume. The two variables are

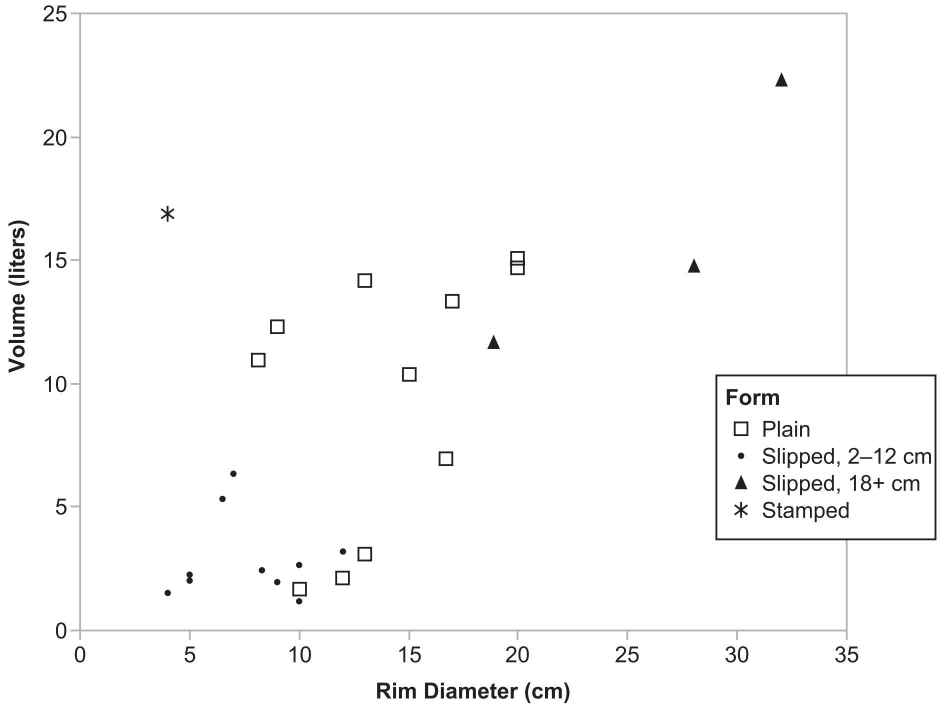


Figure 8.2. Scatter plot of tecomate volume versus rim diameter, split by exterior surface treatment into plain, stamped, slipped (rims 2–12 cm diameter), and slipped (rims 18+ cm diameter).

highly correlated ($R^2 = 0.91$). Based on the fully measurable sample, the following regression equation can be used to estimate vessel volume (V_{est}, in liters) for tecomate sherds when maximum diameter (D, in centimeters), but not vessel height, is known and the estimated volume falls in the range of 2 to 17 liters:

$$V_{est} = -2.401 + 0.014\ D^2$$

Using the above formula to estimate volume for nine additional large rim and body sherds yields volume estimates for 25 tecomates. Those are graphed against rim diameter in Figure 8.2, with the collection split by surface treatment: plain-bodied (T1), slipped (T2 and T3), and fabric-stamped with small mouths (T4).

Figure 8.2 suggests that there were relations, with likely functional implications, between volume, rim diameter, and surface treatment. Slipped tecomates tend to be small. Most in the sample had volumes around 2 liters and rim diameters less than 10 cm (though it should be observed that such small tecomates were more likely than others to survive sufficiently intact to be measurable). There are a couple more slipped tecomates with volumes of 5 to 7 liters and mouths similar to those of their smaller cousins. In addition, there are three slipped tecomates with wide mouths and large volumes. Plain-bodied tecomates tend to have larger capacities than slipped tecomates, with volumes typically 10–16 liters. Although there is little relation between rim diameter and volume among plain tecomates, as a group, their rim diameters are larger than rim diameters of most slipped tecomates. The elaborately decorated, fabric-stamped tecomate stands far outside the ranges of the other categories, with a very small mouth and large capacity. These patterns indicate the presence of functional differences among tecomates and suggest that it would be worthwhile to examine the full dataset split according to surface treatment. Figure 8.3 illustrates distinctions discussed in the following paragraphs.

Tecomates and Jars with Unslipped Bodies

A histogram of wall angle for tecomates with unslipped bodies reveals two types of vessel profile (Lesure 1998a:Figures 2 and 5a). Globular tecomates have rim angles of 15 to 50 degrees, with a central peak at 35–40 degrees. Subglobular tecomates have rim angles greater than or equal to 55 degrees, with the central peak 60–70 degrees. Histograms for rim diameter show that values are tightly bunched between about 13 and 19 cm for both globular and subglobular forms, and the main mode for each is near 15 cm (Lesure 1998a:Figure 5b–c). Thus, while globular and subglobular tecomates are readily distinguishable by rim angle, there are no differences between these two in terms of orifice size.

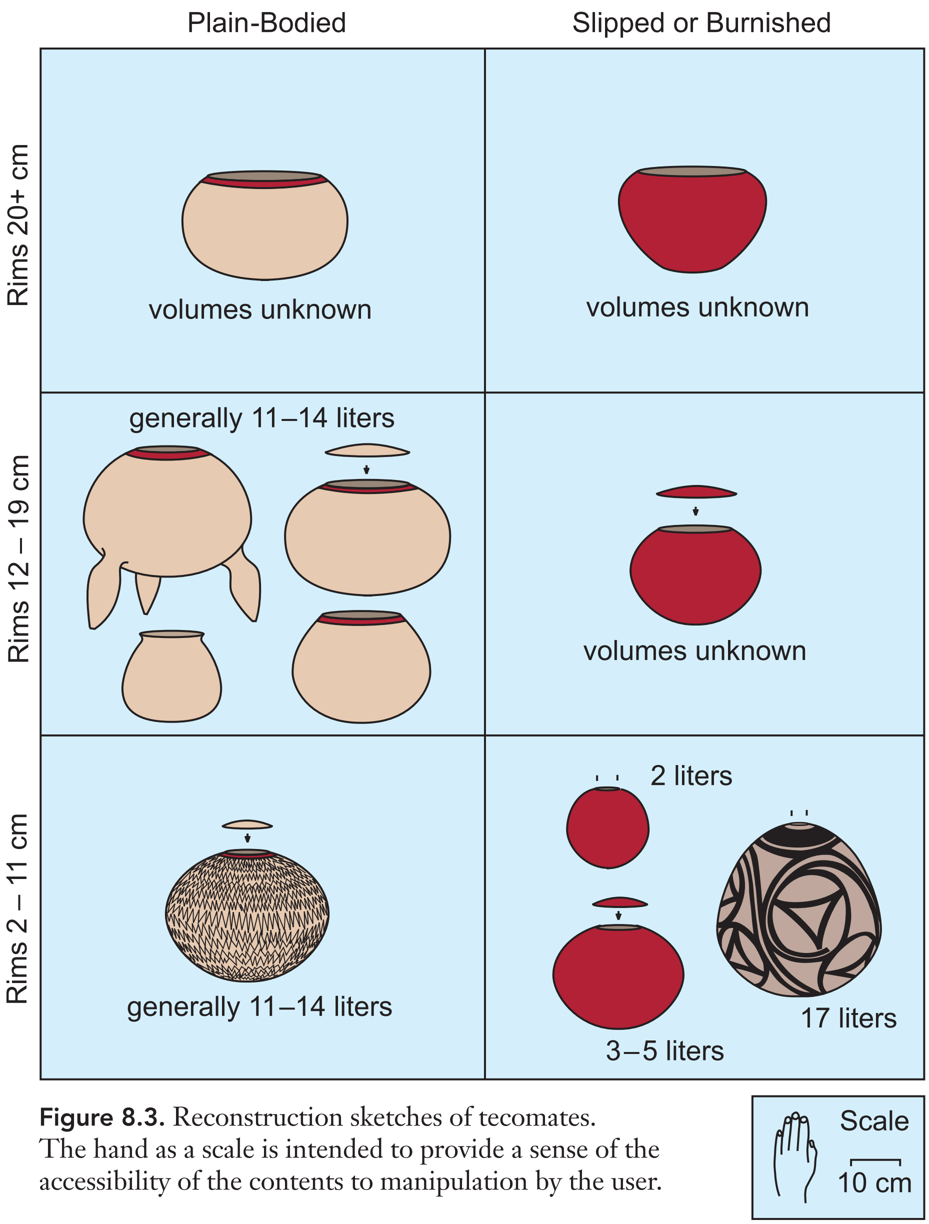


Figure 8.3. Reconstruction sketches of tecomates. The hand as a scale is intended to provide a sense of the accessibility of the contents to manipulation by the user.

A second, much smaller mode appears in histograms for the globular tecomates at a rim diameter of about 10 cm (Lesure 1998a:Figure 5b). This second mode does not appear for subglobular tecomates. The larger mode was defined as globular, plain-bodied tecomates with rim diameters of 12 cm or greater. The smaller mode had rim diameters of 11 cm or less. Interestingly, 32 percent (seven out of 22) of the small-mouthed tecomates with measured rim angles are decorated with shell-edge rocker stamping on the exterior, while just one of the 166 examples of larger-mouthed tecomates have shell-edge rocker stamping. In the complete sample of unslipped tecomates with measurable rims, 16 percent of those with rim diameters of 11 cm or less had stamped exterior walls, whereas only 1 percent of those with diameters 12 cm or greater were stamped. There was thus a strong preference for stamping only those tecomates with particularly small mouths.

Shell-edge rocker stamping produces a roughened surface to the vessel and may be related to vessel function. One possibility is the use of roughening to enhance heat transfer in cooking; the other purpose for roughened surfaces is to make water transport jars, which often get wet and slippery, easier to carry by providing a more secure grip (Rice 1987:232). A large portion of a small-mouthed globular tecomate with shell-edge stamping—including all the base—was recovered from Mound 12. The base was generally rounded, but at the very bottom it was flattened, suggesting that the vessel was meant to rest on flat surfaces. There was no evidence of sooting or discoloration of the basal region or the sides of the vessel that might suggest it had been set in a flame. If the roughened exterior of plain tecomates was functional, then it is most likely to have been for aid in the transport of liquids. This is in accordance with the very restricted mouths of these vessels (≤ 11 cm in diameter), which would have minimized spillage during transport and evaporation during storage.

Far more common are the globular and subglobular tecomates with rim diameters greater than 11 cm. However, no clear-cut functional interpretation can be provided for these. The orifice sizes of these main modes of plain-bodied tecomates were big enough to admit a hand. (Note the hand as a scale in Figure 8.3.) The contents could have been easily stirred or perhaps scooped out with a small container. One function of these vessels was probably as everyday cooking pots. Bases seem generally to have been rounded, a favored shape for even heating. Evidence of sooting and oxidation appears on the exterior basal portions of several large fragments from Mound 12. In addition, some plain-bodied tecomates had tripod supports (solid or hollow), which would have been appropriate for positioning these rounded-bottom vessels over the fire. The ratio of support fragments to rim sherds suggests that the proportion of plain tecomates with supports in the discard assemblage reached a peak of between 5 and 15 percent during the Ocós phase. Most supports did not exhibit any evidence of use-related alteration by fire, but a few supports had been baked completely red in firing, during use, or after breakage of the vessel. It is possible that vessels without supports were placed over the fire by other means.

The most common sizes of plain tecomates probably served other functions in addition to cooking. Tecomates with orifices in this size range would have been appropriate for dry food or liquid storage. Liquids could have been poured more easily from subglobular than globular tecomates and would have evaporated more readily. Because rim angles fall so neatly into two separate groups, supports appear on only a minor proportion of vessels, and some large vessel fragments show no evidence of having been placed over a fire, it seems likely that a number of functional categories were represented by plain tecomates with orifices in this size range. These were multipurpose vessels that served as everyday cooking pots as well as for storage and the preparation of foods or liquids.

Low-necked jars appeared in the Cherla phase. These were made in the same style as the typical plain-bodied tecomates, and the rim diameters match those for the main modes of the plain-bodied tecomates. No large vessel fragments were recovered, so no information is available concerning basal morphology or evidence of use over a fire. However, the low outflaring neck seems most appropriate for the transport and/or storage of liquids. A cover could easily have been tied over the mouth. I suspect that necks were added to vessels that were otherwise indistinguishable from regular plain tecomates and were an adaptation that enhanced one use of these vessels. Most of the Cherla jars recovered have wall angles below the neck that are in the range of the rim angle for subglobular tecomates.

Slipped Tecomates

Slipped tecomates from Paso de la Amada are predominantly small and globular. Rim angles were not measured due to difficulty in finding a consistent location at which to take the measurements on the steadily curving walls. In contrast to the plain tecomates, the distribution of rim diameter measurements for slipped tecomates is skewed instead of normal, with no clearly defined modes (Lesure 1998a:Figure 5d). It seems unlikely, however, that tecomates with mouths 5 cm in diameter served the same function as ones with mouths 25 cm across; a range of functions for these pots seems likely. Histograms of rim diameter split by phase suggest a division for this range of rim diameters that probably correlates roughly with function (Lesure 1995:Figure 6.7). In each phase there is a mode around or below 10 cm, a mode between 10 and 20 cm, and a scatter of rim values above 20 cm. The correspondence of the lower two modes with those identified for plain tecomates invites a comparison. Slipped tecomates with mouths in the range of 12–19 cm were similar to plain tecomates in size and in the relative accessibility of contents. They may have served similar functions related to storage and preparation of food or liquid. The function of the rare mode of tecomates with rim diameters greater than 19 cm is unknown; preparation or serving that involved scooping or dipping seems likely.

Vessels with rim diameters in the lower portion of the range comprise the overwhelming majority of slipped tecomates. Like their plain-bodied counterparts, they were probably primarily for containing liquids. Many appear to have been small globular vessels with capacities of about 2 liters. The fact that such large numbers of these were recovered suggests that households had a number of them and used them frequently. Use for the serving of liquids is suggested by the highly restricted orifices. Larger versions with similar orifice diameters ranged up to 3–5 liters in capacity and were probably not intended for individual service. They may have been used for a variety of purposes related to liquid storage, preparation, and service. Some wide-mouth slipped tecomates had significantly larger capacities.

The primary drawback to the interpretation of small-mouthed tecomates as related to liquid storage, preparation, and service concerns the lack of pouring technology. Although some rims are slightly upturned in a way that would have aided pouring, most vessels would have been difficult to pour or drink from without spilling. Drinking out of small globular tecomates could have been facilitated with straws (for which there is no physical evidence but which could have been fashioned from reeds). In the face of all this, an alternative functional interpretation, such as the storage of dry foods like small seeds, might be suggested. The main problem with the latter interpretation concerns the size, frequency, and decoration of the small globular tecomates. Dry storage vessels tend to be significantly larger than the 2 liters common among slipped tecomates. (See dimensions given by Henrickson and McDonald 1983:632.) Also, dry storage vessels would be subjected to significantly less daily risk of breakage than liquid service containers (DeBoer and Lathrap 1979:127–28, Figure 4.5). The frequency of small slipped tecomates at Paso de la Amada suggests rates of breakage more comparable to ethnographically observed serving vessels than to storage vessels. Finally, the fact that these are slipped and sometimes decorated with plastic modification of the surface, such as fluting or gadrooning, supports the argument that they were serving vessels. At this point, the weight of evidence favors the idea that small-mouthed tecomates were used mainly for the processing and service of beverages.

Clark and Blake (1994) argue that Barra-phase vessels are essentially a beverage-serving complex. Powis et al. (2008) found evidence of the use of a single vessel from Mound 6 for cacao. An expanded residue study described in Chapter 21 did not yield additional positive cases for cacao but revealed instead a signature of chili in the fabric of a variety of vessel forms.

Decorated Tecomates with Very Small Mouths

A set of large tecomates with highly restricted mouths (rim diameter generally 3–5 cm) forms an easily identifiable category since rim diameter, vessel contour, vessel size, and surface treatment set these vessels off from all others in the study collection. Their vessel form code is T4. The single vessel for which volume can be estimated is one of the biggest tecomates in the collection, with a capacity of 16.9 liters. A second reconstructible fragment was clearly a vessel of similar size, and most may have been this large. The very small mouth would have required pouring and would indicate contents of either very small seeds or liquids. The second possibility seems more likely. These tecomates were the most elaborately decorated vessels encountered. They are all assigned to a single type, Amada Black-to-Brown. Surface treatment included zoned string or fabric stamping, grooving, and polished bands that traced a complex curvilinear pattern across the entire surface of the vessel. The use of these elaborate vessels in contexts where their motifs could be seen and appreciated seems likely; probably they were for serving beverages. If individual portions of beverages were around 2 liters, then a single decorated tecomate could have served eight adults. The unusual capacities of these vessels, their elaborate decoration, and their rarity in the study collection are all features that would be expected of special vessels used in feasts.

Tecomate Lids

Fifty-three tecomate lids were recovered, dating primarily to the Locona phase. Their use would suggest storage functions for the vessel forms they match. The lid, which rested over the mouth of the tecomate, would have needed to be 1–2 cm bigger than the vessel mouth. Two modes are suggested by the distribution of lid rim diameters: one group between 8 and 13 cm, the other between 15 and 19 cm, with a single outlier at 23 cm. Although the sample sizes are small, the modes appear for both slipped and unslipped lids. They also match the rim size modes identified for globular plain tecomates and slipped tecomates. It would appear that lids were used with both plain and slipped tecomates of various rim diameters. Note that lids were never common and decreased markedly in frequency after the Locona phase. Vessels were usually covered by other means. See Chapter 18 for discussion of worked sherds interpreted as vessel lids.

Summary on Tecomates

Surface treatment and rim diameter provide a readily observable basis for a rough functional division of tecomates. Tecomates of rim diameter 2–11 cm were used primarily for the storage, preparation, and serving of liquids. Globular, plain-bodied tecomates with mouths in this size range often had roughened surfaces to make them easier to carry when wet and slippery. Slipped and burnished tecomates with rim diameters this small varied considerably. Most common were small globular vessels with volumes of about 2 liters that were probably used for individual consumption. Somewhat larger vessels, of 3 to 5 liters, may have been used to store or serve liquids, but they could also have been used to store dry food such as seeds. Large tecomates with tiny mouths and elaborate stamped and burnished decoration were probably part of the beverage-service complex. Intermediate-mouthed (12–19 cm) tecomates were used for a variety of purposes, including cooking, food preparation, and storage. Their volumes tended to be between 11 and 14 liters, but smaller and larger ones were made. Plain-bodied tecomates in this range included both globular and subglobular forms. Perhaps 5 to 15 percent had large tripod supports. The comparatively few tecomates with rim diameters 20 cm or more were probably used in the preparation and storage of foods or liquids.

BOWLS AND MINOR FORMS

Scale drawings of the bowls and minor forms described below appear in Figure 8.4. Open bowls are the most abundant forms in the assemblage and were undoubtedly used every day to serve meals. The most common sizes of vertical-walled bowls are the bottom two bowls pictured in the figure. They were probably used to serve food and drink, as were the bowls with restricted rims. The shouldered basins were probably used for cooking large quantities of food.

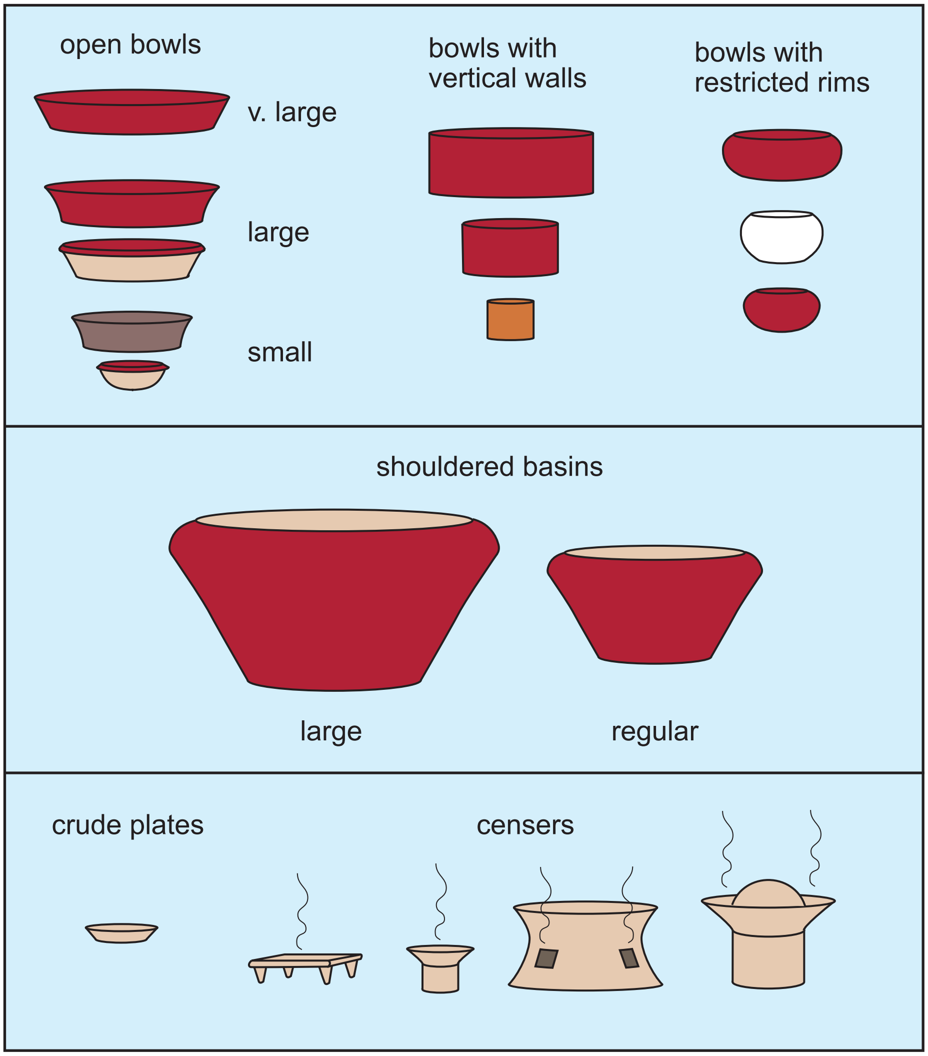
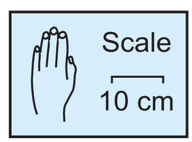


Figure 8.4. Reconstruction sketches of vessel forms other than tecomates.



Open Bowls

Dishes or open bowls (the terms are used interchangeably here) constitute the most numerous class of vessel in the study collection (Forms B1, B2, B4, B7, BR1–BR7). Maximum diameter is at the rim, and vessel height is generally between one-fifth and one-third of the maximum diameter. Almost all are slipped at least in the interior, and many are decorated in other ways as well. Rims are often modeled and grooved (Forms BR1–BR9). Sometimes the interiors are stamped lightly with the edges of shells. Some bear animal effigies. Low, open vessels such as these would have been appropriate for serving food. The attention paid to decoration as well as the abundance of these vessels in the discard assemblage support the interpretation based on vessel form.

An ethnographic survey of serving vessels suggests the likely presence of specific size classes, such as individual and family-capacity bowls (Henrickson and McDonald 1983:632). A heuristic division of open bowls into three size classes is proposed here based on distributions of bowl volumes. Approximate bowl volume (V, in liters) was calculated from rim diameter (d, in centimeters) and height (h, in centimeters) according to the following formula:

$$V = (.001)\pi h(d/2)^2$$

Since this formula treats each bowl as a cylinder with a diameter equal to the bowl's maximum diameter, it will consistently overestimate actual volume. A histogram of V for open bowls of the Locona through Cherla phases shown in Figure 8.5 reveals a trimodal distribution, brought out quite clearly when the assemblage is split by diameter into *small* (5–25 cm diameter), *large* (26–35 cm diameter), and *very large* (36-plus cm diameter) bowls. There appears to have been two common sizes of dishes: one with a capacity of 1–2 liters, the other 3–5 liters. Since both modes are very common, they may well correspond to the individual and family-size serving vessels identified ethnographically by Henrickson and McDonald (1983). The third mode is a tiny one, represented by just five vessels with measurable heights, yet it is clearly distinguished from the other modes at 7–9 liters. These might be more family-size serving vessels; alternatively, their rarity might indicate that they were for serving food at feasts.

Bowls with Vertical Sides

Bowls with vertical sides (B3) differ from dishes in overall vessel proportions, with vessel height around four-tenths of maximum diameter (though the sample with measurable heights is small). They are much less common than dishes and probably had functional distinctions. However, the openness of the vessel profile and the fact that they are generally slipped and burnished on both sides supports the idea that they were to serve food or beverages. Rim diameters range greatly (from 7 to 35 cm). The smallest of these vessels (rim diameters 10–15 cm) could have been cups, but larger ones were more likely used to contain food.

Bowls with Restricted Rims

Bowls with restricted rims (Form B5) have rounded sides, like globular tecomates. They are distinguished from tecomates by having slipped, burnished interiors, an attribute that suggests different functions. Rim diameters range considerably, from 4 to 43 cm, though two-thirds are from 9 to 19 cm. These vessels were probably used for serving and/or food preparation.

Shouldered Basins

Deep, flat-bottomed basins (Form B9) with outflaring walls that curve sharply inward just below the rim to form a marked shoulder may have been used in the preparation of large quantities of food or drink. These have slipped, burnished exteriors, but in contrast to all other bowl forms, they have roughly finished interiors, indicating that display of the interior was not a significant part of the function of these vessels even though the vessel profile was relatively open. The rough interior finishing of shouldered basins indicates a storage or preparation function for this form, though exteriors are always either entirely slipped or partly slipped, with contrasting zones of fingernail gouging on a scraped surface.

The histogram of rim diameter is bimodal (Lesure 1995:Figure 6.12). There was a *regular shouldered basin* with rim diameters ranging from 20 to 46 cm (median 35 cm) and a *large shouldered basin* with rim diameters of 47 to 64 cm (median 54 cm). The capacities of the large shouldered basins were greater than those of any other vessels encountered at Paso de la Amada. The one reconstructible example, from Pit 32 Feature 4, had an estimated volume (base to rim) of 45.8 liters (10.8 gallons). Capacities for the regular-size shouldered basins were smaller, in the range of plain tecomates.

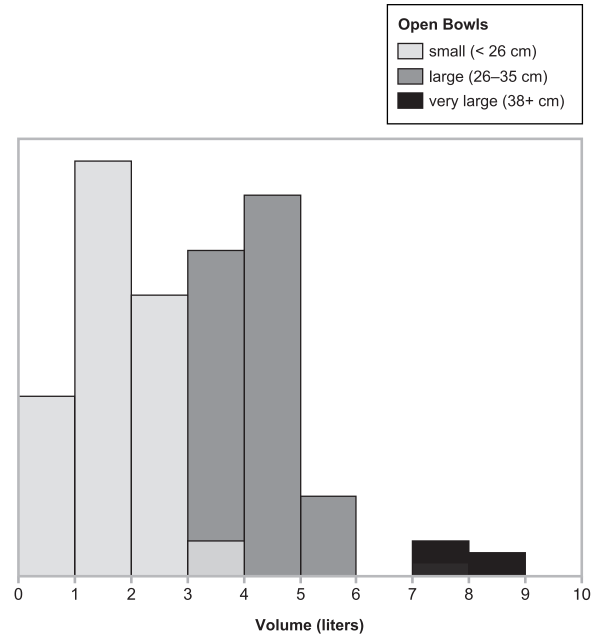


Figure 8.5. Histogram of bowl volumes, split by rim diameter. Rim diameter is closely related to volume.

The reconstructible sherds from Feature 4 hold other information related to function. The base is flat and is thus not particularly appropriate for use over a fire. There is no evidence of oxidation or sooting on the exterior of the base or wall sherds. The interior shows an unusual pattern of surface attrition that appears to represent a fill line (Figure 8.6). Below a horizontal band just under the shoulder, the surface has been so scarred by pitting that the original surface is completely gone. The pitting appears to have covered the whole interior surface of the vessel below the fill line. Above a band of about 3.5 cm, which represents a transition zone of partial pitting, the scraped original surface is intact.

Potential use-related causes include chemical corrosion, thermal shock, and physical abrasion (Hally 1983:18; Skibo 1992). One conceivable possibility is corrosion resulting from the fermentation of beverages. Another possibility is that these were in fact cooking vessels but that cooking was achieved by adding heated rocks to the contents of a vessel instead of placing by the vessel over heat.

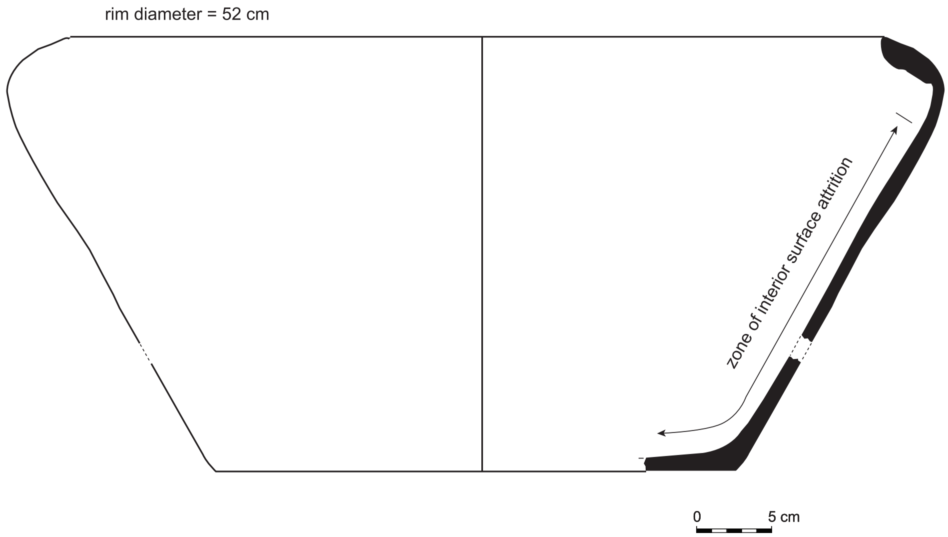


Figure 8.6. Profile of large shouldered basin, Form B9, showing zone of interior surface damage on a reconstructable vessel fragment from Pit 32 Feature 4 (Locona). Estimated volume of this vessel is 45.8 liters.

These vessels are common in Locona and late Locona contexts, decline somewhat in Ocós, and disappear by Cherla. Their disappearance from the record thus tracks the decline in occurrence of fire-cracked rock (see Table 12.9). Abrasion through stirring, scraping, and contact of rocks with the vessel interior are potential causes of the observed wear pattern, but I have not performed any experiments to test that suggestion. For further comments on the possible use of rocks for boiling, see Chapter 26 and the discussion of fire-cracked rock at the end of Chapter 12.

Assuming that (whatever its origin) the line between the pitted and intact interior surface is in fact a fill line, then the volume of the contents of the vessel from Pit 32 Feature 4 averaged about 30 liters. The rim diameter of this particular vessel is smaller than the median for the large shouldered basins; capacities of 35 liters were probably typical.

Large shouldered basins might have been replaced functionally in the Cherla phase by deep, vertical-walled basins with bolstered rims and mouths 50–60 cm in diameter (Form BR9). If that was the case, then some function other than cooking with heated rocks would be indicated.

Censers and Probable Censers

Ceramic forms not dealt with above include the plates, Forms P1 and P2. These small, crude plates are a persistent presence in the Locona, Ocós, and Cherla phases. Their unfinished exteriors are consistent with ritual uses, but specific functions are unknown. I think they were most likely censers and treat them as such in Chapter 19 and subsequent chapters. More definitive censers were made in a variety of forms (C1–C4) throughout the occupation.

SUMMARY OF VESSEL FUNCTION

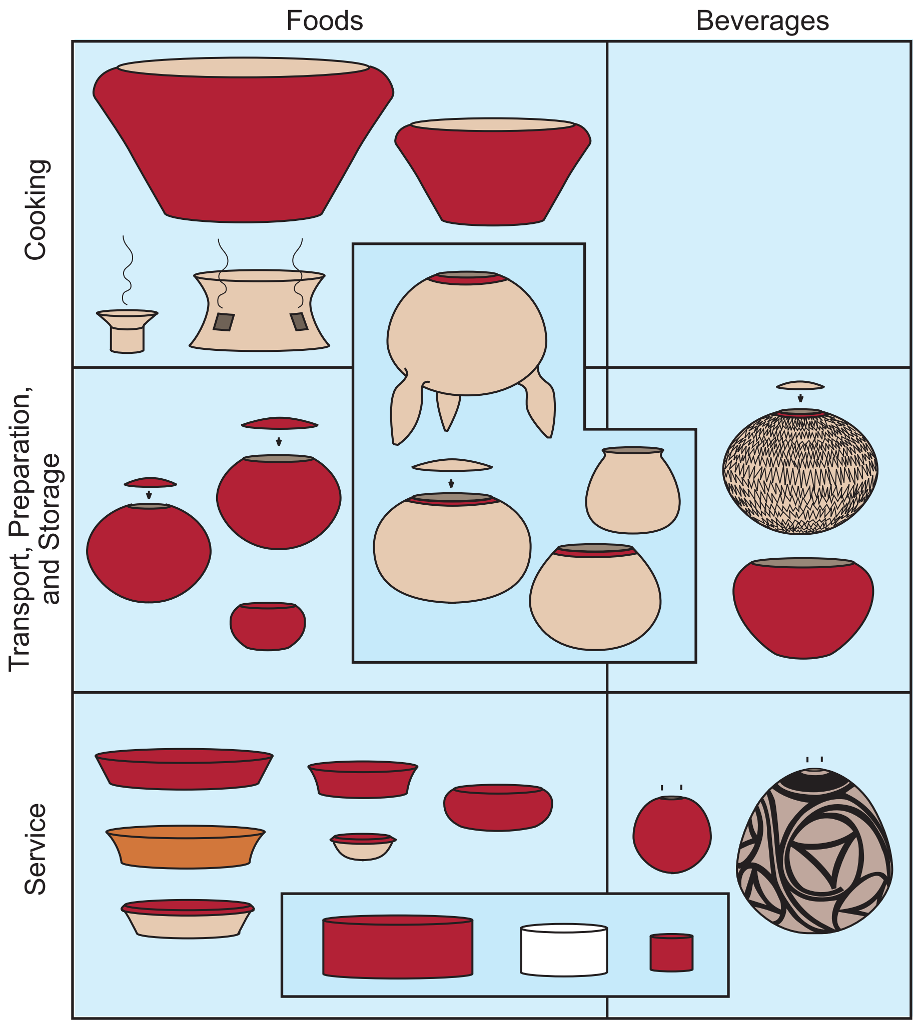
Vessel forms at Paso de la Amada consisted almost exclusively of tecomates and bowls (Figure 8.7). The principal cooking vessels were plain tecomates, perhaps those with large supports for suspending the pot over a fire. Other possible cooking forms include shouldered basins. Tecomates, both plain and slipped, were used for transport, preparation, and storage of food and beverages. Bowls with a variety of wall profiles were used for serving food. Small, vertical-walled bowls may have been used as cups, but more common were small globular tecomates with capacities of about 2 liters. Some larger tecomates were also probably used to serve beverages.

DECORATION

Locona-Ocós-phase decorative techniques have been described in detail by Coe (1961:56–57, Figures 47 and 48a–c) for La Victoria and by Ceja Tenorio (1985:73–78, Figure 41) for Paso de la Amada. The most common technique is rocker stamping with the edge or back of shells of the genus *Anadara* (Ceja Tenorio 1985:73). Another important technique is string and/or fabric stamping and other decoration. Varieties of stamping are illustrated in Figure 8.8.

SURFACE TREATMENT TYPOLOGY

The slipped and/or burnished sherds sort into three main type classes: Red, Brown-Orange-Pink, and Black-White-



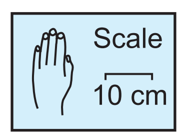


Figure 8.7. Overview of the vessel assemblage, synthesizing form and function.

Gray. There is some fuzziness to the boundaries between these, particularly with Brown-Orange-Pink and Black-White-Gray. Decorated Rim Plain is the other common type class, consisting mainly of tecomate sherds with unslipped exterior bodies and a decorated band around the rim. Two types separated here as a Stamped type class are often also slipped and/or burnished. A small portion of the assemblage consists of bichromes. Those are grouped here in a Miscellaneous Bichrome type class based on the idea that, as bichromes, they sort out of the collection as unusual. The Coarse type class consists primarily of ritual vessels, particularly censers.

The type classes and their constituent types are listed in Table 8.1 (see page 158) in the order in which they are presented in the following pages. Type names are a compromise between those used by previous investigators (especially Clark and Cheetham 2005) and the criteria I found helpful for grouping sherds. Close relations between types are signaled by similarity in names—for example, Mavi Buff and Mavi Red on Buff.

In the type descriptions, frequencies of each type are given as rim counts in the assemblage analyzed to Levels A and B, unless otherwise specified. Forms are noted in the codes of Figure 8.1 and/or with brief descriptions.

DECORATED RIM PLAIN TYPE CLASS

Particularly prominent in collections of the Locona through Cherla phases is a cluster of attribute states involving surface treatment, vessel form, rim elaboration, and characteristics of vessel profiles. The vessels involved constitute the predominant "plain" ware of these phases in the sense that most of any vessel was unslipped or at least unburnished and that the vessels in question were used for

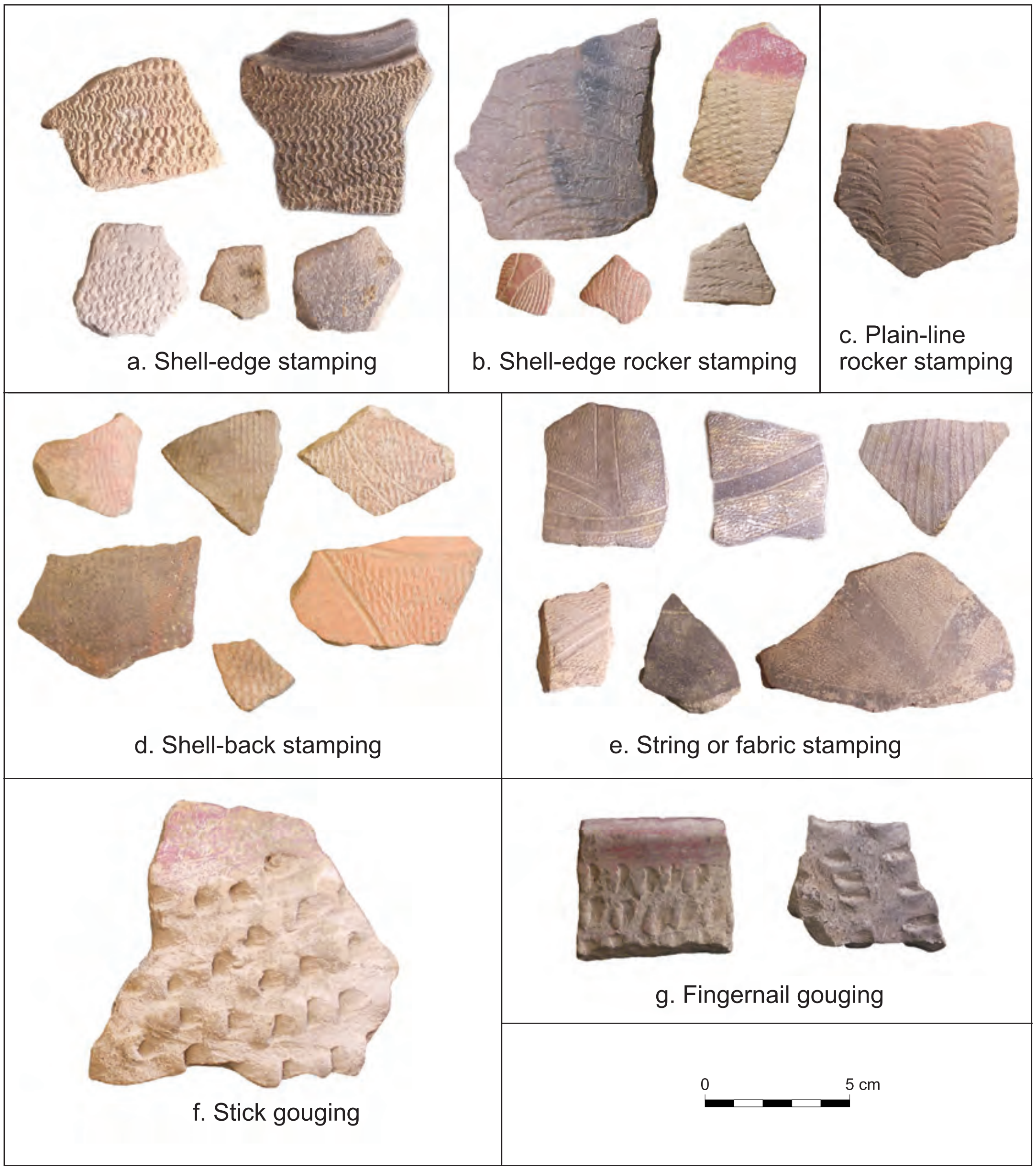


Figure 8.8. Types of decoration in the pottery assemblage.

cooking and storage. A striking cluster of attributes makes these common vessels—consisting entirely of tecomates in Locona and Ocós but including low-necked jars and open bowls in the Cherla phase—stand out on the sorting table. The type class constitutes about 30 percent of identified rims. "Real" plain ware—completely unslipped, unburnished vessels—is rare (5 percent of rims) and appears in general to have been for ritual rather than alimentary purposes (the Coarse type class).

Michis Red Rim is the principal type of the Decorated Rim Plain type class. Its features include relatively thin walls; carefully scraped exteriors contrasting with a red-slipped, burnished band around the rim; and two circumferential incisions on the rim band, one close to the mouth and the other at the base of the decorated band. Rims exhibit a delicate interior thickening. Lips are often slightly pointed. Small and even medium-size rim sherds appear quite flat when viewed from the exterior. With typical mouth diameters in the range of 12 to 19 cm, the curvature of the restricted rim is readily apparent.

This suite of features is so coherent and readily identifiable among rim sherd collections that it forms a sound basis for a type class. Complications arise in that there are changes over time. The "classic Michis" suite of attributes just described was prevalent in later Locona and Ocós. It was in a state of coalescence in earlier Locona and gradual dissolution in Cherla. In the Cherla phase, some tecomates still deserve the name Michis, but there is also a derived style designated Mavi. In the collection from Paso de la Amada, Mavi tecomates are somewhat difficult to sort from Michis. An important innovation of Mavi is application of a modified version of the Michis template to open bowls; previously it had been confined solely to tecomates.

Although the types of this class are, as categories, replicable among different analysts, there is some divergence of opinion on type names. The issues involved are discussed in the "History" paragraphs of the type descriptions. Six types—four variants of Michis and two of Mavi—are described here. Those, along with 628 rims identified as Michis but not assigned to a type, constitute 99 percent of the 3,956 rims in this type class. Other types represented are Guamuchal Plain (Clark and Cheetham 2005; Coe and Flannery 1967:28–30) and Mapache Red-on-Buff (Clark and Cheetham 2005:333; Coe and Flannery 1967:26), both from the ephemeral Jocotal occupation of the site

Michis Red Rim

Identifying Features. This type includes tecomates, both globular and subglobular, with scraped (not burnished) exteriors. The bodies are unslipped or covered with an orange wash. The rims are particularly diagnostic. Traits include a slipped rim band; two incisions on that band, one 2–6 mm from the lip, the other marking the lower edge of the slipped band; the specific tone of the rim slip, which differs from both Chilo and Paso Red, ranging toward pink; interior thickening of the rim with the lip tapering to a point to create a characteristic profile; the walls being thin, notwithstanding the large size of many of the vessels; and the restricted-rim, neckless form of the vessels in which the interior is left unscraped and unslipped. This coherent suite of features makes the type readily identifiable.

Illustration. Figure 8.9.

History. This type was first defined by Lowe (1967:104–6), who referred to it as Michis Thin Tecomate. It was more fully described by Ekholm (1969:27–29) under the same name. Ceja Tenorio (1985:53–55) provided a more extended description based on an expanded sample. Clark and Cheetham (2005:299–301, 309) introduce instead the designation Michis Pink on Orange. They are able to distinguish temporal difference within the type. Grooving on the exterior body and solid supports are Locona traits; hollow supports and absence of grooving are Ocós. Clark and Cheetham also identify several related types, categories that basically correspond to those described here despite some changes in the names.

Sample. 2,198 rims.

Phases. Locona and Ocós, continuing into Cherla, although in that last phase Michis Burnished Rim and other modified versions are more common.

Paste. Local paste; brown ranging to dark brown, orange, or gray (7.5YR5/4, 2.5YR6/6, 5YR4/3).

Surface Finish. Interiors are scraped. Exteriors are well scraped, often with an orange wash (10R5/6, 2.5YR6/6). Even when a wash is applied, exteriors are never burnished. General characteristics of the rims have already been described. The slip used around the rim is red to pink (7.5YR5/4, 5YR6/6, 7.5YR6/4, ranging to 10R5/3 when somewhat eroded). As Clark and Cheetham (2005:301) note, the slip is usually slightly iridescent. In contrast to the rest of the exteriors, the rims are well burnished.

Forms. Vessel forms are confined almost exclusively to globular and subglobular tecomates. Judging by the number of supports recovered, some but not all Michis Red Rim tecomates had tripod supports, in various forms. Solid supports in a variety of styles tend to be earlier (Locona) and hollow supports later (Ocós).

Decoration. Rim bands are usually 2 to 3 cm wide, though they range from 1 to 4 cm. The two incisions that usually appear around the rim—one near the lip, the other at the lower margin of the rim band—have already been described. Some exterior bodies below the rim band are also decorated with incised lines, often pairs of parallel lines. In such cases, sets of parallel lines are spaced around the vessel, intersecting at the base or toward the rim. Some bodies are decorated from just below the rim to the base with shell-edge rocker stamping.

Potential Misidentifications. Small rim sherds of red-slipped tecomates (T2), unless they exhibit certain characteristic rim modifications (T2b, T2c), can be difficult to distinguish from Michis Red Rim sherds when the latter are so small that no indication of the transition from rim band to unslipped body is preserved. Michis Red Rim is distinguished from Michis Specular Red Rim by the qualities of the slip on the rim band. Rim sherds of the type can be difficult to distinguish from Michis Burnished Rim in eroded collections.

Comparisons. Michis Red Rim was in use in much of the Soconusco region in the Initial Formative. It has been identified in Locona and Ocós contexts at Altamira (Lowe 1967), Izapa (Ekholm 1969), and numerous other sites in the Mazatán region, as well as at Cuauhtémoc (Rosenswig 2010:Figure 6.14) and El Mesak (Pye and Demarest 1991:Figures 4–5). Coe (1961:Figures 14–16) illustrates Locona-phase versions from La Victoria, many of which match the Mazatán material quite closely. (He included what was later to be separated as Michis in a broader category, Victoria Coarse.) One question is the extent to which Michis Red Rim continues into the Cherla phase. Cheetham (2010a:576) does not report any Michis variant from Cherla deposits at Cantón Corralito, but in the Cherla-phase type collection from Cantón Corralito at the New World Archaeological Foundation, at least half the tecomates classified by Cheetham as Mavi Red and Buff would have been designated Michis Red Rim according to the standards used in the present study. Thus Michis Red Rim

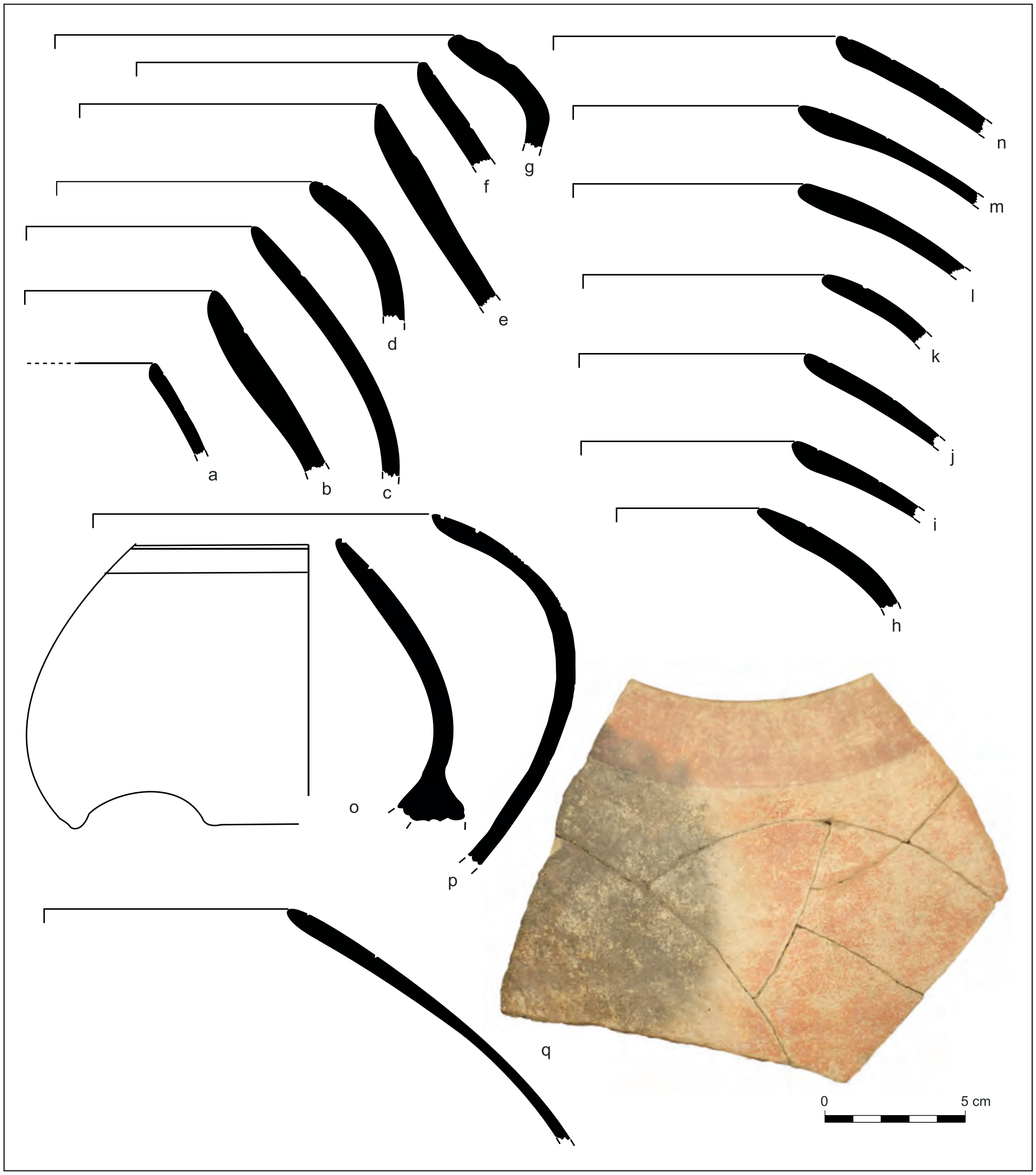


Figure 8.9. Michis Red Rim type: (a–q) plain-walled tecomates (T1); (r, u, x) solid supports; (s–t, v–w) hollow supports; (y) tecomate (T1) decorated with paired diagonal grooves, a Locona-phase trait (T1); (z) tecomate (T1) with exterior shell-edge rocker stamping.

(as defined here) seems to have continued into the Cherla phase alongside more definitive deviations from the classic Michis suite of traits.

Michis Specular Red Rim

Identifying Features. This type includes tecomates with scraped, unslipped exteriors and decorated rim bands. The decoration consists of a polished, specular red slip, the same slip used for Chilo Red. Not all the classic Michis features are present in this type, which appears to register the Michis template in the process of coalescence. In Michis Specular Red Rim, there may be only a single groove on the rim band or none at all.

Illustrations. Figure 8.10j–l.

History. Clark and Cheetham (2005:301) define the type, which they call Chilo Red on Buff. However, the notion of a Chilo Red on Buff opens up a can of worms, since many bowl sherds classified here as Chilo Red—and apparently so classified by Clark and Cheetham based on their

Figure 8.9. *continued*

absence from vessel forms illustrated as red on buff (Clark and Cheetham 2005:Figure 9v, Figure 9x–aa)—are nevertheless "red on buff" since all or a portion of the exterior is left unslipped. One could shift those over to Chilo Red and Buff (creating also a Paso Red and Buff, and so forth), but that would raise the practical problem that small sherds might be completely red and thus designated Chilo Red, whereas larger sherds from the same vessel would be identifiable as Chilo Red and Buff. This type is an early version of Michis Red Rim, and in my opinion that link should be recognized in the type name.

Sample. 42 rims.

Phase. Locona.

Paste. Similar to Michis Red Rim.

Surface Finish. Interiors are scraped. Exteriors do not have the orange wash that often appears on Michis Red Rim.

Forms. Tecomates; Form T1.

Decoration. Grooved parallel lines in sets of two or three appear on the bodies.

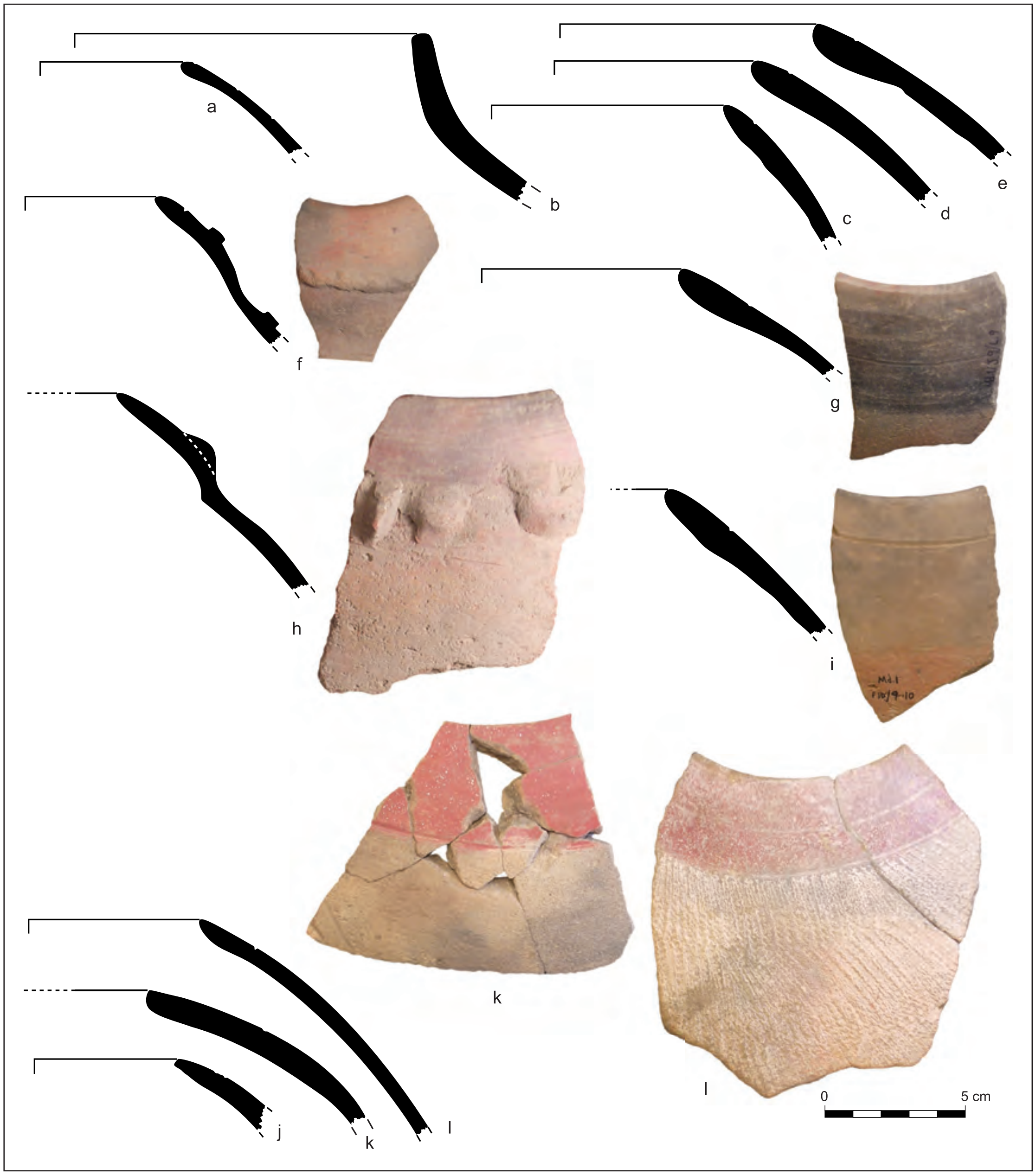


Figure 8.10. Other Michis types. Michis Burnished Rim: (a–i) plain-walled tecomates (T1); Michis Specular Red Rim: (j, k, l) plain-walled tecomates (T1).

Potential Misidentifications. Distinguished from Michis Red Rim by the specular slip on the rim and by other occasional divergences from the classic Michis template, such as variation in the number of incisions on the rim band. Other problems of identification are similar to those of Michis Red Rim.

Michis Burnished Rim and Other "Modified Michis" Variants

Identifying Features. These tecomates are clearly related to Michis Red Rim but the rim bands are merely burnished, not slipped. This type registers the loosening of the cluster of classic Michis features, and there is more variability from sherd to sherd in the treatment of the rim. The type is defined as having burnished buff, unslipped rim bands. It occurs alongside a proliferation of other minor variants—Michis White Rim, Michis Brown Rim, and Michis Black Rim—that may be collectively referred to as Modified Michis and that are not separately described here. Aside from the absence of red slip, other attributes of the classic Michis suite vary in their presence. Sometimes the two rim incisions are present, but in other cases they are reduced to a single groove, placed partway down the burnished band. An orange wash on the scraped exterior body remains common.

Illustrations. Figure 8.10a–i.

History. Clark and Cheetham (2005:314) identify the type, which they refer to as Michis Buff and Orange. I think that some Cherla-phase, burnished-rim, Michis-related tecomates do not have the orange wash. It seems unnecessary to exclude them by making the presence of orange definitional.

Sample. 728 rims.

Phase. Cherla.

Paste. Local paste. Some sherds have a gray core, which may be thin or instead take up much of the thickness of the sherd. Paste colors vary from tan to dark brown to gray and include 5YR5/4, 7.5YR4/2, 7.5YR7/4, and 7.5YR6/4.

Surface Finish. Exteriors are scraped but not burnished. They are often covered with an orange wash (2.5YR6/6). Rim bands vary from 3 to 6 cm in width. The color of the burnished area ranges from gray (2.5YR5/0) to tan (7.5YR6/4, 7.5YR7/2, 10YR7/2) to brown (5YR6/3 to 6/1).

Forms. Vessel forms include globular and subglobular tecomates (T1). There are a few tecomates with gently recurved rims that form a slight neck (Figure 8.10b). There are also jars with low, outsloping necks (Form J1), but most of those were classified as Mavi Buff or Coarse. Both of these variants are rare in relation to true (neckless) tecomates, and in both cases the neck forms retain stylistic traits of Michis. There are some fragments of tecomate-like vessels with a constriction in the upper profile that created a convex neck. Those often seem to bear zoomorphic effigies on the neck (Figures 8.10f and 8.10h).

Decoration. Decoration is primarily restricted to incisions around the rim. Some vessels have the standard two incisions (one 2–6 mm from the lip and the other at the margin of the burnished rim band). However, many have just one incision, located typically 10–20 mm from the lip. In these cases there is no incision defining the lower margin of the decorated rim band. A few pieces appear to have had further incisions on the body, and, as already noted, there are some effigies.

Potential Misidentifications. The absence of red slip on the rim and the maintenance of other Michis traits distinguish the type from Michis Red Rim, on the one hand, and from Mavi Buff, on the other. Because of considerable variation within each type, the distinction between Michis Burnished Rim and Mavi Buff is somewhat arbitrary. No single trait is determinative, but the quality of burnishing and the presence or absence of rim incisions are particularly helpful.

Comparisons. What is here termed Michis Burnished Rim appears to have been abundant in Cherla contexts at Cantón Corralito, judging from Cheetham's type collection at the New World Archaeological Foundation; Cheetham (2010a) classified that material as Mavi Buff.

Mavi Buff

Identifying Features. In this successor type to Michis Burnished Rim, the classic Michis set of features is further modified. Defining features include a burnish on vessel rims that is rougher than for the Michis types, leaving noticeable streaks. The burnished areas contrast with unburnished areas either on the exterior below the rim (for tecomates and low-necked jars) or in the interior (for open bowls). Vessel forms, though more extensive than for Michis Burnished Rim, are nonetheless still confined to a narrow range of forms. In the case of open bowls, only the lip and a band around the interior rim are burnished (often delineated with a groove at its lower margin, recalling the Michis practice). Below this band, the interior is well scraped. It is in addition almost always stamped, in any of a variety of ways described below.

Illustration. Figure 8.11.

History. The type is defined by Clark and Cheetham (2005:314). Mavi Buff includes much of the type Tzijón Stamped as defined by Ekholm (1969:Figures 21a–c, 21e–n, 22c, 22f–g). The squared, often grooved lip and burnished interior rim band are characteristic of Mavi Buff bowls.

Sample. 283 rims.

Phases. Cherla.

Paste. Local paste. Paste color is highly variable, ranging from light brown to dark gray to orange (5YR5/3, 10YR6/2, 5YR6/6, 10R6/8).

Surface Finish. The finish is described above. Fire clouding is common, contributing to the typical black-gray of the burnished areas, both on tecomates and dishes.

Forms. Form T1 predominates (70 percent). Also relatively common are B1a (10 percent), BR5 (9 percent), and J1 (4 percent). Other forms include B4, J2, and a few thick-walled tecomates (T5, T6).

Decoration. There is sometimes patterned burnishing on the exterior walls of tecomates and rounded-walled bowls. In very rare cases, tecomates bear exterior incising such as zoned cross-hatching. Effigies are more common than in the Michis types. Stamping is of various kinds, though plain-line rocker stamping is the most common. (The line in that case is not dentate as in typical shell-edge rocker stamping; the tool here is uncertain, but a shell with a smooth edge would have worked.) Other forms of stamping include string stamping and shell-back stamping (distinct from the more common shell-edge stamping). In some cases it appears that a stick was lightly dragged across the surface to simulate rocker stamping.

Potential Misidentifications. Challenges of recognition differ by vessel form. In the case of tecomates and jars, the big challenge is to distinguish Mavi from Michis Burnished Rim. The types are polythetic sets that grade into

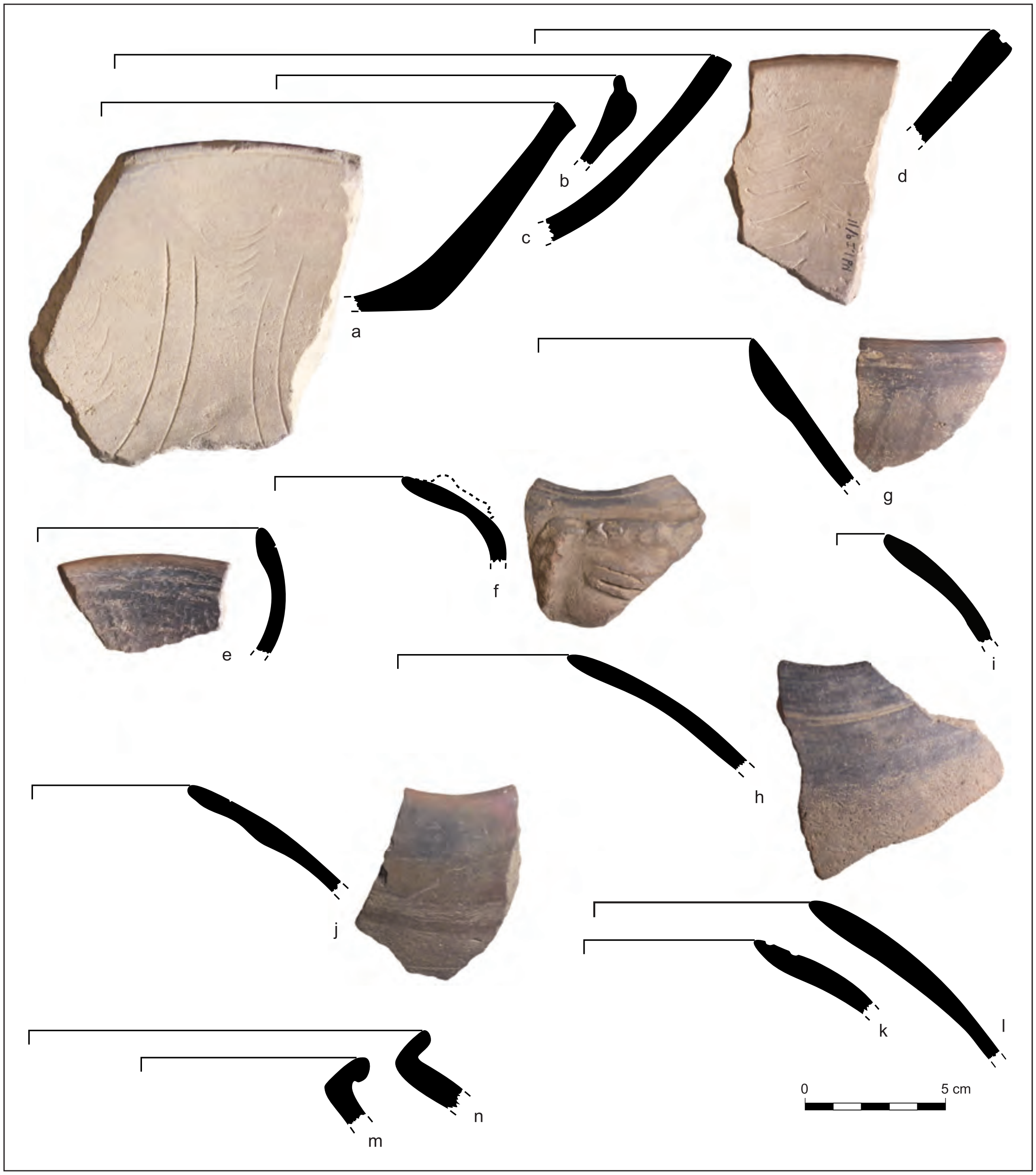


Figure 8.11. Mavi Buff type: (a, b, c) bowls classified as B1; (d) grooved-lip bowl (BR5); (e) rounded-walled bowl (B4); (f) tecomate (T); (g–h, j–l) plain-walled tecomates (T1); (i) incurving-walled bowl (B5); (m, n) plain jars with low, outflaring necks (J1).

each other, and any division between them will be to some extent arbitrary. On the one hand are Michis Burnished Rim tecomates with smooth, well-burnished rim bands. On the other hand are the Mavi tecomates with streaky burnished rim bands that often take a gray-black appearance due to the color of the underlying paste. However, many rims are hard to assign easily to one of those sets or the other. Features that prove helpful for distinguishing Mavi Buff are the absence of orange wash on all vessel forms and the rarity of circumferential rim incisions on tecomates. The challenges in the case of dishes are different since this form is unknown in Michis. There is potential for confusion with black and gray types, but if the rim sherd is large enough, Mavi dishes are easily recognized because the interior is left unslipped, an unusual trait in the collection. Mavi bowls are distinguished from Guijarra Stamped by the burnished rim band; the common flattened, grooved lip (Form BR5); and the prevalence of rocker stamping. The last trait is virtually unknown in Guijarra (though there is shell-back stamping). Plain-line rocker stamping is strongly associated with Mavi.

Comparisons. Mavi Buff is characteristic of the Cherla phase and is mainly known from sites in the Mazatán region, including Aquiles Serdán and Cantón Corralito. Burnished-rim Mavi bowls, however, appear to have been rare at Cantón Corralito. Cheetham classified a few examples as Pino Black (Cheetham 2010a:589 and in the bags for Forms 2 and 3 in the Corralito type collection). The strong presence of Mavi Buff bowls at Izapa (part of Ekholm's Tzijón Stamped) indicates a Cherla component at that site.

Mavi Red and Buff

Identifying Features. This type is a minor one at Paso de la Amada, where it appears to be a decorative variant of Mavi Buff. Red slip is applied on part or all of the rim of forms similar to those described for Mavi Buff. Tecomates in which the burnishing extends farther down the vessel wall than the red-slipped band are particularly distinctive; that is a trait completely unknown in the Michis types.

Illustration. Figure 8.12.

History. The type is defined by Clark and Cheetham (2005:314–16).

Sample. 47 rims.

Phases. Cherla

Paste. Similar to Mavi Buff.

Surface Finish. Rims of open bowls or tecomates are slipped a dark red (7.5R4/4 to 5R5/3).

Forms. T1 (28 percent), BR5 (26 percent), B4, J1, and a variant of B1 with a flat lip (essentially BR5 without the groove).

Decoration. Open bowls typically have stamping on the unslipped interiors, as described for Mavi Buff. There is a similar range of stamping techniques. Tecomates are occasionally decorated with slipped and/or burnished bands, either vertical or circumferential, below the rim (Figure 8.12i).

Potential Misidentifications. Mavi Red and Buff bowls are distinctive due to the combination of red slip with scraped interiors. Likewise, the tecomates are hard to mistake for Michis Red Rim because of their numerous deviations from the classic Michis set of traits.

Comparisons. At Cantón Corralito, as at Paso de la Amada, Mavi Red and Buff is a minor type, especially when we consider that, given type definitions employed in the present study, perhaps half of the Corralito Mavi Red and Buff would be classified as Michis Red Rim. (See comments for the latter type.) Mavi Red and Buff may have been more important at Aquiles Serdán. In the general Mazatán type collection at the NWAF are decorative modes in Mavi—particularly brushing below the rim band—that anticipate Guamuchal tecomates of the Cuadros phase. Those are unknown at Paso de la Amada.

RED TYPE CLASS

The red-slipped type class is particularly prominent at Paso de la Amada. The 5,073 Red rims comprise 39 percent of identifiable sherds. Red slips predominated in the Locona and Ocós phases. A distinctive, specular red slip, with minute flecks of hematite that sparkle when a sherd is held up to the light, is diagnostic of Chilo Red, a type that makes up 58.1 percent of identified rims in the type class. It was prevalent in the Locona phase, whereas a non-specular red type (Paso Red; 37.8 percent of unidentified red rims) was common in the Ocós phase. Chilo and Paso Red differ not only in the presence and absence of specular hematite but also in hue and/or chroma. Chilo Red is a dark red (7.5R3/6, 10R4/4), whereas Paso Polished Red is a more orange-red (2.5YR4/6). These are by far the most common of the red types identified. Only sherds that could be satisfactorily analyzed according to both criteria (hematite inclusions and color) were assigned to one of these types. The distinction was often difficult because (1) even in well-preserved collections there is a gradation between these two slips in terms of both color and amount of hematite inclusions; (2) in eroded sherds the tint of red could not always be determined; and (3) tiny flecks of mica appeared in the paste of many sherds, making eroded Paso Red sherds appear to sparkle like Chilo Red. Many sherds that were almost certainly either Chilo or Paso were identified to the Red type class only (2,537 rims, constituting 50 percent of the type class). Two other types (Tusta and Cotan Red) date principally to the Barra phase and make only a minor appearance in this collection (2.2 percent and 1.0 percent of the identified Red rims). Gallo Pink on Red, although a bichrome, is described here because the fugitive pink easily erodes, in which circumstances the sherd would be classified as monochrome red (0.8 percent of identified Red rims). Two rim sherds were identified as the Jocotal-phase type Xquic Red (Green and Lowe 1967:116, 118), not described here.

Chilo Red

Identifying Features. The red slip is dark in contrast to the other common red type, Paso Red, and it is mixed with specular hematite so that sherds sparkle when held to the light. The sparkle has a silvery quality rather than the yellowish of the mica flecks that occur naturally in the paste of most sherds in the collection.

Illustration. Figure 8.13.

History. This type was first identified for La Victoria by Coe (1961), who named it Ocós Specular Red. That type name was used also in reporting Altamira, Izapa, and Paso de la Amada (Ceja Tenorio 1985:70–72; Ekholm 1969:35–36; Lowe 1967:104). When Clark divided the Ocós phase into three separate phases—Locona, Ocós, and Cherla—he found that Ocós Specular Red characterized the Locona phase rather than the newly narrowed Ocós phase. Clark

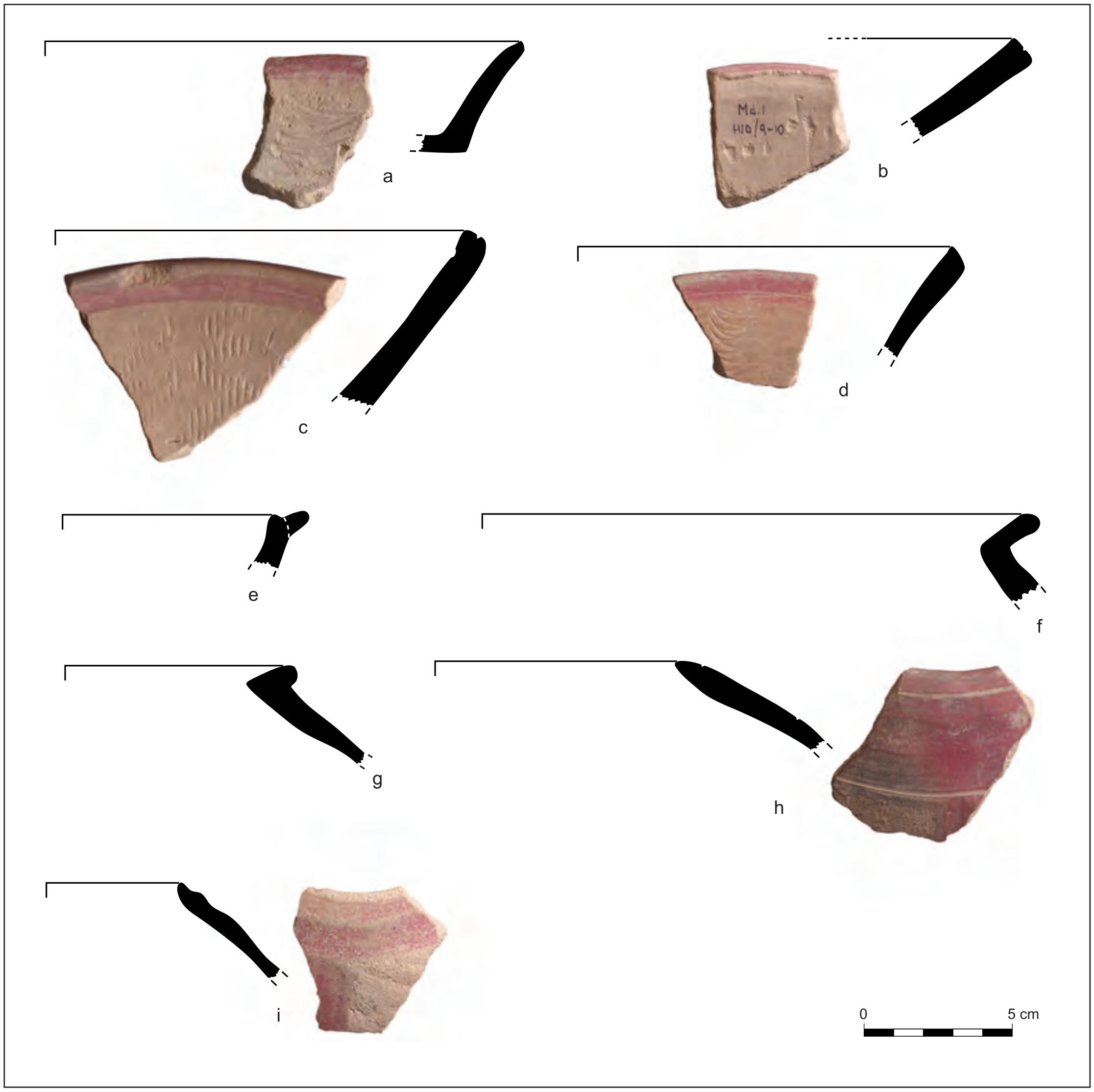


Figure 8.12. Mavi Red and Buff type: (a, d) open bowl (B1); (b, c) grooved-lip bowls (BR5); (e) bowl with modeling on rim; (f–g) plain jars with low, outflaring necks (J1); (h–i) plain-walled tecomates with red rims (T1).

therefore gave Ocós Specular Red a new name: Chilo Red (Clark and Cheetham 2005:301–3).

Sample. 1,473 rims.

Phases. Locona into Ocós.

Paste. A local paste. The color is usually brown (7.5YR6/4, 7.5YR7/4, 10YR6/4), varying occasionally to gray or reddish (2.5YR5/4), sometimes with a gray core.

Surface Finish. The red slip appears on the exteriors of tecomates and on the interiors and often the exteriors of bowls. The slip color is 7.5R5/4 to 7.5R4/4 or 10R4/4. Clark and Cheetham record colors of 5R3/6–8 and 10R3/6 for Chilo Red, but in the collection reported here, surface colors are less dramatic than that.

Forms. The most common forms are B1 (26 percent, with B1a outnumbering B1b by five to one), T2a (19 percent), BR1a–d (10 percent), BR2 (7 percent), and BR3 (7 percent). Other forms include B2b, B3, B4, B5, B6, B7, B8, B9, BR4, BR5, BR6, BR7, BR8, T2b, T2c, T2d, T3, and T4.

Decoration. Certain decorative embellishments are characteristic of particular vessel forms, such as circumferential channeling or gadrooning on the rim of form BR2, notching along the outer edge of the rim on the same form, and radial gadrooning on the thickened ("piecrust") rims of BR3. Other decoration consists most typically of circumferential grooves near the rims of tecomates, rounded bowls, and modified-rim dishes. Some rims are elaborately modeled, and there are occasionally effigies, either

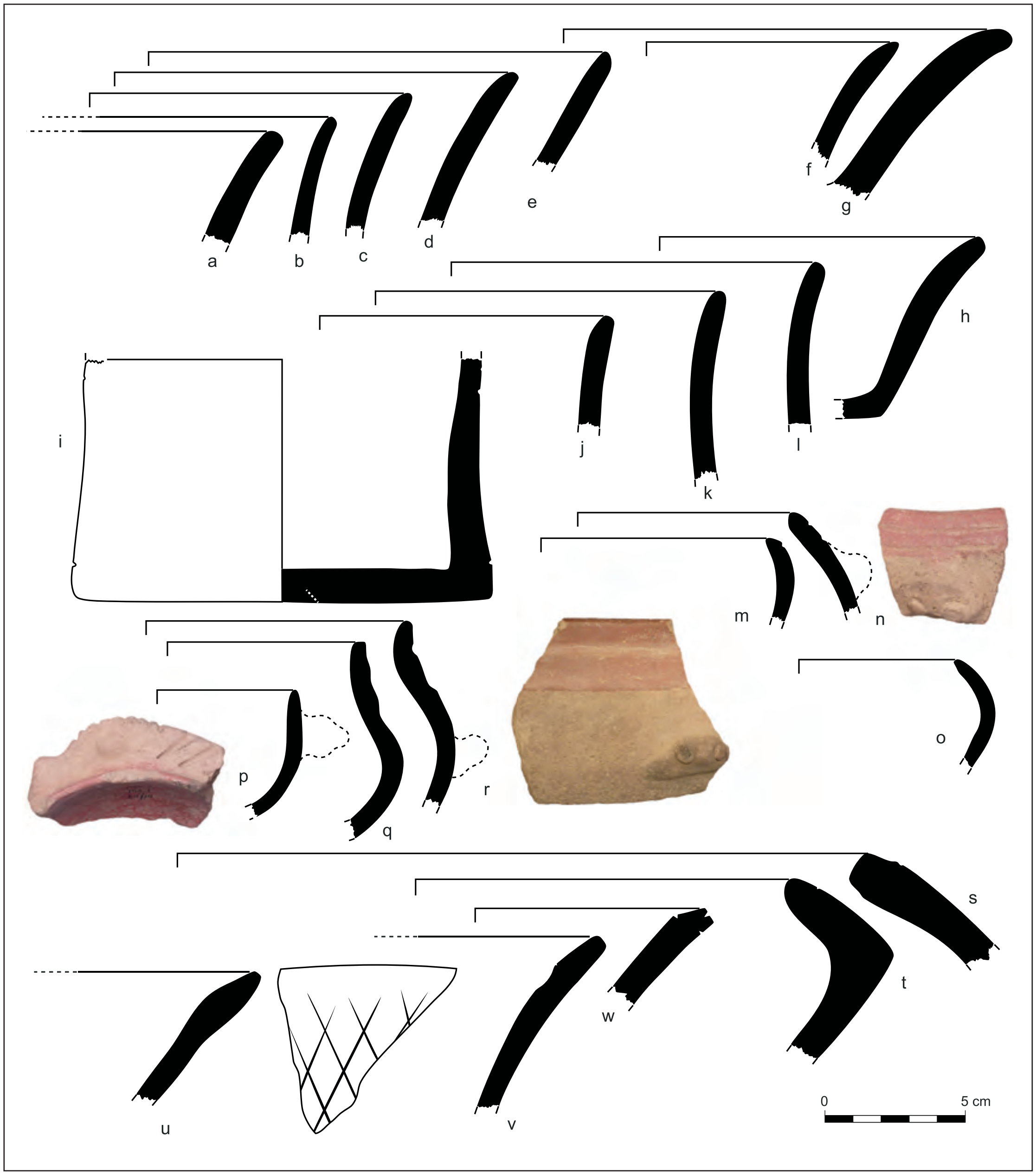


Figure 8.13. Chilo Red type: (a–f) open bowls with outsloping walls (B1a); (g–h) open bowls with outcurving walls (B1b); (i–l) vertical-walled bowls (B3); (m) rounded-walled bowl (B4); (n–o) incurving-walled bowls (B5), one with toad effigy; (p) rounded-walled bowl (B4) with fish effigy; (q–r) rounded-walled bowls with necks (B8); (s–t) shouldered basins (B9); (u–v) miscellaneous beveled-rim bowls (BR1c variants); (w) beveled-rim bowl with direct, beveled rim (BR1a); (x) beveled-rim bowl with thickened rim and spaced notches (BR1b variant); (y–aa) beveled-rim bowls with thickened beveled rims (BR1b); (bb–ee) bowls with everted beveled rims (BR1c); (ff–gg) more miscellaneous beveled-rim bowls (BR1c variants); (hh–nn) wedge-rim bowls (BR2); (oo–pp) grooved-lip bowls (BR5); (qq–tt) piecrust rim bowls (BR3b); (uu–vv) notched-rim bowls (BR6); (ww–bbb) slipped tecomates (T2a); (ccc–ggg) slipped tecomates with grooved rims (T2b); (hhh) slipped tecomate with vertical gadrooning (T3a); (iii–jjj, qqq) miscellaneous slipped tecomates (T2); (kkk–lll) slipped tecomates with beveled rims (T2c); (mmm, ppp) flat bases of slipped tecomates; (nnn) tecomate with reverse S profile and sets of horizontal grooves; (ooo) tecomate with reverse S profile and vertical gadrooning.

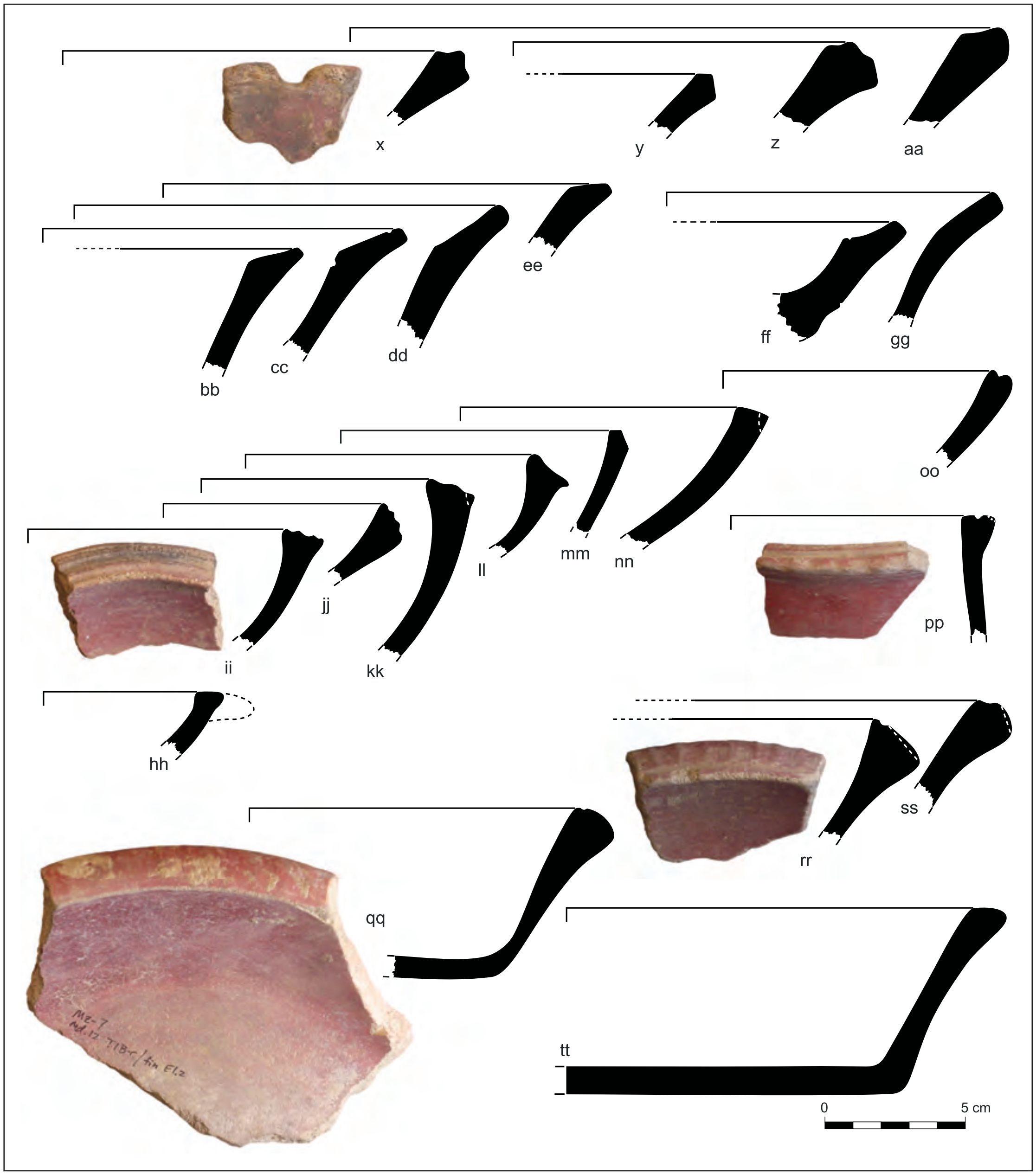


Figure 8.13. *continued*

along the outer rim of beveled-everted-rim bowls or attached to the exterior of rounded-walled bowls. Occasionally the interiors of flat-based bowls are decorated with grooving or other surface modification. The tecomate rim forms T2b and T2c are particularly characteristic of Chilo Red tecomates. There is also occasionally vertical fluting or gadrooning on the exterior walls of tecomates. Rarely the form BR3 is elaborated with vertical exterior ribbing (or other embellishment) below the modified rim. Forms B4 and B9 sometimes have unslipped exteriors below a relatively wide rim band and stick gouges, fingernail gouges, or shell-edge stamping on the unslipped exterior.

Potential Misidentifications. In eroded collections, Chilo Red can be difficult to distinguish from Paso Red. If it is necessary to make predictions based on vessel form, BR1b, BR1c, and BR2 are more often Chilo, whereas BR3b–d and BR7 are more typically Paso Red. Observation of well-preserved assemblages, however, indicates that form does not always predict surface finish.

Comparisons. Chilo Red was a common Locona-phase type and its deep red, specular surfaces are one of the important markers for the phase. The type is reported as Ocós Specular Red from Paso de la Amada (Ceja Tenorio 1985:70–72), Altamira (Lowe 1967:105), Izapa (Ekholm

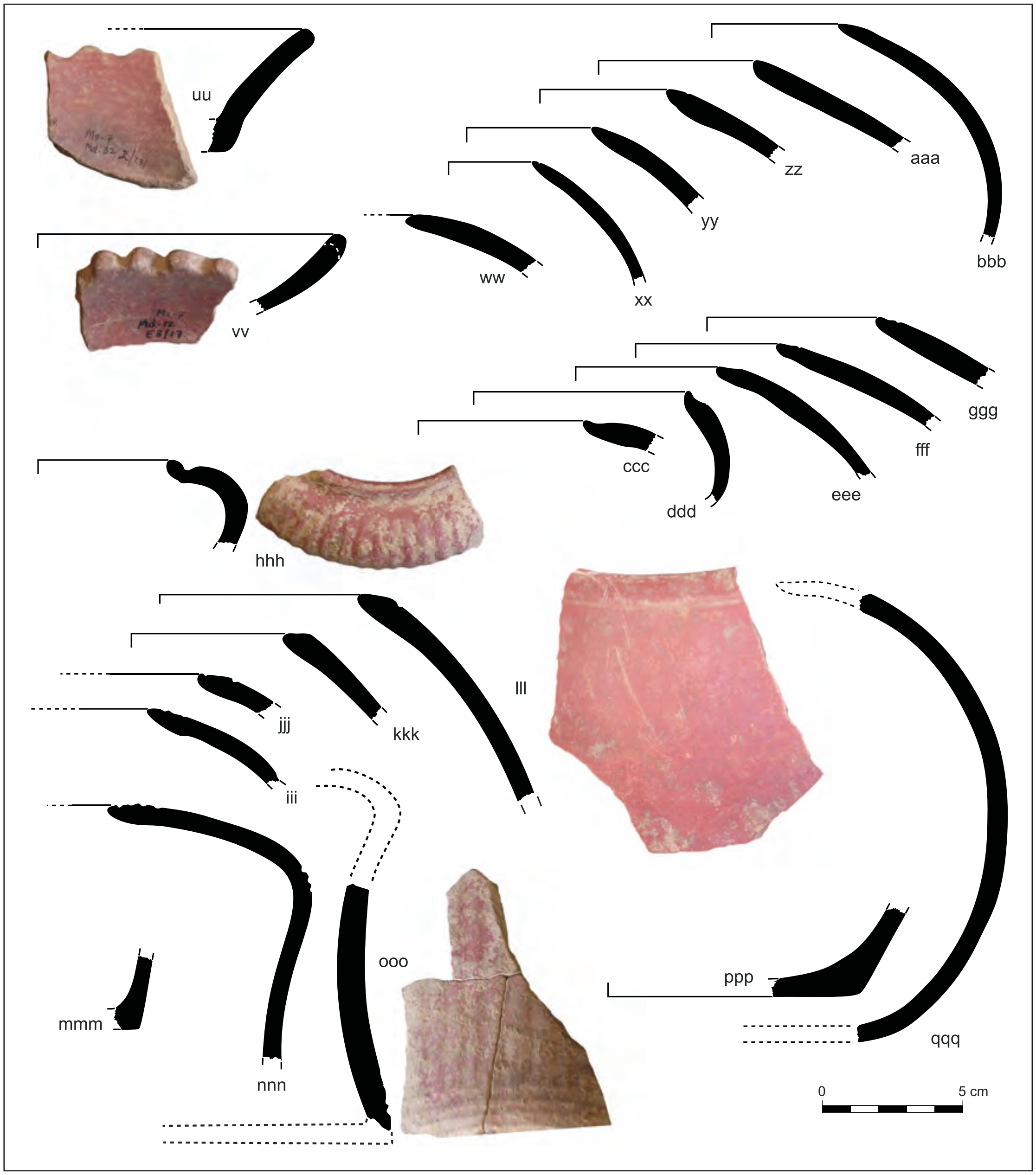


Figure 8.13. *continued*

1969:35–36), and La Victoria (Coe 1961:51–53).

Paso Red

Identifying Features. The slip of Paso Red is not specular, and the color tends toward orange, in contrast to the darker red of Chilo. Paso is a common type that gradually replaced Chilo Red during the Ocós phase. The type shares most vessel forms with Chilo, but with shifts in frequency between different specific rim modifications of bowls.

Illustration. Figure 8.14.

History. The type Paso Polished Red was defined by Ceja Tenorio (1985:56–65) in previous work at Paso de la Amada. Clark and Cheetham (2005:309) shortened the name to Paso Red.

Sample. 959 rims.

Phases. Ocós and Cherla.

Paste. Local paste. The color is brown (7.5YR5/4, 7.5YR7/6, 10R6/3–5/3, 10YR6/4–5/4), often with a gray core. Fire clouding on vessel surfaces is rare.

Surface Finish. Red slip was applied to the exteriors of tecomates and to the interiors (sometimes also exteriors) of open forms. A common Ocós surface finish scheme for bowls, appearing in a variety of colors including Paso Red,

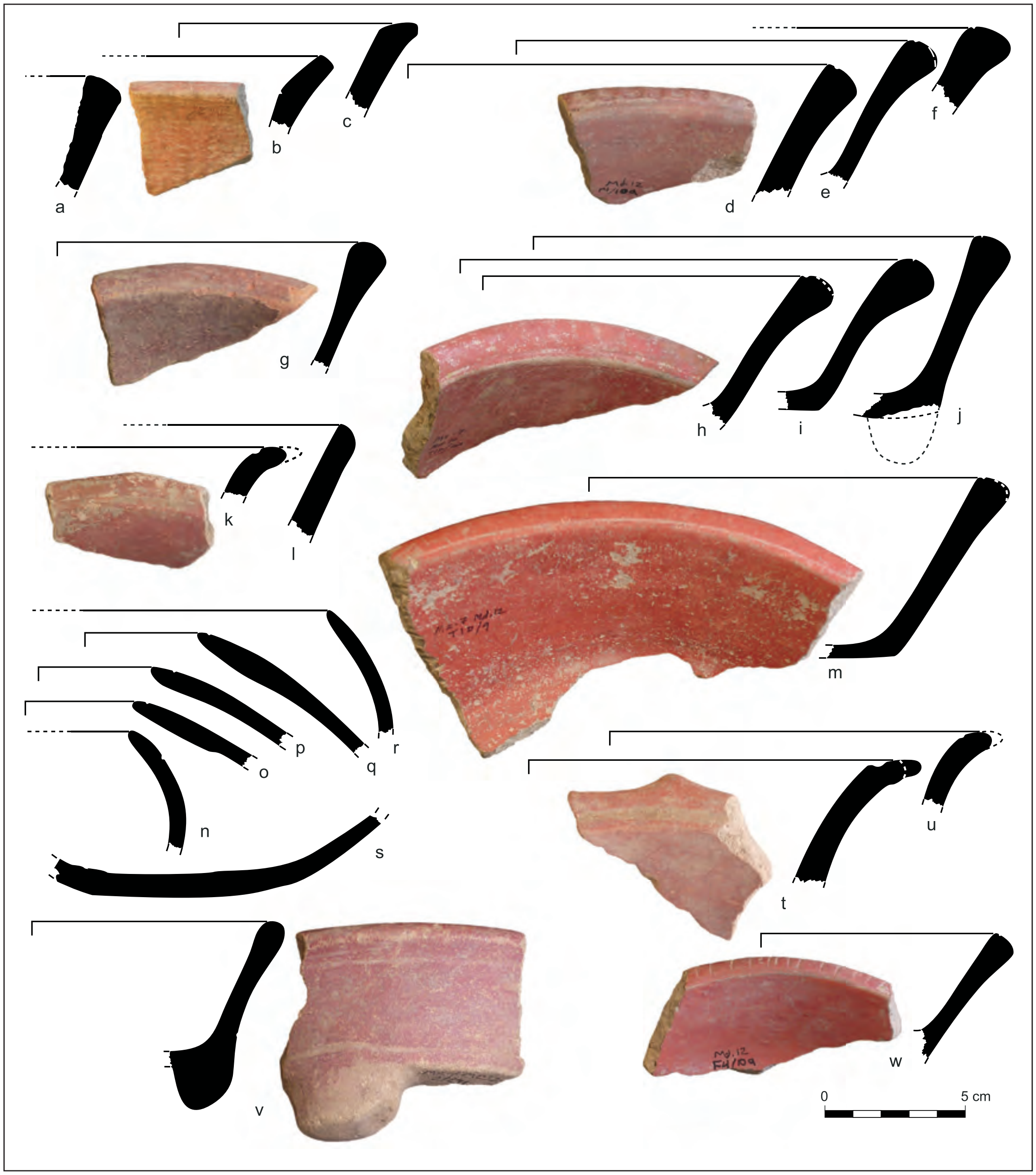


Figure 8.14. Paso Red type: (a) variant of thickened-rim bowl (BR4) with pre-slip stamping on rim and exterior; (b) bowl with everted beveled rim (BR1c); (c) beveled-rim bowl with direct, beveled rim (BR1a); (d–f, h–j, m, w) piecrust rim bowls (BR3b); (g) piecrust rim bowl with angled gadrooning (BR3c); (k–l, t, u) undulating-rim bowls (BR7); (n–r) slipped tecomates (T2a); (s) slightly flattened tecomate base; (v) thickened-rim bowl (BR4); (x–aa) open bowls (B1); (bb) low, vertical-walled dish (B2b); (cc–ee) open bowls with outsloping or slightly outcurving walls (B1a); (ff, nn) bowls; (gg–jj) open bowls with distinctly outcurving walls (B1b); (kk–ll) lids (L); (mm, uu–xx) large shouldered basins (B9); (oo–pp) incurving-walled bowls (B5); (qq–rr) rounded-walled bowls (B4); (ss–tt) vertical-walled bowls (B3).

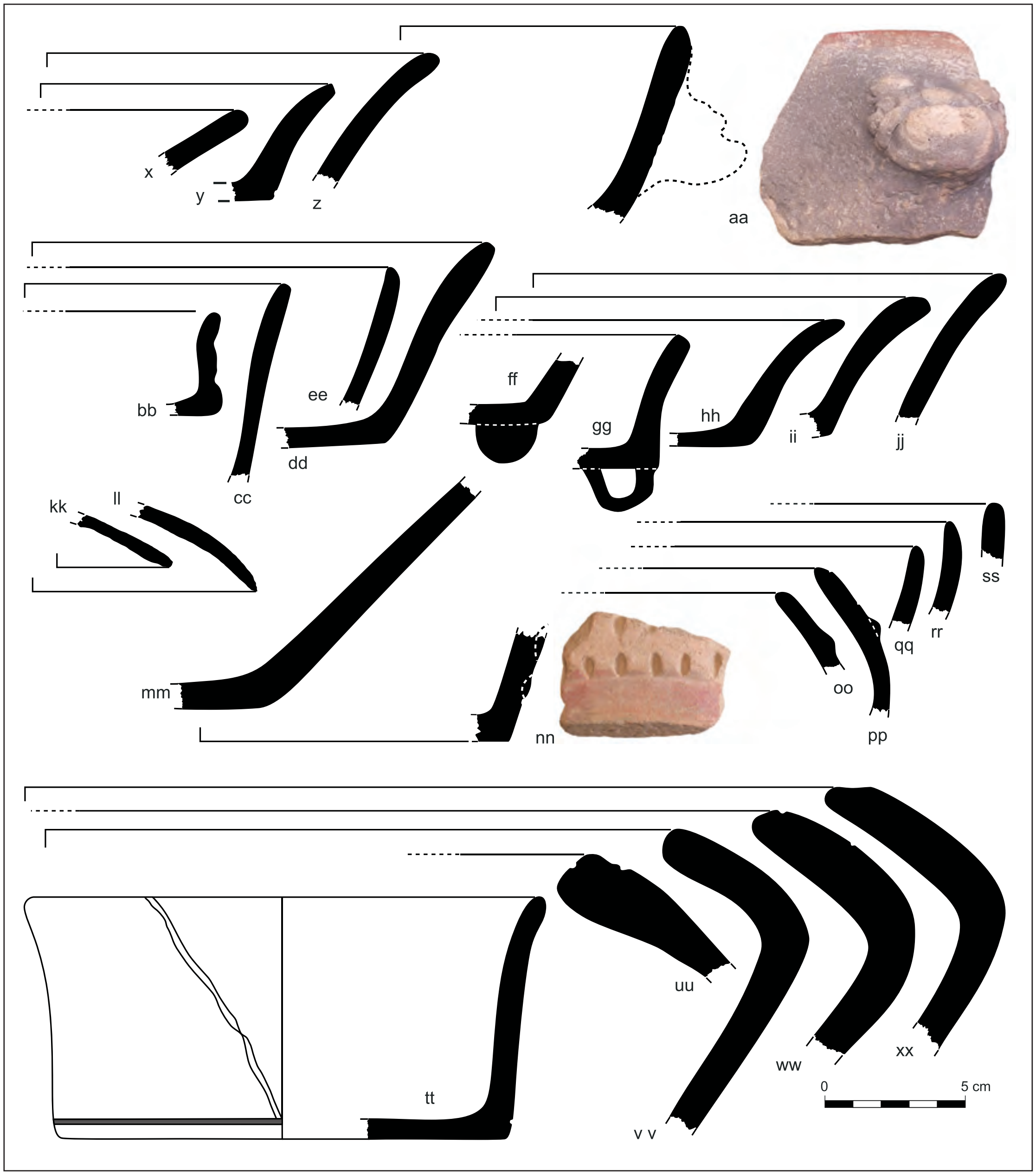


Figure 8.14. *continued*

is a slipped interior and a carefully scraped exterior. Slipping (or simply burnishing) of exteriors on bowls becomes more prevalent in the Cherla phase. Slip colors include 7.5R6/8 and 10R5/6 but also 7.5R4/4 to 4/6.

Forms. Common forms include B1 (39 percent, with B1a outnumbering B1b 1.4 to 1.0; compare to Chilo Red), BR3a–d (20 percent), T2 (13 percent), and BR7 (8 percent). Other forms include B2b, B3, B4, B5, B7, B9, BR1a–d, BR2, BR4, BR5, BR6, BR8, BR9, L, and T3. Some B1 or B3 bowls have four short, solid supports.

Decoration. There is occasional pre-slip grooving, generally circumferential and associated with the rim of bowls or tecomates. Bowls, including BR1, BR2, BR3, and BR7, often have modeled rims. Bowls with low vertical walls sometimes have exterior horizontal, circumferential channeling or gadrooning (B2b). Effigies are similar to those in Chilo Red. Toads are most common. Head and appendages were applied on the exterior walls of B4 bowls such that the vessel itself becomes the body of the toad (Figure 16.4a). Unslipped exteriors of B3, B4, and B9 bowls are occasionally decorated with fingernail gouges, stick gouges, or shell-edge rocker stamping. Very rarely, tecomates classified as Paso Red exhibit pre-slip shell-back or other stamping. Of the variants of BR3, the exaggerated BR3a is unknown in Paso Red. BR3b is the most common, and in many cases the radial gadrooning is quite faint. Variants BR3c and BR3d (with oblique gadrooning and radial grooving, respectively) are more common in Paso Red than in any other type.

Potential Misidentifications. In the collection under consideration, distinguishing between Chilo Red and Paso Red in eroded collections is difficult. (See comments for Chilo Red.) The paste and color of the Barra-type Tusta Red overlap with those of Paso. There appears to be only a trace of Tusta in the collection reported here. Tusta sherds have been identified primarily based on vessel form and decoration.

Comparisons. Paso Red gradually replaced Chilo Red during the Ocós phase, becoming one of the most common types. Coe's (1961:51) Ocós Red Burnished from La Victoria, with a slip color of 10R4/7, may be an equivalent of Paso Red in the lower Naranjo River region. Lowe (1967) identified only Ocós Specular Red (Chilo Red) at Altamira. Ekholm (1969:25–27) reported Tustlán Red from Izapa, in addition to Ocós Specular Red. The forms are similar to Paso Red, with B2 and BR3 (including BR3c and BR3d). The color (7.5R4/6) is close to that observed here for Paso Red. Ceja Tenorio's (1985:56–65) Paso Polished Red is clearly the same thing described here as Paso Red. In a Cherla collection from Cantón Corralito unmixed with Ocós, Cheetham (2010a:578–82) documents the continuity of Paso Red into the former phase, in which it constitutes 9 percent of rim sherds, making it the fifth-most-common type. However, about 19 percent of Cheetham's Cherla collection consists of domed censers, which for the collection reported here were assigned—based on lack of burnishing—to the Coarse type class. Other forms mainly match those reported here, including Form B9 (Cheetham's Form 11), demonstrating a degree of local continuity from the Locona phase. Only the jar forms he reports (Cheetham's Forms 13, 14, and 21) are unknown at Paso de la Amada. Based on a review of his very helpfully labeled type collection, the last two of these are completely unknown at Paso de la Amada. The first, Form 13, would be more appropriately classified to the Michis–Mavi continuum than to Paso Red. The form is a low-necked jar with an orange wash on its scraped, unburnished body. The interior of the rim is burnished, and, in an apparent nod to Michis conventions, there is a single circumferential groove partway down the burnished band. It appears to be an intriguing case of the decorative template of Michis Burnished Rim (Clark and Cheetham's [2005] Michis Buff and Orange) transferred from tecomate to jar.

Gallo Pink-on-Red

Identifying Features. This type is contemporaneous with Chilo Red. A thin iridescent pink paint was applied atop the dark red slip. Designs in bowl interiors are usually diagonal bands. On tecomates and perhaps occasionally bowls, the bands of pink are delimited with grooves. This type was probably more extensive in the collection than reported here. Some sherds identified as Chilo Red were probably originally Gallo, but all trace of the iridescent paint has eroded away.

Illustrations. Figure 8.15c–g. Two sherds of a variant, Gallo Pink-on-Brown, are illustrated in Figure 8.15a–b; those were the only such sherds identified. The type is not otherwise described here.

History. Coe (1961) first recorded the use of iridescent paint atop red in Initial Formative material from La Victoria; he did not separate painted sherds from his Ocós Specular Red. Gallo Pink on Red was defined by Clark and Cheetham (2005:303).

Sample. 20 rims.

Phase. Locona

Paste. Similar to Chilo Red.

Surface Finish. The red base color is 7.5R4/4.

Forms. BR1c, BR2, B1, T2a, and T2c.

Decoration. The iridescent pink was painted in bands on the interiors of bowls, especially Forms BR1c and BR2. Gallo tecomates were elaborately decorated with curvilinear motifs and overall design schemes similar to the later Amada Black-to-Brown.

Potential Misidentifications. The pink paint is easy to miss even in relatively well-preserved collections, in which case the sherd might well be classified as Chilo Red.

Comparisons. Neither Lowe (1967) for Altamira nor Ekholm (1969) for Izapa report iridescent paint over red. Coe and Diehl (1980:137) remark on the lack of that technique also in Ojochí-phase San Lorenzo. At La Victoria, the use of iridescent paint on Locona serving vessels may have been more widespread than at Paso de la Amada. Coe (1961) reports iridescent paint on Ocós Specular Red, Ocós Buff, and Ocós Iridescent. (In the last case, the interior or exterior is entirely covered in iridescent slip.)

Tusta Red

Identifying Features. These are orange-red-slipped, flat-based tecomates with modeled exteriors.

Illustrations. Figure 8.16a–e.

History. This is defined by Lowe (1967:104) as a relatively minor type. He does not mention the fluting characteristic of specimens identified as Tusta in the collection reported here. In Ceja Tenorio's (1985) report on Paso de la Amada, there is some confusion about the name of the type (compare page 49, the Figure 30 caption, and the table of contents). Again, Ceja's description does not particularly match the sherds identified here as Tusta. The conception of the type used here is that of Clark and Cheetham (2005:293).

Sample. 26 rims.

Phases. Barra and earlier Locona.

Paste. Local paste.

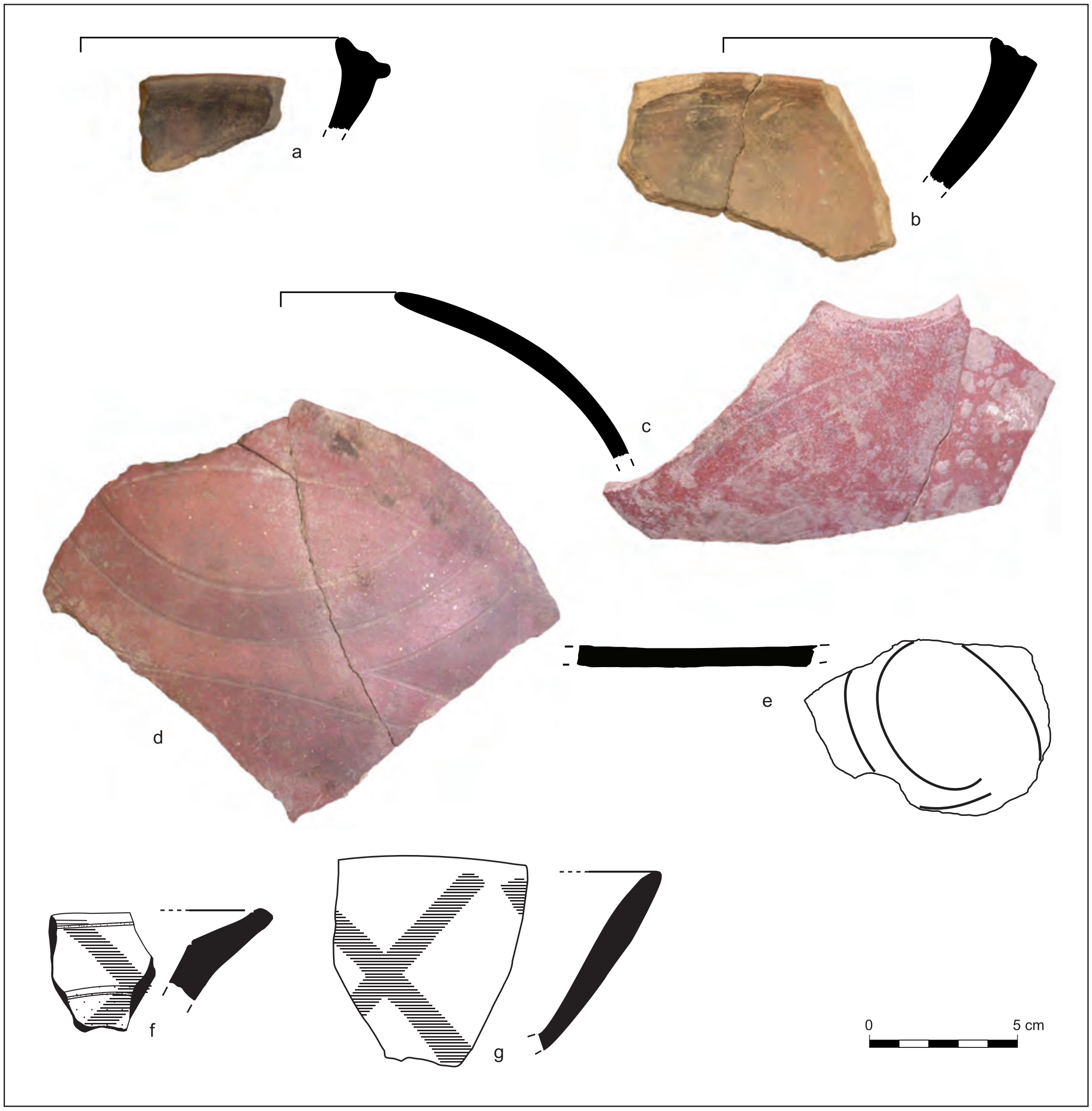


Figure 8.15. Gallo types. Gallo Pink-on-Brown: (a, b) wedge-rim bowls (BR2). Gallo Pink-on-Red: (c, d) tecomates; (e) flat base of bowl with incised spiral; (f) everted beveled-rim bowl (BR1c); (g) open bowl (B1).

Surface Finish. Slipped orange-red exteriors and unslipped interiors.

Forms. Tecomates with flat bases.

Decoration. Exterior modeling is usually in the form of vertical or diagonal fluting—or, less often, ribbing.

Potential Misidentifications. Although the slip color and paste characteristics of Tusta Red overlap with those of Paso Red, mistaken identifications as Paso Red are unlikely due to radical differences in form.

Comparisons. This is a Barra-phase type that probably continued in use into the early part of the Locona phase. It was recovered in trace amounts in the collection described here. Identification of Tusta sherds relied heavily on the characteristic vessel form (flat-based tecomates) and the striking exterior fluting (or ribbing) that matches some of the several decorative schemes for this type illustrated by Clark and Cheetham (2005; see especially their Figure 7m–s).

Cotan Red

Identifying Features. These red-slipped vessels are confined to tecomates in the collection described here. There is patterned grooving and/or ridging on the bodies.

Illustrations. Figure 8.16f–g.

History. The type was defined by Lowe (1967:97–100) as Cotan Grooved Red and reported previously from Paso de la Amada by Ceja Tenorio (1985:41–45) as Co-

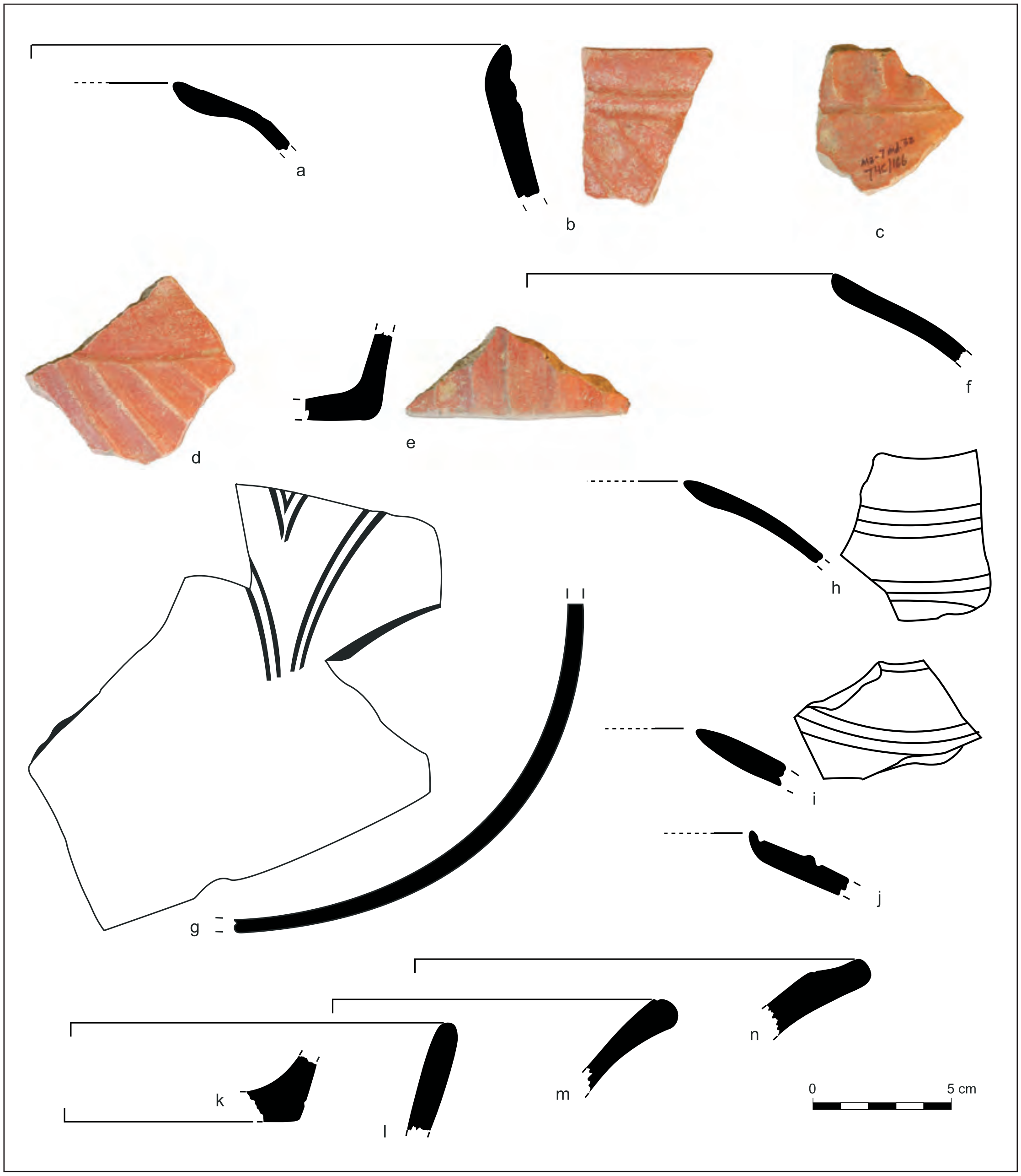


Figure 8.16. Three minor types. Tusta Red: (a–e) tecomates with fluted exteriors (T3). Cotan Red: (f, h–i) grooved tecomates (T2); (g) tecomate with patterned exterior grooving (T2); (j) grooved tecomate with raised lip (T2d). Alba Red-on-White: (k) flat base of open bowl; (l) open bowl with outsloping walls (B1a); (m) piecrust rim bowl (BR3); (n) beveled-rim bowl (BR1).

tan Grooved. Clark and Cheetham (2005:293) call it Cotan Red.

Sample. 56 rims.

Phases. Barra and early Locona.

Paste. Local paste.

Surface Finish. The tecomates have scraped interiors and slipped exteriors. The slip is darker in color than that of Tusta Red (10R3/6).

Forms. Tecomates, sometimes with a raised lip.

Decoration. In the small collection under consideration here, decoration is limited to patterned grooving in sets of parallel grooves and to ridges associated with the rim.

Potential Misidentifications. Like Tusta Red, this type makes only a trace appearance in the collection reported here. One helpful identifying feature observed by Clark and Cheetham (2005:293) is that as the slip of Cotan Red erodes, it flakes off in tiny spalls to leave a speckled appearance on the exterior surface. This sort of pattern is characteristic to the type and is of help in distinguishing it from other reds. The patterned grooving is also characteristic.

Comparisons. Cotan Red is an important type in the Barra phase and is known primarily from the Mazatán zone of the Soconusco (Ceja Tenorio 1985; Clark and Cheetham 2005; Lowe 1967).

BROWN-ORANGE-PINK TYPE CLASS

This type class repeatedly frustrated attempts to break it down into a replicable and logically coherent set of types. The 935 rim sherds in question—constituting about 7 percent of rims identified to a type class—are slipped brown, orange, or pink and are moderately to well burnished. However, brown grades into orange, which grades into pink, which in turn grades into gray and (of course) into brown. Two orange types are distinguished here based on replicable surface treatment attributes. The browns proved more challenging, in part because of an overabundance of choices. Clark and Cheetham (2005) identify three separate brown types for the Locona, Ocós, and Cherla phases: Colona Brown, Paso Brown, and Bala Brown, each corresponding, respectively, to one of the three phases. Serdán Brown, a name used by Clark in the early 1990s and in some of my early classifications, has dropped out of Clark's current typology. In the face of so many choices that seemed to me distinguishable for only a limited set of the full range of vessel forms and/or by appeal to stratigraphic information, I often classified brown-slipped pottery as simply "brown" (38 percent of identified rims in the type class).

Brown slips range greatly from light to dark within each phase. The type Colona Brown as described here is most representative of the browns in Locona to late Locona contexts. In my view, Ocós-phase browns cannot be reliably distinguished sherd by sherd from those of the Locona phase, even though as a set, the mix of vessel forms is somewhat different. Minor types not described here include Bayo Brown (22 rims), Casnel Black on Orange (one rim), Salta Orange (four rims)—all Barra-phase types described by Clark and Cheetham (2005)—and one rim of Arenera Orange (Green and Lowe 1967:114).

Papaya Orange-Pink

Identifying Features. Vessels of this type share many attributes with contemporaneous brown-slipped pots of the Locona and Ocós phases. Orange sherds were separated primarily on the basis of color. There tends to be a clearer division between orange and brown in the Locona phase. In the Ocós phase, the division is less clear, with more of a continuum from brown through pink-gray to orange. Forms overlap with those of contemporary red types, but some particularly exaggerated rims of Forms BR1 and BR3 are significantly more common in Papaya (and/or Colona) than in any other type.

Illustration. Figure 8.17.

History. The type Papaya Orange was defined by Clark and Cheetham (2005:303)

Sample. 131 rims.

Phases. Locona and Ocós.

Paste. Local paste.

Surface Finish. Open bowls are usually slipped on both sides, though sometimes the exterior is scraped only. During the Locona phase, colors are more uniform and tend more toward orange (2.5YR6/6). They are more typically clouded with gray in Ocós (2.5YR7/6 mottled with 2.5YR6/0, 2.5YR6/2, 2.5YR3/0, and 2.5YR5/2). Portions of the surface can be quite pink (2.5YR8/2 or 7/2).

Forms. Common forms are BR1c, Bla, BR6, and T2a. Other forms include B1b, B3, B4, B5, BR1a, BR1b, BR2, BR3a, BR3b, BR5, L1, T2b, T2c, and T3.

Decoration. Some tecomates have subtle exterior fluting, and there are sometimes grooves on or near the rims of bowls and tecomates.

Potential Misidentifications. Papaya Orange-Pink can be difficult to distinguish from Colona Brown of the Locona and Ocós phase. The division between these two types is ultimately arbitrary. The more important issue is the distinction between Papaya and Aquiles Orange, and here there are a number of useful distinctions despite an overlap of surface color. Aquiles Orange sherds tend to be thinner and somewhat harder-fired than Papaya. Within Cherla collections, the typological challenge is distinguishing them from Bala White rather than (as for Papaya) from Colona Brown and Mijo Black and White. Mottling on Aquiles sherds tends toward staining in white and black rather than the cloudy gray of Ocós-phase Papaya or the brownish tinge of Locona Papaya.

Aquiles Orange

Identifying Features. This type is characterized by thin-walled, orange-slipped vessels in forms typical of other Cherla-phase types, particularly Pino Black and White and Bala White.

History. Defined by Clark and Cheetham (2005:316).

Sample. 43 rims.

Phases. Cherla.

Paste. Local paste. The color is brown to gray, similar to Bala White. There is sometimes a gray core.

Surface Finish. Surfaces are slipped. The color is a mottled orange (2.5YR6/6), white, brown, and gray, in which orange is particularly prominent.

Forms. B1a, B1b, B3, B4, B5, BR1a, BR6, J1, and T2.

Decoration. Decoration is rare. The bowls sometimes have a single exterior circumferential groove below the rim. Some BR6 bowls have a direct rim and notched lip.

Potential Misidentifications. See discussion of Papaya Orange.

Figure 8.17. Papaya Orange type: (a–f, i) open bowls with outsloping or slightly outcurving walls (B1a); (g) open bowl with outcurving walls (B1b) and circumferential grooves and ridges; (h) vertical-walled bowl (B3); (j) heavy bowl with circumferential ridges and three supports that have been broken and ground to stubs; (k) slipped tecomate (T2); (l–m) bowls with thickened beveled rims (BR1b); (n–o) bowls with everted beveled rims (BR1c); (p) beveled-rim bowl with everted, scalloped rim (BR1d); (q) everted beveled-rim bowl with bevel that is concave in profile (BR1c variant); (r–s) piecrust rim bowls (BR3b); (t–u) piecrust-rim bowls with exaggerated rims (BR3a); (v) unique rectangular vessel; (w) BR6 or BR1c variant.

Comparisons. Based on an inspection of the Cantón Corralito type collection, the assemblage of Aquiles Orange described here matches that reported by Cheetham (2010a:594–97) in multiple traits of vessel form, surface treatment, and color. The type grades into Bala White. Cheetham seems to have placed the division between the two somewhat farther toward the white pole than I have.

Colona Brown

Identifying Features. These are brown-slipped vessels among which bowls with modified rims are common.

Illustration. Figure 8.18.

History. The type is defined by Clark and Cheetham (2005:303). Coe (1961:53–54) identified Ocós Buff and Ocós Brown Burnished at La Victoria. Investigators in Chiapas did not report browns for the "Ocós" phase (now Locona, Ocós, and Cherla) until Clark and Cheetham (2005:303, 310, 316, 319) identified three distinct types for this span.

Sample. 147 rims. That figure would be doubled if unidentified brown sherds of the Locona and Ocós phases were assigned to this type.

Phases. Locona and Ocós.

Paste. Local paste, brown to gray.

Surface Finish. Brown slips vary greatly in color, grading in to orange, pink, white, gray, and black. Surface color examples include 10YR3/1, 10YR5/3 to 4/3, 10YR5/2 to 6/2, 7.5YR6/4 mottled with gray, mottled 7.5YR5/2 and 10YR4/1, and mottled 5YR6/4 and 5YR5/1. Bowls are often but not always slipped on both sides.

Forms. Common forms are BR1c, B1a, BR2, T2a, and

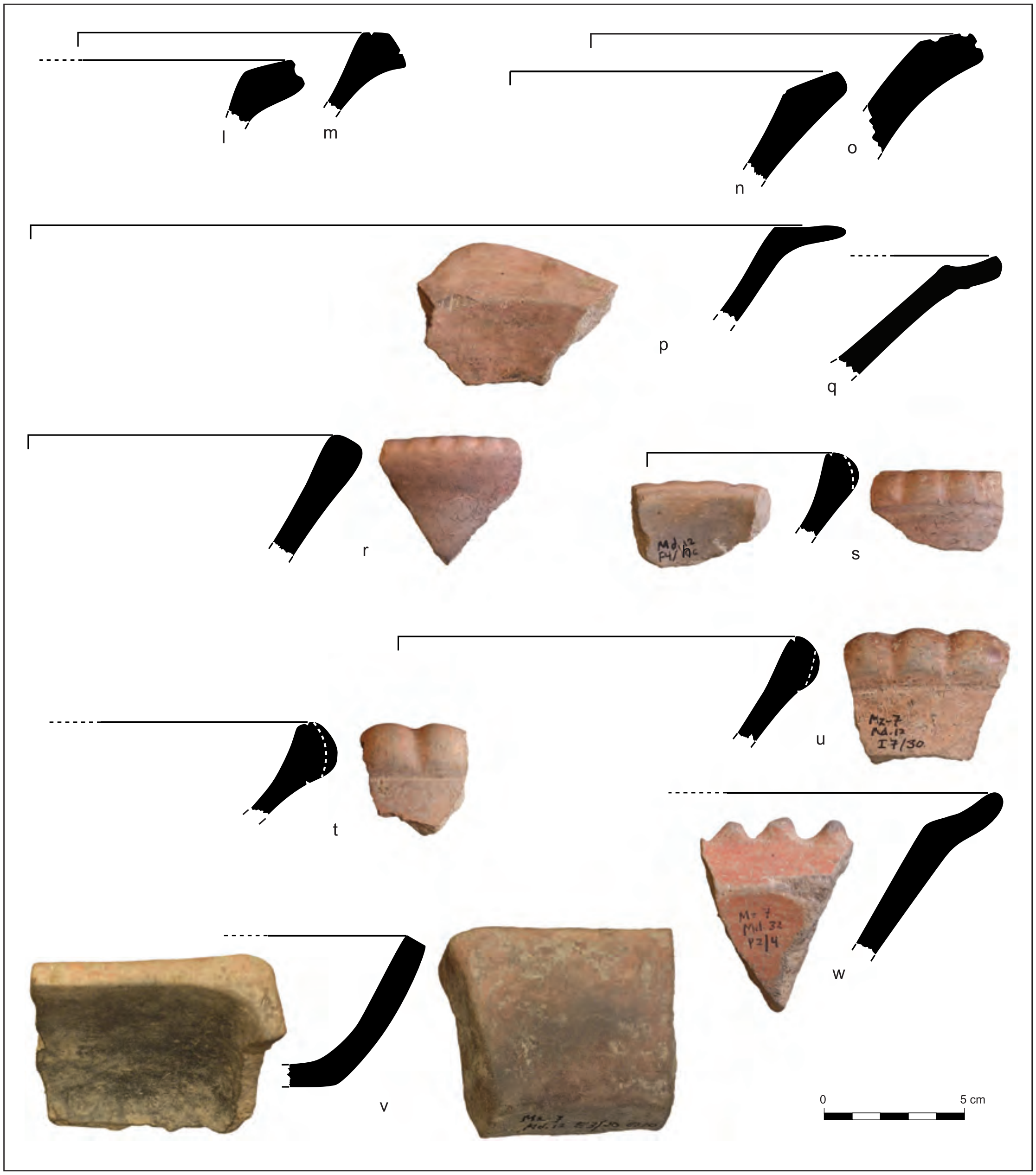


Figure 8.17. *continued*

BR3a. Other forms include B1b, B3, B4, B5, BR1b, BR3b, BR5, BR7, and T3.

Decoration. There are sometimes circumferential grooves on the exteriors of bowls. In very rare cases, the exteriors of tecomates or certain bowl forms (B1, B3, B5) are vertically or (even less often) horizontally gadrooned.

Potential Misidentifications. Colona Brown is difficult to distinguish from the other brown-slipped types identified by Clark and Cheetham (2005).

Comparisons. Coe's (1961:Figure 21) Ocós Buff is a good match for Colona Brown; his illustrated forms include BR2 and BR3 variants.

Bala Brown

Identifying Features. As described here, this is basically a color variant of Bala White.

Illustration. Figure 8.19.

History. Defined by Clark and Cheetham (2005:316, 319).

Sample. 80 rims.

Phase. Cherla.

Paste. Similar to Bala White.

Surface Finish. Slipped brown; 7.5YR 6/2 is typical. There is often gray-black clouding. Slipping of open ves-

Figure 8.18. Colona Brown type: (a) bowl with thickened rim (BR4); (b–d) open bowls with outsloping or slightly outcurving walls (B1a); (e, m–n) wedge-rim bowls (BR2); (f) effigy dish with low vertical walls (B3 variant); (g) rounded-walled bowl (B4) with fish effigy on projecting tab just below rim; (h) deep bowl with slightly in-sloping walls (B3 variant); (i–j) beveled-rim bowls with thickened, beveled rims (BR1b); (k–l) beveled-rim bowls with everted beveled rims (BR1c); (o) grooved-lip bowl (BR5); (p) piecrust rim bowl (BR3 variant); (q) piecrust rim bowl with exaggerated rim (BR3a); (r) piecrust-rim bowl (BR3b); (s) necked tecomate with vertical gadrooning (T3 variant); (t–v) tecomates (T2); (w) tecomate with subtle vertical gadrooning (T3)

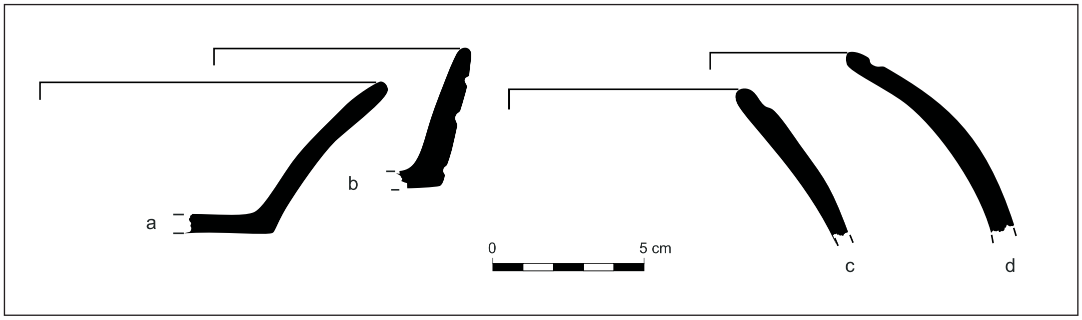


Figure 8.19. Bala Brown type: (a) open bowl with outcurving walls (B1b); (b) low, vertical-walled dish, variant (B2b); (c) incurving-walled bowl (B5); (d) thin-walled, slipped tecomate (T2).

sels is on both interior and exterior.

Forms. Common forms are B1a and B4, constituting more than half the collection. Other forms include B2, B5, BR5, BR7, and T2a.

Decoration. Characteristic decorative modes are an exterior circumferential groove just below the rim of outsloping or rounded-walled bowls and spaced vertical grooves on the exterior walls of the same forms.

Potential Misidentifications. These are distinguishable from other browns mainly based on the mix of vessel form and decoration.

Comparisons. This type appears to require a careful review. Cheetham (2010a:597–98) reports only three rims from Cherla contexts at Cantón Corralito (0.04 percent of his collection for that phase). The three sherds are in the Cantón Corralito type collection at the New World Archaeological Foundation, and all three diverge from the dark colors described for the type by Clark and Cheetham (2005:316) and well represented in the general Mazatán type collection at the NWAF. The Bala Brown drawer in the general type collection included, as of summer 2012, some Mijo Black and White sherds. Other sherds in that drawer would have been classified as Pino Black in the study reported here, while still others seem incontestably brown and very likely Cherla based on vessel form, wall thickness, surface treatment, and decoration similar to Bala White. A Cherla-phase brown type may have been more widely used at Aquiles Serdán than at either Paso de la Amada or Cantón Corralito.

BLACK-WHITE-GRAY TYPE CLASS

Sixteen percent of identified rims (2,056 sherds) are black, white, or gray. Surfaces are usually slipped and burnished but in some cases burnished only. The type class as a set is readily distinguished from Brown-Orange-Pink, though there is occasional orange mottling on otherwise white-to-black sherds. The main types are Bala White (18.4 percent of identified rims in the type class) and Pino Black and Pino Black and White (together, 66.5 percent); all of those are Cherla in date, as are several imported black and white types (Extranjero Black and White, Extranjero Grayish White, Extranjero Glossy Gray, and Imported Kaolin, totaling 3.2 percent). Mijo Black and White (11 percent) is an Ocós type defined for the first time here. Types present in trace amounts and not described here include two rims of Alba Gray (Clark and Cheetham 2005:309–10), two rims of Capote White (Clark and Cheetham 2005:299), one rim of Pampas Black and White (Coe and Flannery 1967:35–36), eight rims of Siltepec White (Green and Lowe 1967:112, 114), and two rims of Tacaná White (Ekholm 1969:65, 66; Green and Lowe 1967:118, 120).

Mijo Black and White

Identifying Features. Vessels in this type have white, black, or gray slip—or a cloudy combination of all those—over paste that is typically tan to brown. The blacks, grays, and sometimes whites tend to have a bluish cast distinctive to this type.

Illustration. Figure 8.20.

History. This type is defined here (though see also the "Comparisons" paragraph below). In the spirit of Clark's introduction of "Lo-co-na" as a tribute to Gareth *Lo*we, Michael *Co*e, and Carlos *Na*varete, this type designation is a tribute to Michael Blake and John Clark. (The *j* in *Mijo* should be pronounced as in Spanish.)

Sample. 181 rims, in part classified retroactively after recognition of this type.

Phases. Mainly Ocós.

Paste. Local paste. Colors range from brown to gray: 7.5YR6/2, 7.5YR3/2, 7.5YR5/4, and 10YR4/2. There are sometimes gray to black cores.

Surface Finish. Open forms are slipped on both sides or else just on the interior (with the exterior scraped), the latter a trait common on contemporaneous Paso Red bowls. Note that there is considerable variability in color within this type, which includes all-white, all-black, and all-gray vessels in addition to vessels with cloudy combinations of white, gray, and black. Darker surfaces are typically

Figure 8.20. Mijo Black and White type: (a, d–e, i–k) open bowls with outsloping or slightly outcurving walls (B1a); (b) bowl with interiorly thickened rim; (c) incurving-walled bowl (B5); (f–h) open bowls with outcurving walls (B1b); (l) undulating-rim bowl (BR7); (m–n) piecrust rim bowl (BR3b); (o) piecrust rim bowl with exaggerated rim (BR3a); (p) rounded-walled bowl (B4); (q–r) vertical-walled bowls (B3); (s) notched-rim bowl (BR6 variant); (t–u) grooved-lip bowls (BR5); (v) beveled-rim bowl with everted beveled rim (BR1c); (w–z), thin-walled, slipped tecomates (T2); (aa) tecomate; (bb) vessel support.

2.5Y5/0 to 2.5Y4/0—they are gray to dark gray, often with a bluish tint. The whites sometimes have a bluish tinge as well (10YR8/1 ranging toward 2.5Y8/0), but in other cases it is absent (7.5YR8/2, 10YR8/2, 10YR8/3). Both white and black slips are streaky in appearance, an effect of burnishing

Forms. Most common are B1a (34 percent), B1b (25 percent), and T2 (8 percent). Other forms include B3, B4, B5, B8, BR1a, BR1c, BR2, BR3a–c, BR4, BR5, BR6, BR7, BR8, L1, and T3. Open bowls occasionally have solid supports (Figure 8.20bb).

Decoration. There is little in the way of incised decoration. Bowl forms sometimes exhibit rim modeling, including scalloping (Form BR7) and variations on the piecrust rim (Form BR3). There are gadrooned jars or tecomates and an occasional effigy.

Potential Misidentifications. Pure white versions of Mijo can be indistinguishable from the whiter end of the spectrum represented by Bala White, though the occasional bluish cast even of white-slipped Mijo sherds can sometimes be a help. Mijo is distinguished from Pino Black and Pino Black and White by the bluish tint and also by the lack of smudging (pastes are brown even beneath black slip), the thicker walls (typically 6–10 mm as opposed to 5–8 mm), and the common practice of leaving exteriors of open bowls scraped, without slip or burnishing.

Comparisons. Ceja classified Mijo Black and White sherds with Pino Black and White (Ceja Tenorio 1985:Figure 37—definitely h and i, probably some of a–g [though others are Pino Black and White as defined here], and perhaps some of o–t, though some of those are likely Colona Brown). Clark and Cheetham (2005:309–10) do not report anything like Mijo in their overview of the Ocós complex. Their Amada Black-to-Brown is distinct (seen here under the Stamped type class). Their Alba Gray appears to diverge from Mijo in key traits, particularly the incised decoration with traces of red pigment and the occasional use of a thin red slip to cover the entire exterior of vessels. The forms illustrated by Clark and Cheetham (2005:Figure 17a–i) for Alba Gray are more similar to Pino Black and White than to Mijo. (See further discussion under "Comparisons" for the former type.)

The best previously reported match for Mijo Black and White is Ocós Gray and perhaps Ocós Black from La Victoria. In the case of the former, Coe (1961:55) provides a range of surface colors but notes the presence of "even bluer grays which were not on my soil color charts."

Amada Black-to-Brown

See "Stamped Type Class," below.

Bala White

Identifying Features. Vessels with white to brownish-white slip, mostly in the form of simple bowls with outsloping or convex walls.

Illustration. Figure 8.21.

History. Defined by Clark and Cheetham (2005:316–18).

Sample. 303 rims.

Phases. Cherla.

Paste. Local paste. Colors are typically light brown ranging to gray (7.5YR6/4, 2.5YR6/6, 7.5YR6/2, 10YR6/3), sometimes with a gray core.

Surface Finish. Vessels are usually slipped white or brownish white but are occasionally just burnished. Surface colors include 7.5YR7/2 (particularly common), 10YR8/3, and 10YR8/2. Both sides of open walled forms are slipped and/or burnished. Some vessels bear orange mottling (2.5YR6/6).

Forms. Overwhelmingly open bowls (B1a, B1b) and convex-walled bowls (B4) (66 percent and 16 percent, respectively). Bowl forms include B3, B4, B5, BC, BR1c, BR2, BR4, BR5, BR6, BR7, and BR9. There are some tecomates (4 percent) and a couple of jar necks.

Decoration. Decoration is limited, usually restricted to a single circumferential groove around the exterior rim of bowls. Sometimes there are also spaced vertical grooves, a trait shared with Pino Black and Pino Black and White. Rarely, more complex incised patterns appear. There are also occasional effigy faces.

Potential Misidentifications. Bala White can be difficult to distinguish from Mijo Black and White. Bala whites tend toward brown, with occasional orange mottling. The latter trait, shared with Pino Black and White, is unknown in Mijo. Also, in Bala the common bowl forms (B1, B4) are always slipped on both sides, whereas similar forms in Mijo often have scraped exteriors. Bala is distinguished from Pino primarily by the lack of smudging. Sherds with extensive orange mottling can be difficult to distinguish from Aquiles Orange; the two types were contemporaneous and the boundary between them appears to have been fuzzy.

Comparisons. Cheetham (2010a:576, 586–89) identified Bala White at Cantón Corralito, where it was the third-most-frequent type in the Cherla complex. His Bala matches that identified here quite closely.

Pino Black and White

Identifying Features. These are differentially smudged vessels with surfaces both white and black. White-rimmed black is a common decorative scheme, but it is not the only scheme present. Sometimes the entire interior or exterior is one color. An important identifying feature of this type is that surface color correlates with the color of the immediately underlying paste, a characteristic of smudging. Thus the paste underlying black areas is black to gray while that underlying white areas is tan to brown. Except for surface color scheme, Pino Black and White appears to be identical to Pino Black.

Illustration. Figure 8.22.

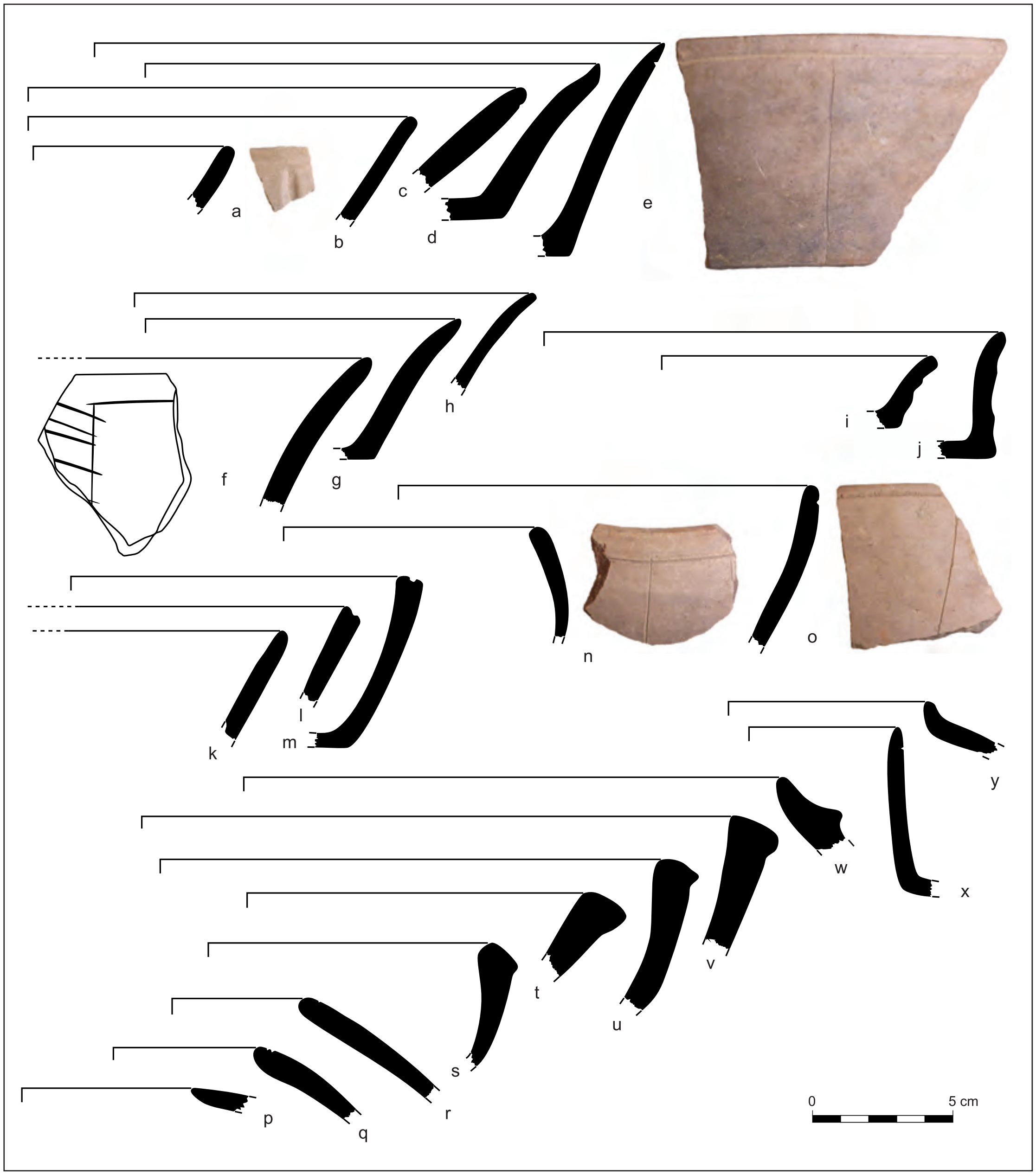


Figure 8.21. Bala White type: (a–e) open bowls with outsloping or slightly outcurving walls (B1a); (f, g, h) open bowls with distinctly outcurving walls (B1b); (i) B1/B2b variant; (j) low, vertical-walled dish, variant of B2b; (k) undulating-rim bowl (BR7); (l, m) grooved-lip bowls (BR5); (n, o) rounded-walled bowls (B4); (p, q, r) tecomates (T2); (s–v) bolstered-rim bowls (BR9); (w) bowl with exterior flanges or tabs (BR8); (x) jar with tall vertical neck (J5); (y) jar with low upturned neck.

History. As originally defined by Ceja Tenorio (1985:65–69), Pino Black and White included what is now identifiable as a distinct type, Mijo Black and White. Clark and Cheetham (2005:319–20) revised the definition of the type and narrowed its application. They note that Pino is antecedent to Pampas Black and White (Coe and Flannery 1967). In contrast to Pampas, the exteriors of Pino bowls are typically slipped and/or burnished, and Pino walls tend to be thinner.

Sample. 1,049 rims.

Phase. Cherla. White-rimmed black Pino sherds are diagnostic of the Cherla phase.

Paste. Local paste. The number of inclusions of sand or other particles varies considerably from sherd to sherd. Paste color varies from black and gray (7.5R4/0, 10YR4/1, 5YR4/1) to tan and brown (7.5R6/4, 7.5YR7/4), depending on the degree of smudging. Occasionally, a gray-black core is identifiable, but only in those parts of any particular vessel that have light-colored surfaces. In parts of the vessel with black surfaces, the paste is black from surface to center—and sometimes clear through if the surface on the other side is also black.

Surface Finish. Vessels are well burnished, almost always on both sides in the case of open forms. Sometimes the surfaces appear to be slipped, but they are more often merely burnished. At any rate, that distinction was not considered important to the definition of this type in the analysis reported here. A considerable number of dish and bowl forms are white-rimmed black (Figures 8.22f and 8.22n). Of those, many are basically white on the exterior. A few are instead white-rimmed black on the exterior as well, while others have white and black clouding on the exterior. Other smudging schemes besides white-rimmed black include black interior/white exterior and black and white clouding on both sides. White parts of Pino vessels sometimes bear orange mottling of the same sort noted for Bala White. In addition, some Pino Black and White vessels bear traces of red pigment. Surprisingly, the most common location is on the scraped *bottoms* of flat bowl bases. Another is within the grooves of exterior decoration. Very rarely, the entire exterior surface of bowls bears traces of a thin red wash.

Forms. Simple bowl forms predominate in this type, including B1a (46 percent), B1b (15 percent), and B4 (19 percent). Other forms include B2b, B3, B6, B9, BC, BR1b, BR1c, BR1d, BR2, BR3b, BR4, BR5, BR7, and BR9. Tecomates (T2, T3) constitute 2 percent of the collection.

Decoration. Common bowl forms are often decorated with a simple design scheme: a single circumferential groove on the exterior below the rim and sometimes, in addition, spaced vertical grooves (Figure 8.22e). That design scheme is shared with Bala White. In rare cases, decorative schemes are more elaborate, including zoned cross-hatching (Figure 8.22z) or other geometric motifs. A few sherds have areas of light shell-edge rocker stamping, and there are occasionally anthropomorphic or zoomorphic effigies (Figures 8.22aa, and 8.22ff).

Potential Misidentifications. Some Pino sherds may be difficult to distinguish from Bala White. The presence of smudging is the key distinguishing criterion, but the two types are contemporaneous and probably do indeed grade into each other, so misidentification of a few pieces is not a worry. Likewise, Pino Black and White and Pino Black are identical except for color scheme. It is important to distinguish Pino from the several imported Extranjero types. The main distinguishing features are paste, wall thickness, and hardness: only Pino is in the local paste; Pino vessel walls are thicker than those of the imported types; and Pino sherds typically emit a dull "clunk" when dropped against each other instead of the sharp "clink" of the imported sherds. Pino sherds are distinguished from Mijo Black and White by the presence of smudging. Vessel walls tend to be thinner (5–8 mm as opposed to 6–10 mm), and bowls tend to be burnished on both sides in contrast to Mijo.

Comparisons. Although Ceja Tenorio (1985) included Colona Brown and Mijo Black and White in Pino, much of his collection was from the same mound as the Cherla collection reported here, and it is clear that there is broad overlap between his collection and mine. Pino Black and White as described by Clark and Cheetham (2005:319) is congruent with that described here. Those authors mention orange mottling but not red pigment, a trait that does appear in their description of Alba Gray, with a usage similar to that described here for Pino (Clark and Cheetham 2005:309–10, Figure 17a–i). Cheetham (2010a:592) has since identified red pigment in grooved designs on Pino Black and White at Cantón Corralito. At Cantón Corralito, Pino Black and White was the second-most-common type in the Cherla complex after Mavi Buff (Cheetham 2010a:576), a pattern similar to that found at Paso de la Amada.

Pino Black

Identifying Features. This type is identical to Pino Black and White except for the surface color scheme, which is entirely black.

History. Defined by Clark and Cheetham (2005:319–20).

Sample. 46 rims.

Phase. Cherla.

Paste. Local paste.

Surface Finish. Black to gray surfaces, apparently well burnished but without slip.

Forms. Mostly B1a, B1b, and B4, with B3, B5, T2, and BR9 also represented.

Decoration. Decorations are similar to Pino Black and White, particularly a single exterior circumferential groove below the rim of dish forms B1a, B1b, and B4, occasionally with spaced vertical grooves.

Comparisons. This type is a variant of Pino Black and White.

Extranjero Black and White (probably Perdida Black and White)

Identifying Features. This is an imported type that is likely Perdida Black and White, from San Lorenzo. This black-and-white, differentially smudged pottery may be slipped or merely well burnished. Identifying features are the thin walls (3–5 mm), fine paste, and hard firing.

Illustration: Figure 8.23a–r.

History. Extranjero Black and White was defined as

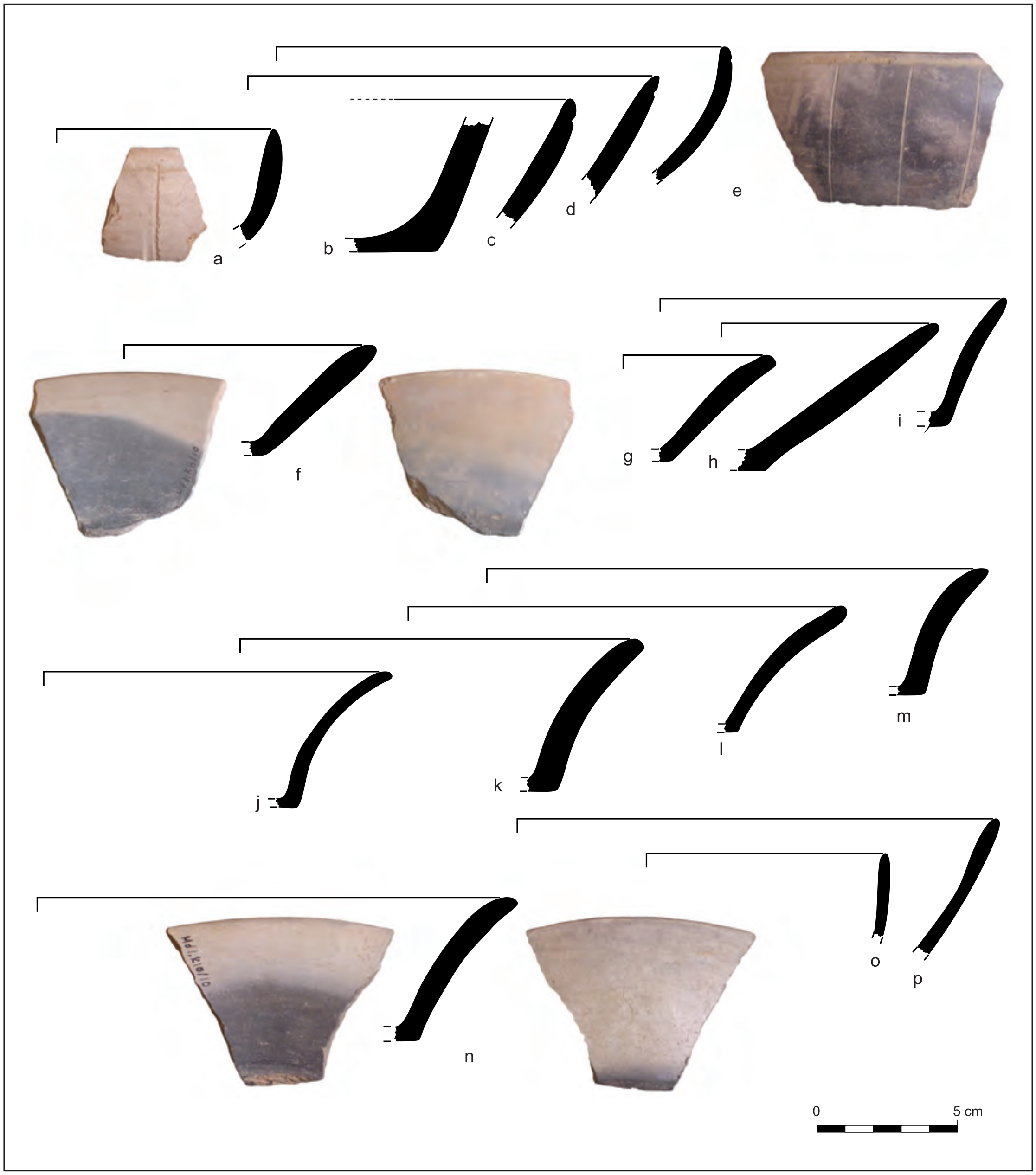


Figure 8.22. Pino Black and White type: (a, e, y) convex-walled bowls with flat bases (B4b), decorated with spaced, vertical grooves on exterior; (b–d, f–i) open bowls with outsloping walls (B1a); (j–n) open bowls with outcurving walls (B1b); (o–p) rounded-walled bowls, bases uncertain (B4); (q) undulating-rim bowl (BR7); (r) bolstered-rim bowl (BR9); (s) grooved-lip bowl (BR5); (t–v) tecomates (T2); (w–x) unusual bowls with interior ridges; (z) deep bowl, burnished both sides, with exterior incising that includes zones of cross-hatching; (aa–cc) rounded-walled bowls with exterior modeling; (dd) tecomate with vertical fluting (T3); (ee) possibly a jar neck (J3 variant); (ff) eye fragment from sculpted effigy bowl, slipped both sides; (gg) bowl with composite silhouette (BC).

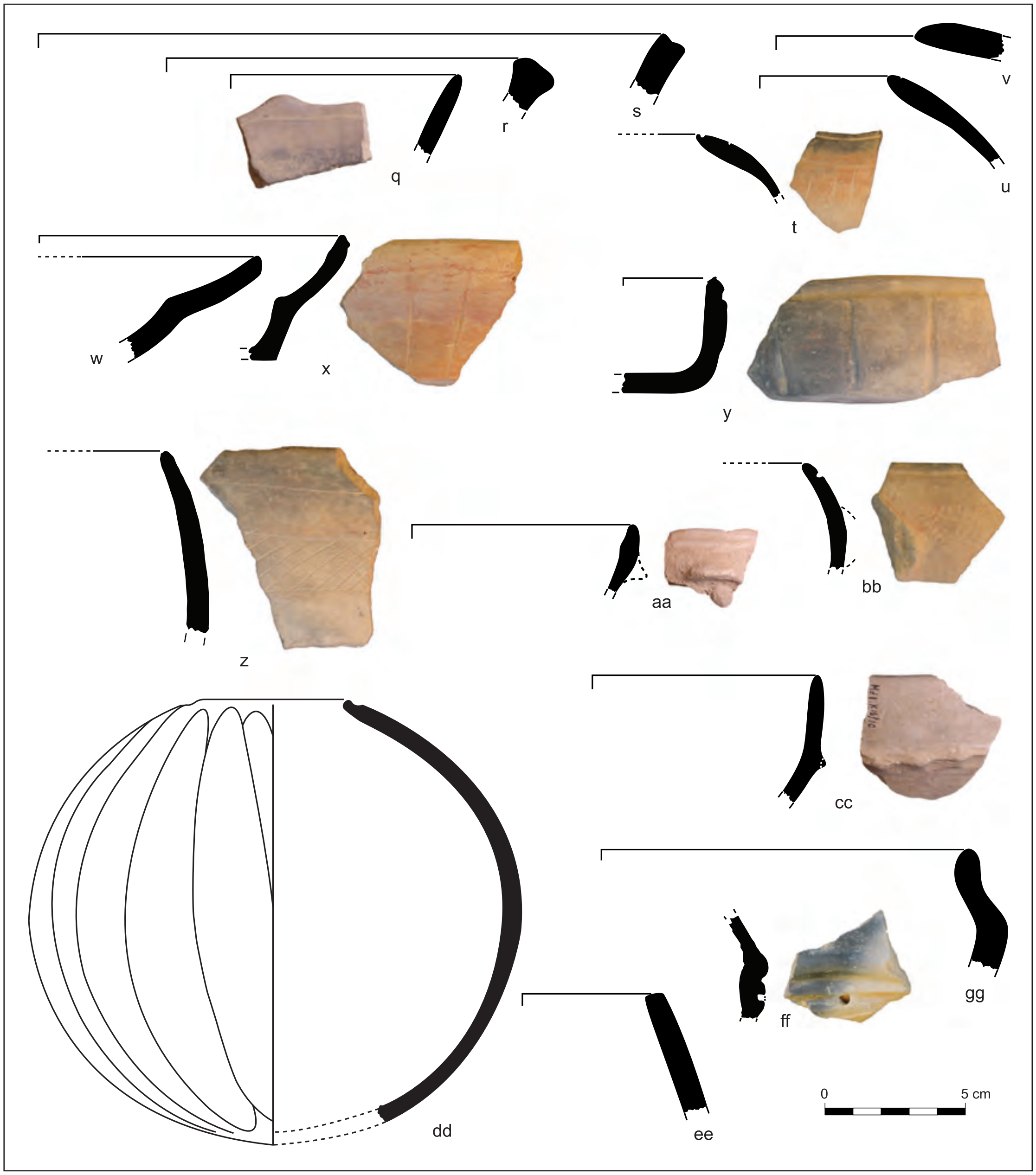


Figure 8.22. *continued*

an imported type in the Mazatán collection by Clark and Cheetham (2005:320).

Sample. Fifty rims in the ceramic assemblage analyzed to Level A or B. Of those, 17 are from Mound 1, six from Mound 12, nine from Trench 1T, five from Trench 1B, five from Mound 32, three from Mound 11, two from the Pit 32 excavations, two from Pit 29, and one from Mound 13.

Phase. Cherla.

Paste. Fine paste, apparently without temper. The firing is harder than is typical in the collection under study (3.0–4.5 on the Mohs scale). Extranjero Black and White sherds "clink" when dropped against each other, a trait that is not characteristic of locally made sherds, which emit instead a dull "clunk." Paste color is generally gray but sometimes tan to brown. Paste is more compact than the local pastes. Some sherds exhibit clear differential firing, with light or dark paste colors corresponding to the color of the overlying white or black surface; however, this trait is not universal.

Surface Finish. Surfaces are sometimes slipped and glossy with something of a waxy feel. In other cases, surfaces are eroded.

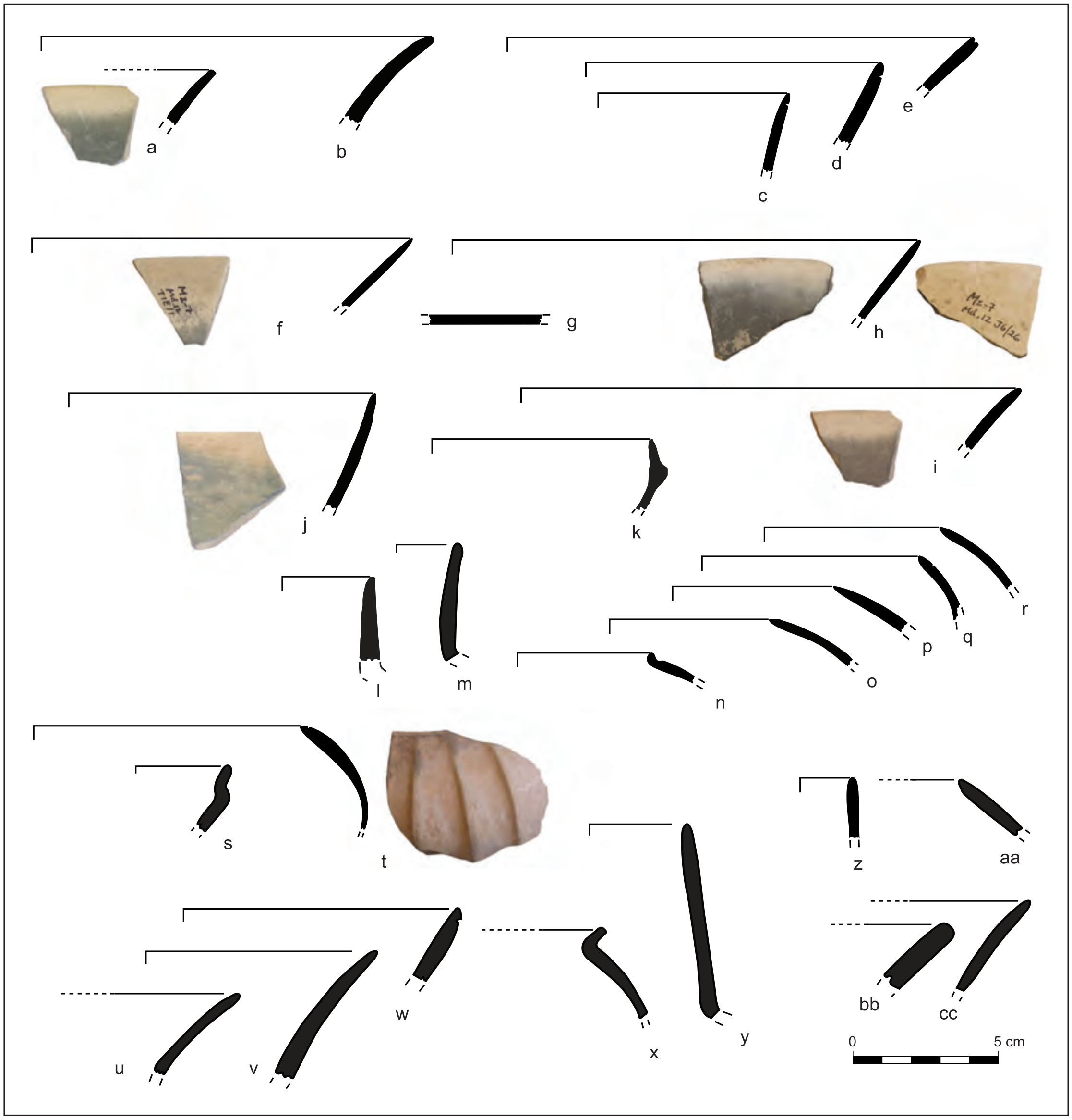


Figure 8.23. Imported pottery of the Cherla phase. Extranjero Black-and-White: (a–d, f–i) open bowls (B1); (e) open bowl with flattened, grooved lip (BR5); (j) rounded-walled bowl (B4); (k) bowl with exterior ridge (BR8); (l–m) jars with near vertical necks (J3); (n) tecomate with slight neck (J2b); (o–r) tecomates. Extranjero Grayish White: (s) small bowl with composite silhouette (BC); (t) bowl with exterior fluting; (u–v) open bowl with outcurving walls (B1b); (w) open bowl with outsloping walls (B1a); (x) small jar with low, outflaring neck; (y) jar with tall, near-vertical neck (J5). Extranjero Glossy Gray: (z) jar neck. Kaolin: (aa) tecomate. White slip over orange paste (not described in chapter): (bb–cc) open bowls (Blb).

Forms. The most common form is an open bowl with outsloping sides, a direct rim, a pointed or rounded lip (compare with Coe and Diehl 1980:156), and a flat base (B1a, rarely B1b). Other forms include tecomates (T2a), a tecomate with a slightly upturned rim or low neck (Figure 8.23n), vertical-walled bowls (B3), rounded-walled bowls (B4, B5), grooved-lip bowls (BR5), bolstered-rim bowls (BR9), and a single rounded-walled bowl with a finger-gouged exterior flange (a variant of BR8).

Decoration. Most sherds do not exhibit decoration aside from the differential smudging. Occasionally there is an exterior groove below the rim (rarely, more than one groove). One tecomate may have had vertical gadrooning.

Potential Misidentifications. The type is distinguishable from Pino Black and White by the distinctive hard-fired paste and thin walls. Pino is likely a local copy of Extranjero.

Comparisons. Clark and Cheetham (2005:320) identified the Gulf Coast as the likely source of Extranjero Black and White. Cheetham (2010a) is more specific in his identifications of imported sherds as from San Lorenzo, and that is supported by neutron activation analysis. He identifies five imported types in Cherla deposits from Cantón Corralito, of which Perdida Black and White is the most common (62 percent). Sherds are thin-walled, smudged, and often white-rimmed black. The collection from Paso de la Amada compares favorably with descriptions by Coe and Diehl (1980:156) and Cheetham (2010a:601–3), as well as with Cheetham's type collection at the New World of Archaeological Foundation.

Extranjero Grayish White (possibly El Tigre White)

Identifying Features. Thin, hard sherds in gray paste. They are not differentially fired. Some are slipped white.

Illustration. Figure 8.23s–y.

History. Extranjero Grayish White is defined here for the first time, but see also "Comparisons."

Sample. None in the ceramic sample identified to Level A or B. This type was identified only in 2011, in units analyzed to Level C. Seven rim sherds were recovered, all from Mound 1 (F9/5, G10/8, J9/8, J12/8, J12/8, K10/8, K10/8). There are probably more in the Mound 1 collection.

Phase. Cherla.

Paste. Fine, hard-fired, light gray paste, apparently without temper (10YR6/1 to 10YR7/1). The paste is very compact. Sherds "clink" when dropped together (3.0 to 4.5 on the Mohs scale). Vessel walls are thin but not to the extent noted in Extranjero Black and White.

Surface Finish. Several sherds bear a thin white slip, while others appear to be burnished only. The neck of a vertical-necked bottle bears traces of red paint.

Forms. Forms include bowls with outcurving walls and direct rims (B1b), convex-walled bowls (B4), incurving-walled bowls with exterior fluting, jars with low outflaring necks, and bottles (or jars) with tall, vertical necks.

Decoration. A convex-walled bowl has a single exterior circumferential groove below the rim. There is an incurving-walled bowl with vertical fluting and a single circumferential groove around the rim (Figure 8.23t). The red pigment on the bottle neck appears to have been laid down in blocks or bands at least 1 cm wide. The bands could have formed a simple geometric motif, but it is also possible that the entire neck was painted red.

Potential Misidentifications. The type is distinguishable from locally made types by the fine, hard-fired gray paste. It is distinguishable from Extranjero Black and White by the lack of smudging and the somewhat thicker walls (4–7 mm as opposed to 3–5 mm).

Comparisons. This imported type may be El Tigre White or perhaps Ixtepec White, from San Lorenzo (Coe and Diehl 1980:153). The former, which has gray paste, appears to be a significantly better match based on Coe and Diehl's description. Cheetham (2010a) did not identify El Tigre White at Cantón Corralito. He did identify 57 sherds of Ixtepec White in his Cherla assemblage, with forms that resemble those identified here (Cheetham 2010a:600). The red pigment is not reported for Ixtepec but instead for La Mina White and Red (Cheetham 2010a:648–49) of the Cuadros phase. The description of the La Mina paste does not match that of Extranjero Grayish White.

Extranjero Glossy Gray

Identifying Features. This type includes hard-fired sherds with a glossy gray slip that is waxy to the touch. Both of the two known sherds appear to be from vertical-necked bottles or jars.

Illustration. Figure 8.23z.

History. Not previously identified.

Sample. None in the ceramic sample identified to Level A or B. Two sherds were in the Level C assemblage, one a rim (Md. 1 J9/8) and one a body sherd that includes part of a broken-off neck.

Phase. Cherla.

Paste. Fine hard-fired paste, apparently without temper. Sherds "clink" when dropped together (3.0 to 4.5 on the Mohs scale). Wall thicknesses are similar to those of local types. Paste color varies from dark to light gray and appears to be partly smudged (10YR7/3 to 10YR6/1 and 10YR4/1).

Surface Finish. Exterior surfaces of jars are covered with a light gray slip, well burnished to a glossy sheen and soft and waxy to the touch.

Forms. Jars with tall vertical necks.

Decoration. Undecorated.

Potential Misidentifications. This type is distinguishable from local types by the hard-fired paste and the waxy feel of the well-burnished surface. It is distinguishable from other imported types by the relatively thick walls and the gray slip.

Comparisons. Cheetham (2010a) did not identify anything matching Extranjero Glossy Gray at Cantón Corralito. If the source for this imported type is San Lorenzo, then the closest resemblance would be with Achiotal Gray of the Chicharras phase (Coe and Diehl 1980:156). However, Achiotal is reported as unslipped, whereas Extranjero Glossy Gray is definitely slipped.

Imported Kaolin

Identifying Features. These are thin-walled, imported vessels in a pure white (kaolin) paste. They may be Xochiltepec White from San Lorenzo.

Illustration. Figure 8.23aa.

History. Cheetham (2010a:598) found seven pure white, kaolin sherds at Cantón Corralito, which he identified as Xochiltepec White, after the San Lorenzo type.

Sample. Two rims in the assemblage identified to Levels A–B, one from Mound 32 2/227, the other from Mound 1 H12/9–10.

Phase. Cherla

Paste. Pure white and completely without temper. Walls are thin (4 mm).

Surface Finish. Surfaces are eroded. It appears likely that exteriors of restricted-rim forms were originally burnished.

Forms. Thin-walled tecomate.

Decoration. None.

Potential Misidentifications. The pure white paste distinguishes this type from all others in the collection.

Comparisons. Chicharras-phase Xochiltepec White at San Lorenzo (Coe and Diehl 1980:Figure 122d) includes tecomates such as that reported here.

STAMPED TYPE CLASS

Stamping or gouging was widely used on portions of vessels or entire vessel surfaces. Ceja Tenorio (1985:73–77) details the great variety of stamping that occurs at Paso de la Amada. Many instances of stamping seem best classified as relatively rare variants of types established on the basis of other characteristics. The unslipped exteriors of Michis Red Rim or Michis Specular Red Rim tecomates are sometimes covered with dentate shell-edge rocker stamping (Figures 8.9z, 8.10l). Some Chilo or Paso Red bowls (B4, B9) have finger or stick gouging on the unslipped portions of their exteriors, while some tecomates of those types bear shell-edge or other stamping (Figure 8.14nn). Mavi Buff and Mavi Red on Buff bowls have stamped interiors (Figures 8.11a, 8.11d, 8.12a, 8.12c).

In two types, however, a particular form of stamping is so closely and reliably linked to other distinctive attributes as to merit the placement of stamping amid the defining characteristics of the types.

Guijarra Stamped

Identifying Features. These are bowls and dishes with unusually thick walls (reaching 1.0 cm or more in thickness) and stamp-roughened surfaces, both interior and exterior. Sometimes the roughening was made by stamping with the back of a shell or in some cases a string-wrapped paddle. In other cases, the rough texture does not have a pattern suggestive of stamping and the manner in which it was created remains unclear. Clark has likened the roughened surface to that of a pebble, and that is the derivation of the type name.

Illustration. Figure 8.24.

History. The type is defined by Clark and Cheetham (2005:303) as Guijarra Burdo. They intend the adjective *burdo* (coarse) to refer to the absence of slip. In my opinion, it is the surface roughening that should be considered definitional. Some Guijarra Stamped sherds have a thin orange-pink, red, or black slip.

Sample. 82 rims.

Phases. Locona and Ocós

Paste. Local paste, varying in color from brown to gray, with inclusions more common than for the types with thinner walls. Tiny white inclusions of unknown composition are unusually common in Guijarra Stamped paste.

Surface Finish. Both sides of bowls were stamped or otherwise roughened as described above. Sometimes surfaces were subsequently lightly burnished and/or slipped orange, pink, or red (10R7/4, 5R5/4) or else black to gray.

Forms. The most typical form is B1a, sometimes with slight plastic modifications to the rim not distinguished in the form codes used here. Other vessel forms include B4, BR1a, BR2, and BR5. Rounded-walled bowls sometimes have heavy exterior lugs or flanges a centimeter or two below the rim (BR8, Figure 8.24h). Some vessels had four solid supports (Figure 8.24j), and some fragments of very thick, heavy bowls appear to be parts of effigy vessels.

Decoration. Aside from the stamping, which has already been described, there are often circumferential grooves or ridges on interiors and/or exteriors.

Potential Misidentifications. Whatever the specific techniques through which it was achieved, the roughened surface of Guijarra Stamped was intentionally created. It was evenly applied across the vessel surface in a production step subsequent to careful scraping. Thus the texture of Guijarra Stamped is unlikely to be confused with the haphazard and uneven texture of the Coarse type class. (See discussion under Mavi Buff on the differences between stamped bowls of that type and Guijarra.)

Comparisons. Although Guijarra had not been isolated as a type before Clark and Cheetham's (2005) publication, Coe illustrates at least two likely candidates from La Victoria (1961 Figure 48b, bottom row right and second-to-bottom row left). A few Tzijón Stamped sherds from Izapa (e.g., Ekholm 1969:Figure 22b, n) may be Guijarra, even though most of Tzijón would here be classified as Mavi Buff.

Amada Black-to-Brown

Identifying Features. The distinctive decorative scheme of this type combines zoned stamped areas with designs in slipped and/or burnished bands. The usual vessel form in this type is itself distinctive: tecomates with small mouths (2 to 6 cm in diameter) but often large dimensions. The elaborate exterior decoration features fine-textured string or fabric impressions, grooving, and areas slipped and burnished black or brown. Slipped areas appear in bands, delineated with grooves along their margins. The slipped bands trace a complex curvilinear design.

Illustrations. Figures 8.25 to 8.27.

Figure 8.24. Guijarra Stamped type: (a–g) open bowls (B1); (h) bowl with exterior flanges or tabs (BR8); (i) bowl with slight interior thickening and tapered lip; (j) open bowl with supports.

History. Amada Stamped, as defined by Ceja Tenorio (1985:55–56), was something of a catchall type. Stamped body sherds might belong to any of a variety of other types. Amada Black-to-Brown is one variety of the original Amada Stamped. It was defined by Clark and Cheetham (2005:310).

Sample. 43 rims and several other large vessel fragments.

Phases. Late Locona and Ocós.

Paste. Local paste.

Surface Finish. Stamping was probably achieved with a string-wrapped paddle (John Clark personal communication, 2011). After stamping, the curvilinear design was superimposed on the surface by the burnishing and slipping of bands typically 0.6–1.3 cm in width. The bands were delineated with grooves either pre- or post-slip. Some sherds appear to be burnished only, not slipped. Colors of slipped and/or burnished areas include: 5YR6/4, 2.5YR3/0, and 5YR5/2.

Forms. The most common form is a large, egg-shaped tecomate with a surprisingly small mouth (T4). The base was rounded. There are a few fragments of vessels with a central constriction in the profile, thus forming a kind of figure eight shape (Figure 8.25h). An occasional vessel had a significantly wider mouth than the norm.

Decoration. One primary design concept involving interlocking spirals was repeatedly applied to these vessels. Two large reconstructed fragments from Mound 12 allow extrapolation of the design (Figures 8.26e, 8.27b).

A single fragment that appears to show a hand indicates that representational elements were sometimes employed alongside elements of the more standard curvilinear design (Figure 8.27e–f). A somewhat more common alternative to the standard design involved zoned hatching with multiple closely spaced parallel grooves, often atop stamping (Figure 8.25e, g–i, k–m). The direction of hatching was varied to create triangular patterns. Zoned hatching atop stamping was associated with slipped-burnished bands and with fabric-stamped areas without hatching, but it is unclear to what extent the slipped bands in these cases followed the standard pattern of interlocking spirals. In some cases the bands on hatched sherds appear to have traced a simple circumferential path, but on at least one sherd a more complex curvilinear design is indicated (Figure 8.25 l).

Potential Misidentifications. In terms of both form and surface treatment, this is a highly distinctive type. It should be emphasized that stamping is confined to string or fabric. No cases of shell-edge or shell-back stamping appear in this type.

Comparisons. The decorative scheme of this Ocós-phase type descended from Locona-phase schemes of the type Gallo Pink on Red. Coe (1961:Figure 17e–l) illustrates Gallo tecomates (identified as Ocós Specular Red) with a similar curvilinear pattern and, in at least one case, a highly restricted mouth. Coe also illustrates impressions of string-marked sherds with curvilinear designs, superimposed burnished bands, and grooved hatching over string or fabric stamping (Coe 1961:Figure 49). Most pieces in his Figure 49 are probably from Amada Black-to-Brown or some closely related variant. Most of Pijijiapan Zoned at Izapa is also Amada Black-to-Brown (Ekholm 1969:32–35; verified in NWAF type collections). Ceja Tenorio (1985:Figure 42v–x) illustrates some fragments from Paso de la Amada.

COARSE TYPE CLASS

Roughly finished vessel surfaces are not common in the collection, and they have not been divided into distinct types. Although in the format of a type description, the following is really more a description of the type class.

Coarse

Identifying Features. The term *coarse* is used for vessels that are either (1) well scraped but completely lacking any slipped or burnished areas or (2) roughly scraped or merely wiped so as to leave an uneven surface. Vessels of the first set are surprisingly rare in the collection and comprise a heterogeneous set of forms—bowls, tecomates—that occur more commonly in better-finished versions. Vessels of the second set occur in forms unique to the Coarse category. Most or all appear to have been ritual rather than alimentary in function. Vessels in this second category were sometimes slipped with a thin wash laid down over a rough surface that was not burnished.

Illustration. Figure 8.28.

Sample. 701 rims, including some ends of ceramic tubes that are likely censer components.

Phases. Locona through Cherla.

Paste. Local paste.

Surface Finish. Surfaces were scraped or roughly wiped. Sometimes a thin orange wash (2.5YR6/6) was applied to one or both sides of censer forms C2, C3, or C4.

Forms. The most common form is P1/P2 (36 percent), followed by B1 (24 percent) and J1 (5 percent). Identified censers (C1–C4) make up 8 percent of the collection, though many of the rims identified as B1 bowls were probably originally parts of censers, and in a 2017 reanalysis many were reclassified as such. Apart from those, many of the form codes are represented in low numbers, including B3, B4, B5, BR1a, BR1b, BR1c, BR2, BR3a, BR4, BR5, BR6, BR7, BR8, BR9, L1, and T.

Decoration. Decoration is rare. There are usually notches along the lips of censer form C2 and sometimes on the crude plates, Form P1.

Potential Misidentifications. As this category is used here, the unusually rough treatment of the vessel surface is key, taking precedence over the application of slip when the latter is applied to a scraped surface and left unburnished.

Comparisons. Coe (1961) defined Victoria Coarse widely, so that it included decorated "plain ware" such as Michis Red Rim. Neither Lowe (1967) at Altamira nor Ekholm (1969) at Izapa identified a coarse ware other than Michis. Ceja Tenorio (1985) does not report anything of the kind from Paso de la Amada; nor do Clark and Cheetham (2005) in their larger-scale survey of coastal ceramics. Based on the orange wash, Cheetham (2010a) assigned Cherla-phase domed censers from Cantón Corralito to Paso Red. In this study, sherds were assigned to Paso Red only if they were burnished as well as slipped.

MISCELLANEOUS BICHROMES

Bichromes are rare in the assemblage (0.6 percent). The most numerous bichrome, Gallo Pink on Red, is described under the Red type class because the thin pink wash atop the red slip erodes and can easily be missed. Another bichrome type is described in this section. Not described are the following Barra-phase types: 16 rims classified as Monte Red on Buff (Clark and Cheetham 2005:293), eight rims of Tepa Red on White (Clark and Cheetham 2004:297),

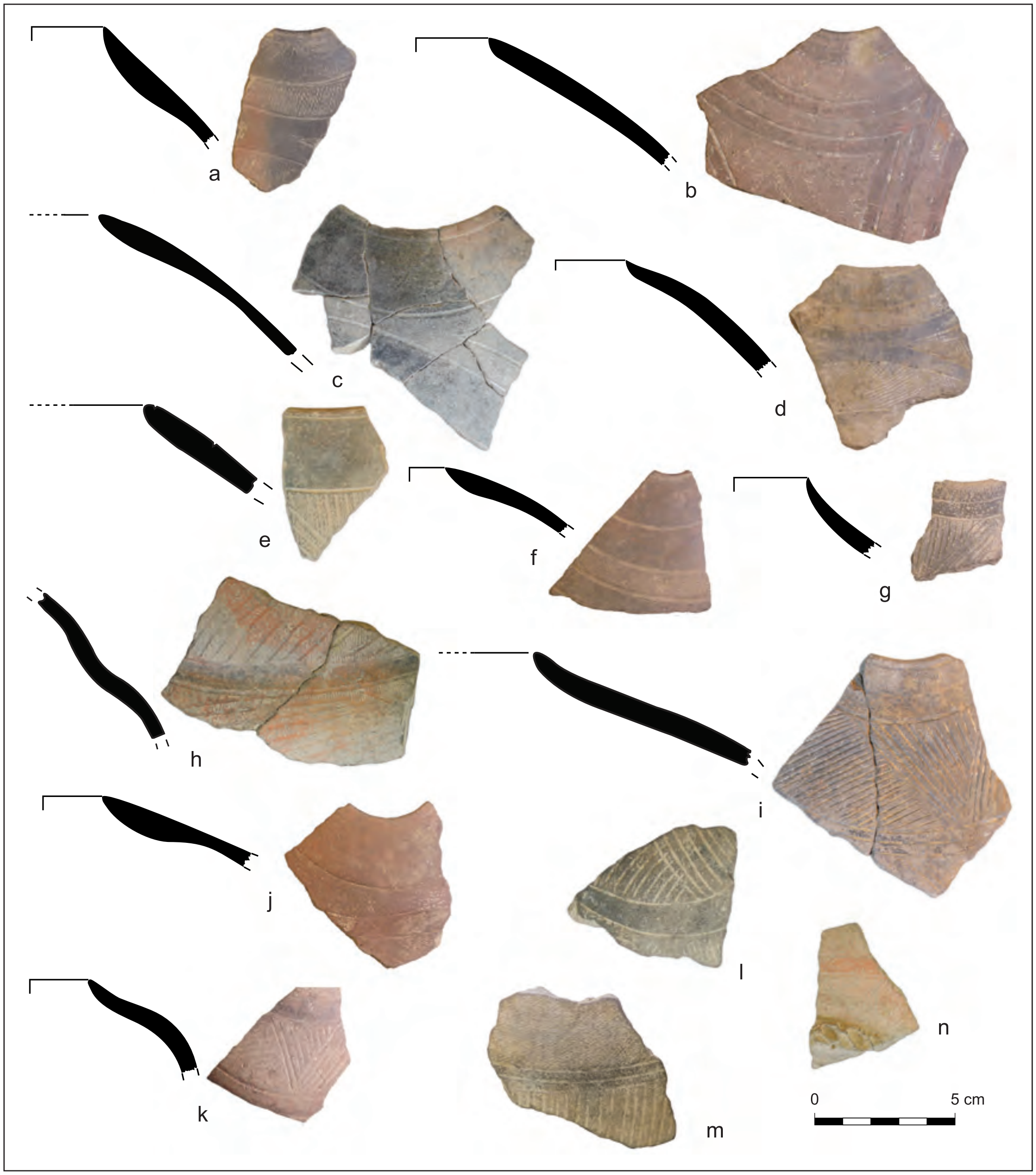


Figure 8.25. Amada Black-to-Brown type: (a–n) rims and diagnostic body sherds from large, egg-shaped tecomates with tiny mouths (T4).

and one rim of Tepa Red on Buff (Clark and Cheetham 2005:297). An additional 15 red-on-buff and two red-on-orange rims are probably Barra sherds. Finally, there is one Jocotal-phase rim of Tilapa Red and White (Coe and Flannery 1967:37–40).

Alba Red and White

Identifying Features. This is a decorative variant of Paso Red that combines red slip with white slip. Vessel forms are all bowls. The white slip appears on the exterior, while the rim and interior are red.

Illustration. Figure 8.16k–n.

History. The type is defined by Clark and Cheetham (2005:309).

Sample. 13 rims.

Phases. Ocós, possibly continuing into Cherla.

Paste. The paste is typical for Paso Red.

Surface Finish. The color of the red slip is 7.5R5/6.

Forms. B1a, B4, BR1c, BR3b, and BR3c.

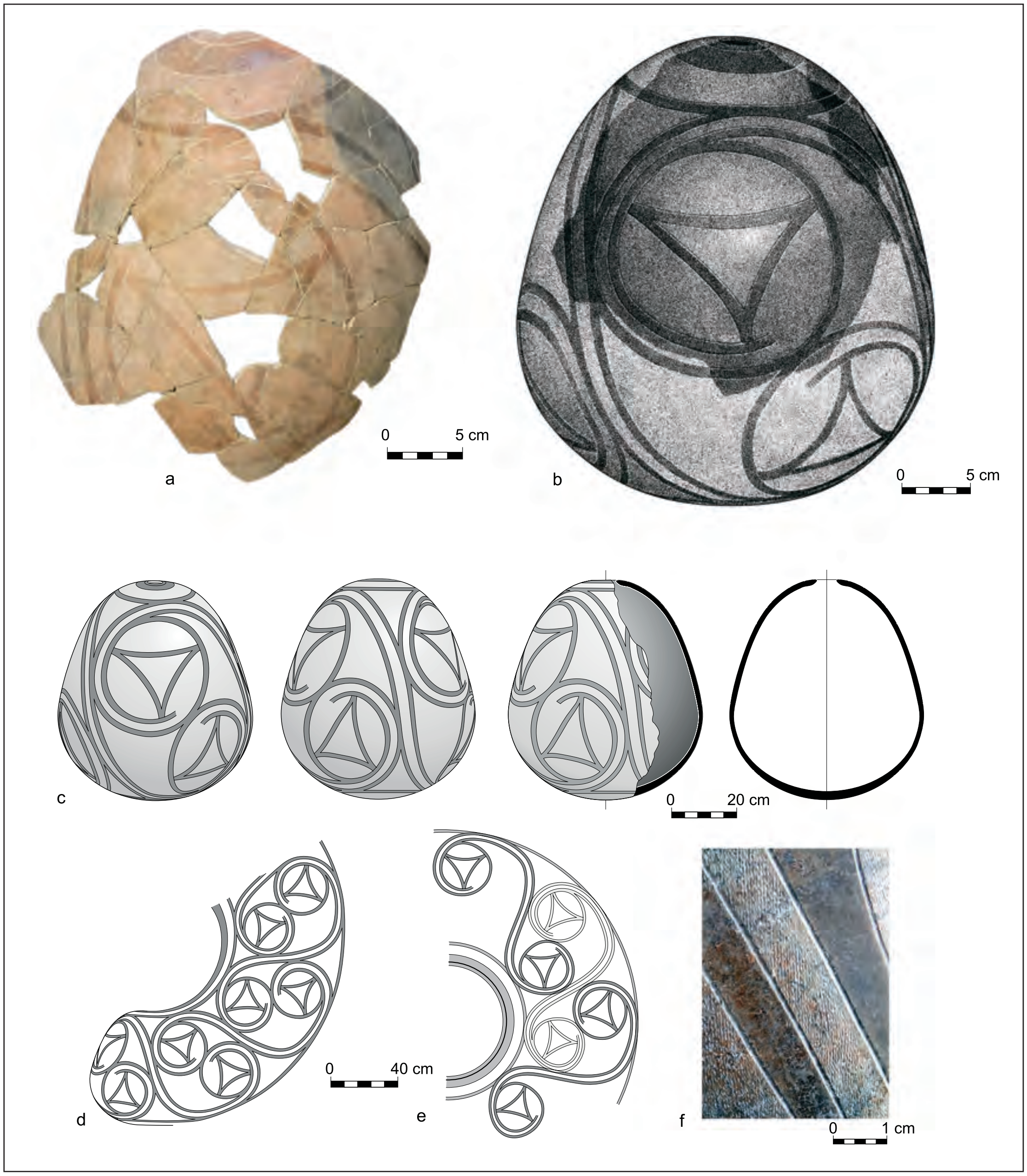


Figure 8.26. Amada Black-to-Brown: reconstruction of a large vessel fragment from Mound 12 T1E/9: (a) photo; (b) reconstruction showing portion preserved; (c) the reconstructed vessel in different views; (d) rollout of design; (e) rollout showing scheme of interlocking spirals; (f) closeup of surface showing fabric-stamped and burnished zones. The design is burnished. Drawings by Ayax Moreno.

Decoration. Decoration is mainly that typical of specific forms, such as radial gadrooning on BR3 rims, sometimes with a groove at the inner margin of the rim. Other decoration includes circumferential grooves on rims or on bowl exteriors. As usual at Paso de la Amada, grooves are pre-slip.

Potential Misidentifications. In the collection under consideration, where slips are preserved, this type could only plausibly be confused with the Barra type Tepa Red and White (Clark and Cheetham 2005:297); vessel forms in the two cases are entirely different.

Comparisons. Cheetham (2010a:583–85) identifies a Paso Red and White at Cantón Corralito. Comparison of his collection with Alba Red and White from Paso de la Amada reveals sharp distinctions of vessel form. The Alba assemblage from Paso is clearly Ocós, in comparison to Cheetham's Cherla assemblage of Paso Red and White.

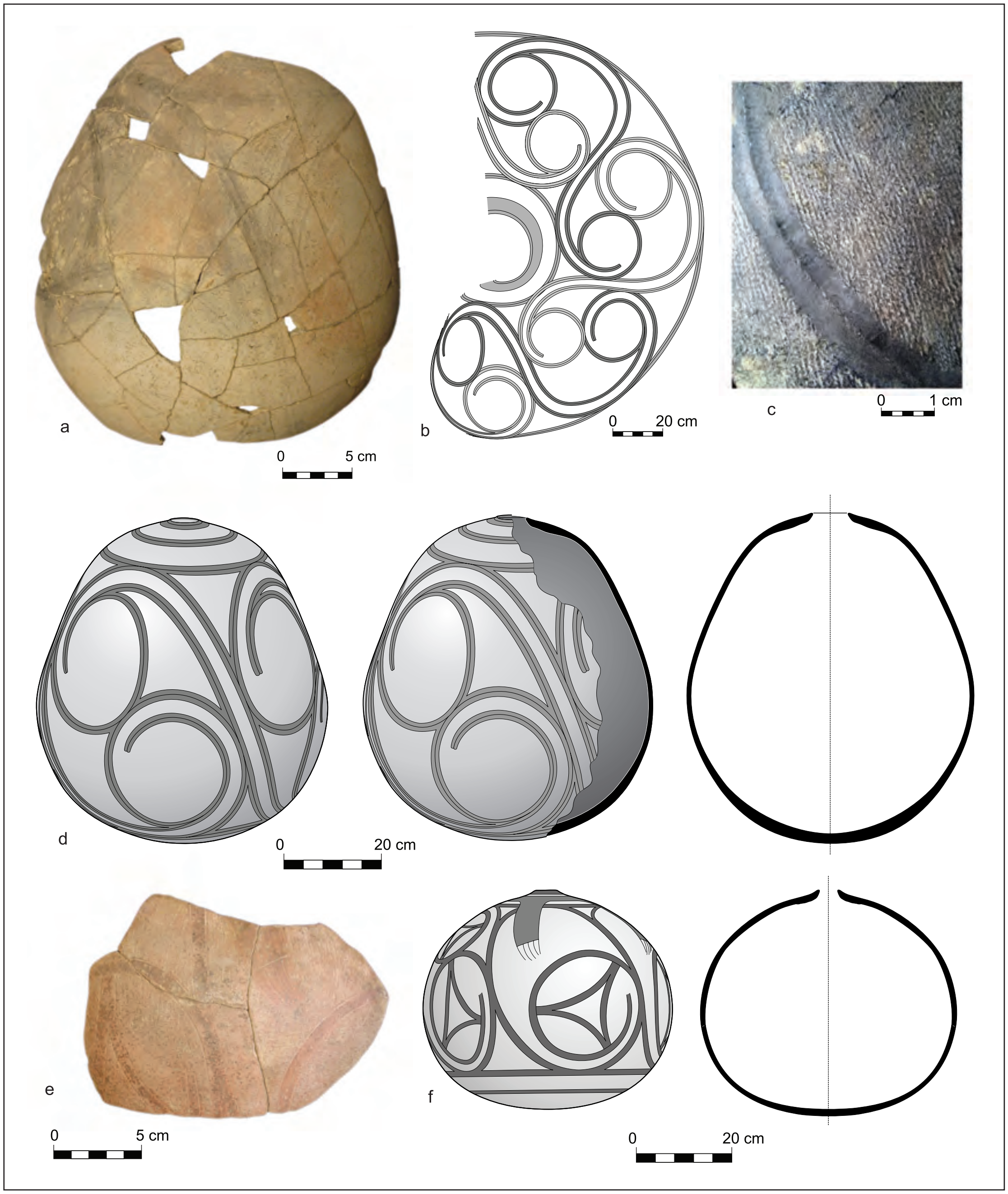


Figure 8.27. Amada Black-to-Brown: reconstructions of two vessel fragments. Top: from Md. 12 H5/F.21A: (a) photo; (b) rollout showing scheme of interlocking spirals; (c) closeup of surface showing juxtaposed fabric stamping and burnished lines; (d) the reconstructed vessel in different views. Bottom: a unique piece with an iconographic element (a paw?) from Md. 12 T1B–C/F.2-fin: (e) photo; (f) reconstructed vessel in different views. *Drawings by Ayax Moreno.*

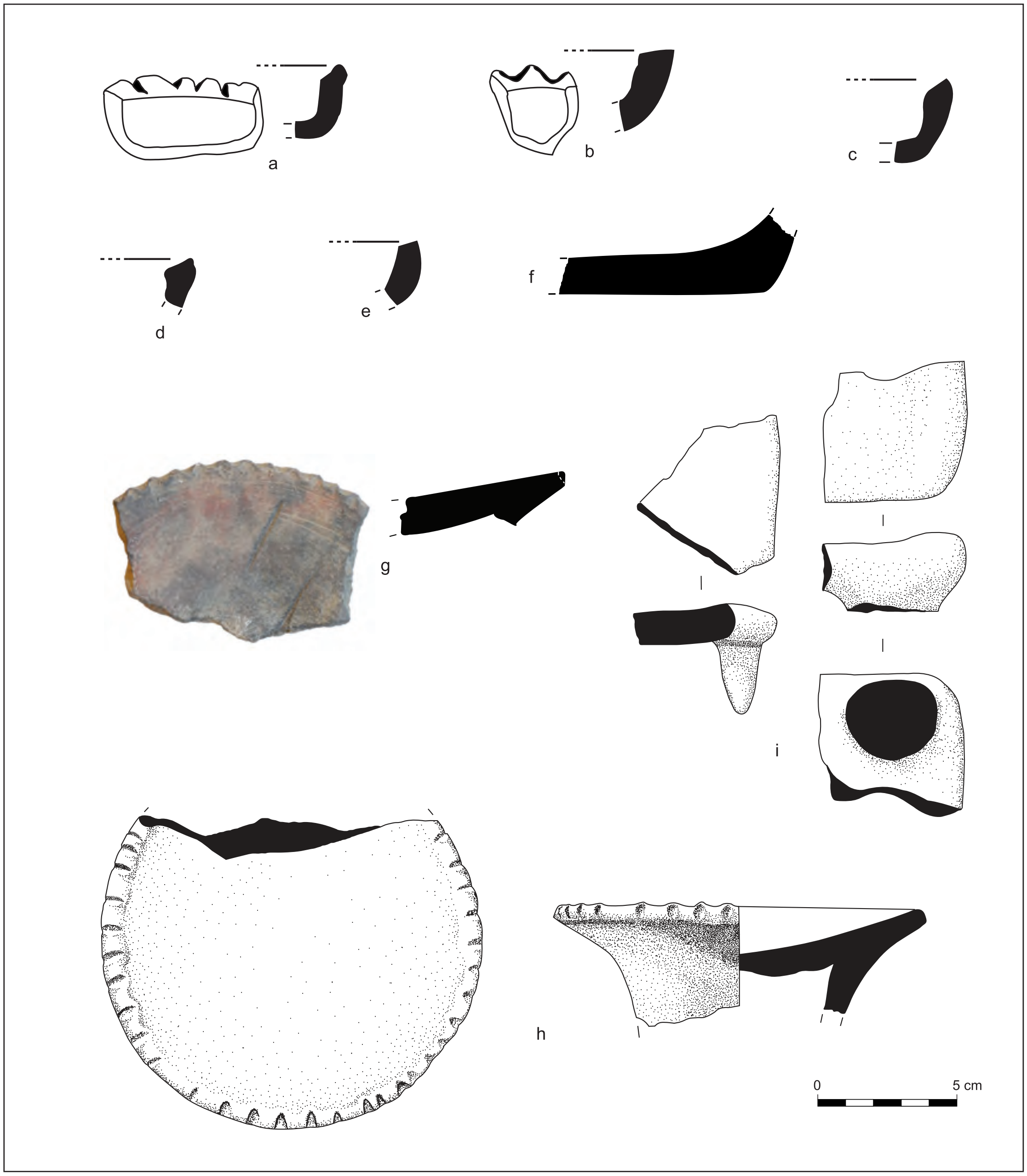


Figure 8.28. Coarse type: (a–e) roughly finished plates, possible censers; (f) flat base of very large, unslipped tecomate; (g, h) rectangular platform censers (C2); (i) round platform censer (C1); (j, k, l) pedestaled bowl-shaped censers (C3); (m, n, o) domed censers (C4); (p) rare censer type with a vertical tube.

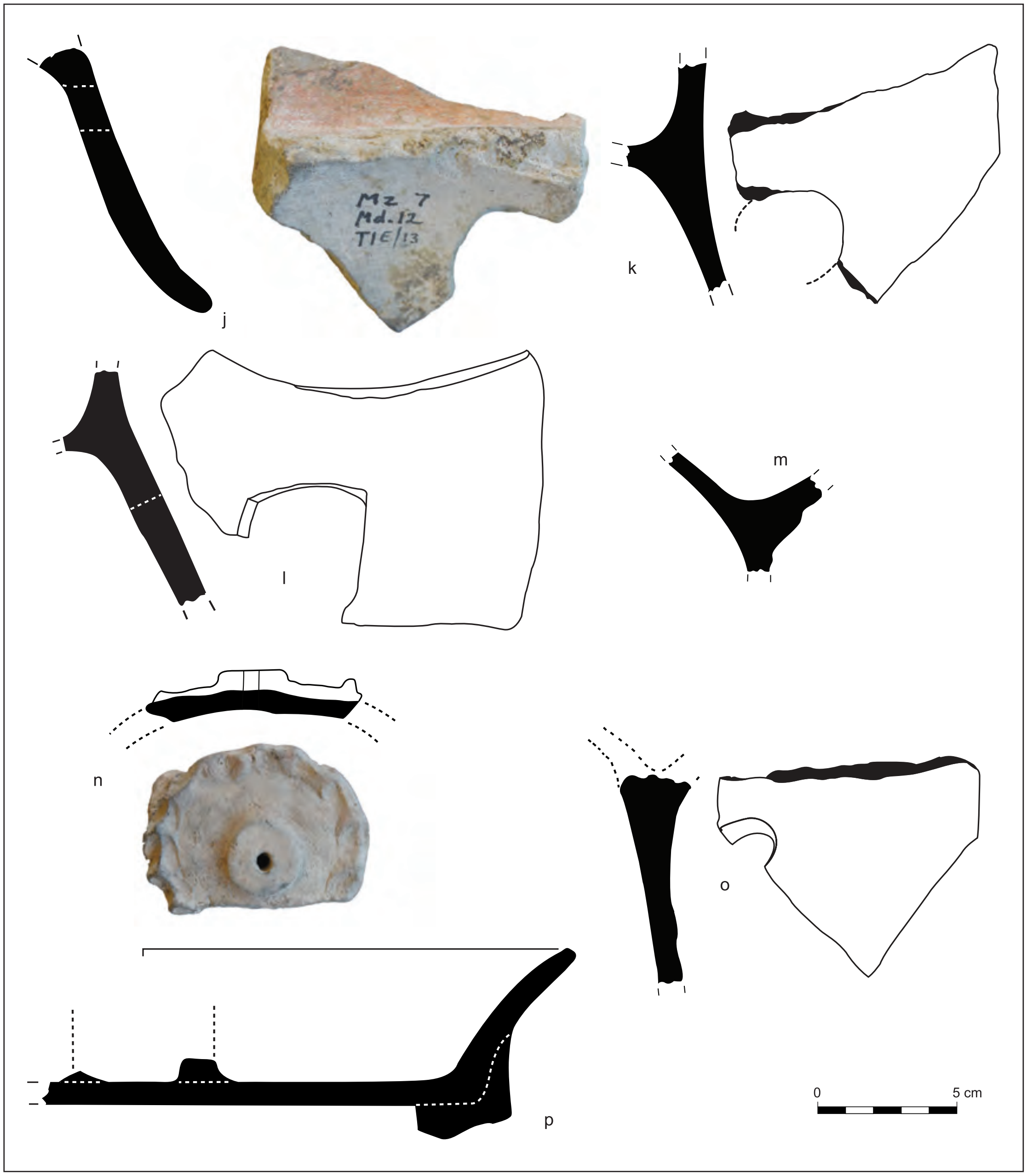


Figure 8.28. *continued*

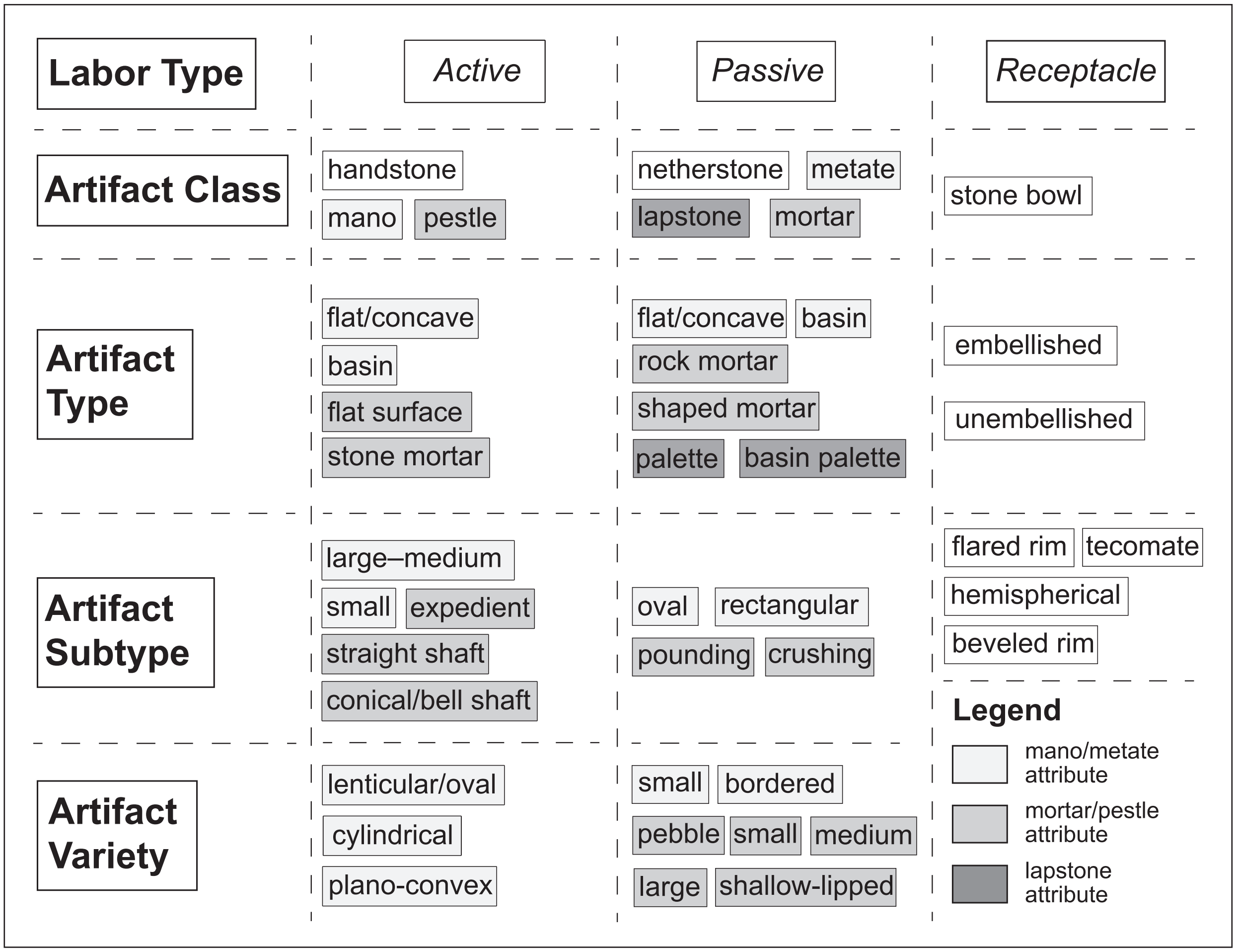


Figure 9.1. Schematic of the Paso de la Amada ground stone typology. Artifacts were classified in a Linnaean fashion into discrete classes, types, subtypes, and varieties. *Illustrations in this chapter by R. J. Sinensky.*

CHAPTER 9

Ground Stone Technology and Routine Food Processing at Paso de la Amada

R. J. Sinensky

THIS CHAPTER EXAMINES a subset of ground stone tools from the 1992–1997 excavations at Paso de la Amada, those used principally for processing activities. The ground stone assemblage includes more than 900 individual artifacts, and this analysis provides an opportunity to study grinding technology at the dawn of settled village life in Mesoamerica. The sizable assemblage allows for a detailed case study regarding not only the degree to which ground stone tools were manufactured and used to process particular foods during the second millennium BC but also whether diachronic trends indicative of cuisine change are present between 1700 and 1300 BC.

FOOD PROCESSING AND DAILY MEALS

Over the last 50 years, the question of "how much maize?" has dominated discourse on food processing during the Initial Formative and Early Formative periods. As of late, a number of researchers have argued that maize did not comprise a significant part of the Mesoamerican diet until the Middle Formative transition, at around 1000 BC (Blake 2006; Blake and Neff 2011; Clark et al. 2007, 2010; Kennett et al. 2006; Rosenswig 2006, 2010; VanDerwarker and Kruger 2012). Some scholars have attributed this shift to the development or introduction of more productive varieties of maize (Webster 2011), while others argue for increasing social complexity during the early first millennium BC as the trigger for agricultural intensification (Rosenswig et al. 2015; VanDerwarker 2006). While ground stone artifacts have played a minor role in these arguments (see Arnold 2009; Blake and Neff 2011; Clark 1994; Clark et al. 2007; Rosenswig 2010; Rosenswig et al. 2015), sample sizes have been small, and studies have mainly compared Initial and Early Formative to Middle Formative assemblages. Furthermore, such models typically draw a sharp contrast between the development of increasingly complex social and political structures as an inherently social process (Blake et al. 1992a; Chisholm and Blake 2006; Clark 2004a; Clark and Pye 2000; Clark and Gosser 1995; Rosenswig 2010; Smalley and Blake 2003) or as driven by nonsocial factors, including climate, demography, increasing sedentism, and, perhaps most notably, the increasing productivity of maize agriculture (Flannery 1986; Marcus and Flannery 1996; Webster 2011).

Here I argue that the Paso de la Amada ground stone assemblage can provide insight into an inherently social activity with important implications for the social, economic, and political trajectories of early villages in the Soconusco: routine food processing (Hastorf 2016; Kerner et al. 2015; Pollock 2015; Twiss 2007). This requires decoupling maize from its contentious status as either prime mover or prestige resource reserved for feasts during the Initial and Early Formative, and considering how a host of domesticated, cultivated, and wild resources were processed by community members through time at Paso de la Amada. Given that numerous archaeological studies have identified a strong relationship between cuisine change and social, economic, and political transformations (Bardolph 2014; Hastorf 1990, 2016; Hastorf and Johannessen 1993; Scarry 1993; Scarry and Steponitis 1997; VanDerwarker 2006; VanDerwarker and Kruger 2012), the dramatic pace of social change during the Initial Formative at Paso de la Amada offers an ideal case study to assess whether cuisine change occurred alongside burgeoning social complexity. Such an assessment, however, requires grounding our interpretation of Initial and Early Formative routine food processing in an assessment of similar practices by small-scale, mobile farmer-foragers during the Late Archaic period and proto-urban intensive agriculturalists during the Middle Formative period.

This study seeks to investigate the following questions:

1. What can the types of ground stone tools manufactured and used by community members at Paso de la Amada tell us about the routine processing activities that took place on the site?

2. Did the manufacture and use of ground stone change through time at Paso de la Amada? If so, how?

3. How does the ground stone assemblage at Paso de la Amada inform our understanding of change and/or continuity of foodways during the second millennium BC in the Soconusco?

4. To what extent were routine food processing activities at Paso de la Amada comparable with or distinct from Late Archaic and Middle Formative strategies? We are particularly interested in whether punctuated changes or subtle shifts are visible during the Late Archaic to Initial Formative transition and the Early Formative to Middle Formative transition.

The chapter begins with a review of methods. Then the ground stone typology is presented, including discussions of the differential design, use, and upkeep of discrete artifact types. Trends in the use, manufacture, and discard of ground stone artifacts between 1700 and 1300 BC are explored, as well as implications for our understanding of routine food and non-food processing activities. The Paso de la Amada tools are then compared to Late Archaic ground stone tools from the Soconusco and to well-published stone grinding tools from the Middle Formative site of La Libertad in central Chiapas.

METHODOLOGY AND SAMPLING STRATEGY

This analysis is structured to investigate the production, use, reuse, and discard of ground stone artifacts. It is assumed that several factors influence the production and use of such tools, including access to raw materials and the historical and technological traditions associated with particular forms of socioeconomic organization. Moreover, the technological style (*sensu* Dietler and Herbich 1998) reflected in the manufacture of ground stone tools reproduces the social learning frameworks of individuals within a community (Dobres 2000; Ingold 2001; Wenger 1998). Strongly or weakly patterned manufacturing traditions, modes of use, and even discard behavior reflect the enculturative networks of individuals and the community more broadly. Building on Schiffer (1987), Hayden (1987), and Adams (2014), this study seeks to track not only the life histories of artifacts by identifying morphological differences attributable to deliberate manufacture but also the differential use of artifacts through time. By tracking the manufacture, use, reuse, and discard of artifacts, this study seeks to simultaneously classify objects to a limited number of types and also account for the fact that Paso de la Amada community members used ground stone objects for multiple purposes, which may or may not match the initial task an object was manufactured to achieve.

Excavations recovered ground stone artifacts from a variety of screened and unscreened contexts, including midden deposits, domestic features, and extramural features. All recovered artifacts were analyzed by the author at the New World Archaeological Foundation in San Cristóbal de Las Casas, Chiapas, in 2016, using a 20x magnification hand lens. All mortars, pestles, stone bowls, rare specimens, and intact or nearly intact tools were examined using a stereoscopic microscope with 40x magnification. Analysis under a microscope helped identify pigment adhering in cracks and pores of artifacts. However, all specimens were washed prior to analysis; it is likely that pigment was washed off an unknown number of tools prior to analysis.

TYPOLOGY AND ATTRIBUTE ANALYSIS

Artifacts were classified in a hierarchical fashion (similar to a Linnaean taxonomy) into a number of discrete categories based on use, function, and morphology (Figures 9.1–9.6). At the broadest level, artifacts were classified into three categories. *Active ground stone* refers to objects that were physically manipulated to process a material, and *passive ground stone* to objects that were manufactured or used in conjunction with active ground stone. *Receptacles* were designed to contain and not process materials.

Within each category, artifacts were further subdivided into *classes* dependent on use. For example, an active artifact primarily used to process material via an up-and-down pounding or crushing motion was classified as a pestle, and an active tool primarily used to reduce material via the friction caused by a repetitive rubbing motion was classified as a mano. Active ground stone artifact classes include manos, pestles, and handstones. Passive artifact classes include, metates, mortars, netherstones, and lapstones. The receptacle category includes only stone bowls. All these artifact classes are described below.

Artifacts primarily designed for manufacturing activities, including abraders, hammerstones, polishing stones, pecking stones, reamers, perforators, and lithic anvils, are presented in Chapter 12. However, a number of ground

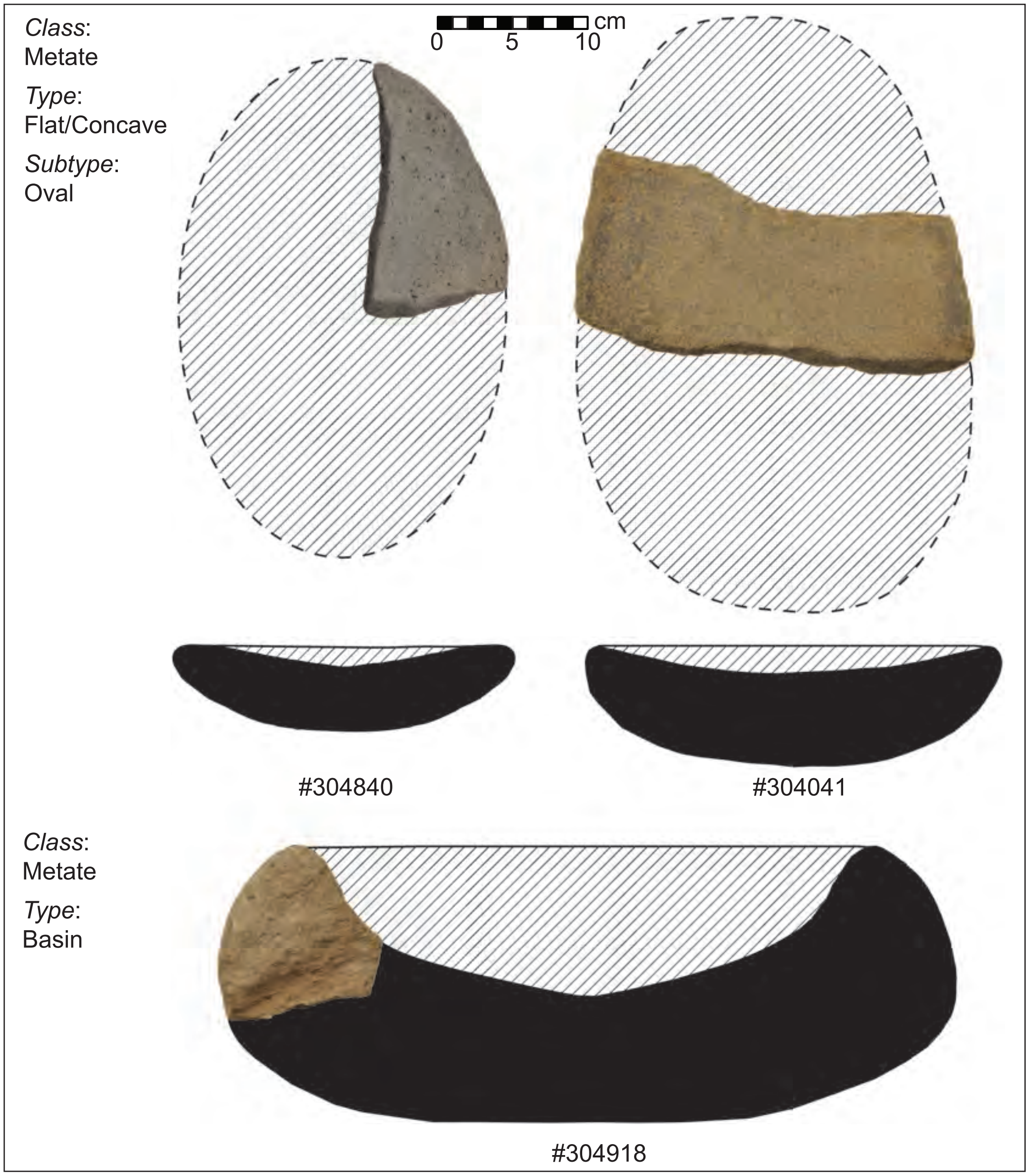


Figure 9.2. Oval flat/concave metates and basin metates from Paso de la Amada.

stone tools were designed for processing activities and subsequently reused for manufacturing activities. These artifacts are included in the current analysis, and manufacturing activities were recorded as secondary and tertiary uses.

Within each artifact class, objects were further delineated into types dependent on use. Since active and passive tools are used together, and the current typology prioritizes artifact life-history and function over form, classification of active tools references passive counterparts (*sensu* Adams 2014). For example, an active tool designed for food processing that was used with a reciprocal grinding motion on a flat or concave metate was given an artifact *class* of mano and an artifact *type* of flat/concave mano. However, an active ground stone tool that was used with a circular stroke on a passive basin metate was given an artifact *class* of mano and an artifact *type* of basin mano. If only a small mano fragment was recorded and type could not be discerned, the object was categorized only to the class level.

When a large enough sample of a particular artifact type was present, objects were further delineated into subtypes and varieties based on morphological design and use wear attributes. For example, flat/concave manos were classified as either medium-large or small subtypes based on their size (related to manufacture), and lenticular/oval, plano-convex, or cylindrical varieties based on their cross section (related to use). Since this typology groups objects used in a similar fashion together (that is, all manos used on

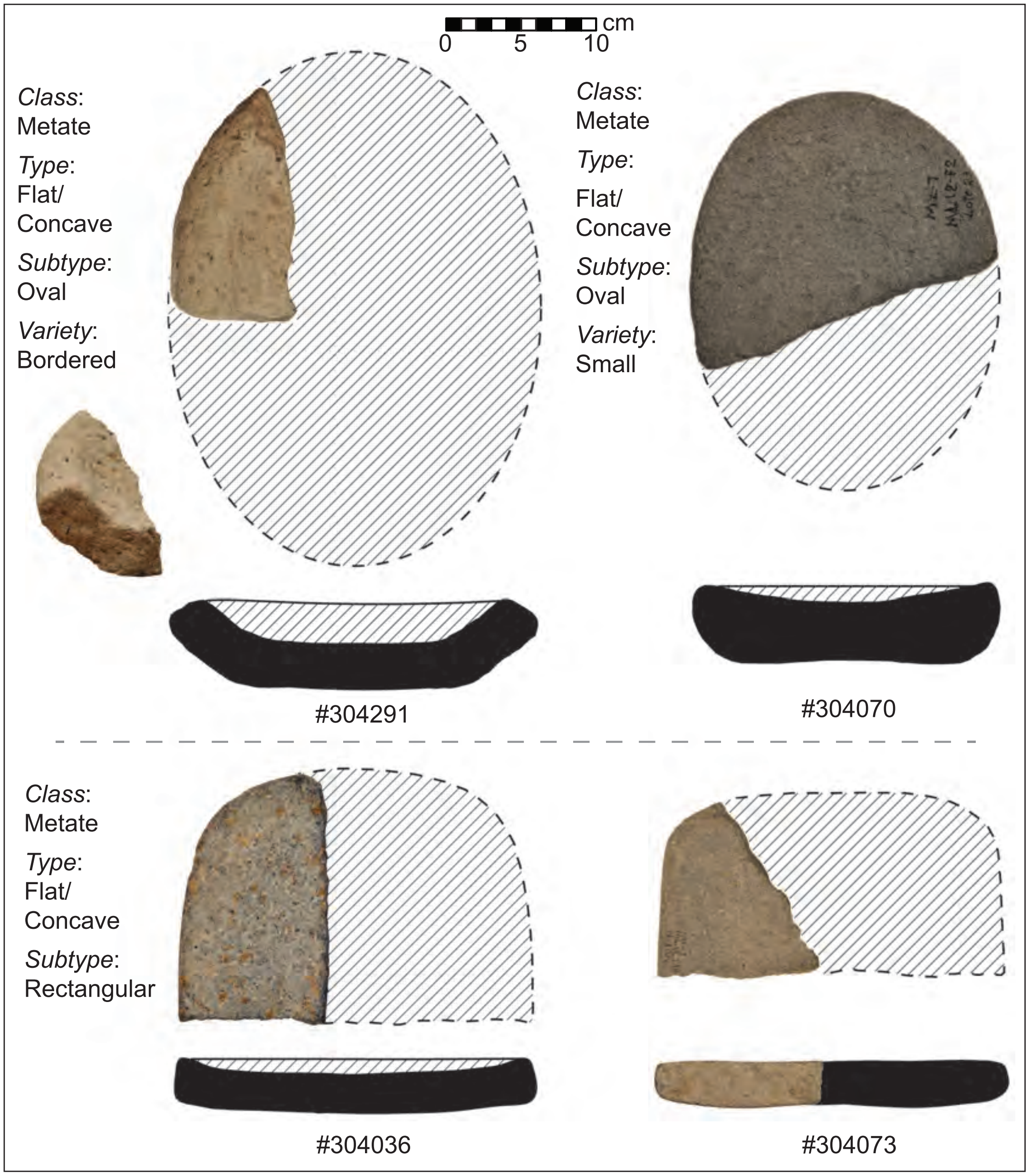


Figure 9.3. Oval flat/concave metate varieties and rectangular flat/concave metates.

a flat/concave metate as a single type), artifact types tend to be broader in comparison to earlier typologies devised for Formative-period ground stone tools in Chiapas (see Clark 1988), and subtype and variety categories are more akin to these previous type classifications. By primarily focusing on function, however, this study hopes to document how community members at Paso de la Amada processed food and non-food materials.

In addition to classifying artifacts into types, subtypes, and varieties, further attributes associated with artifact design, manufacture, use, and maintenance were recorded (Table 9.1). Recorded attributes associated with artifact manufacture and design include identifying whether objects were strategically designed, meaning intentionally shaped prior to use to increase grinding efficiency or conform to societal norms of tool production (Adams 2010, 2014:21; Buonasera 2012; Dietler and Herbich 1998), or were expedient and were shaped only by grinding activities. Raw material type, granularity, and durability of materials were also recorded.

Artifact use was assessed by identifying the primary, secondary, and tertiary uses of objects and considering whether nonprimary uses took place sequentially or concomitantly with designed use. For example, a mano may have been used with a reciprocal motion to process food and then as a hammerstone for bipolar reduction. The sequence of reuse from such activities would be evident because impact fractures from percussion would be superim-

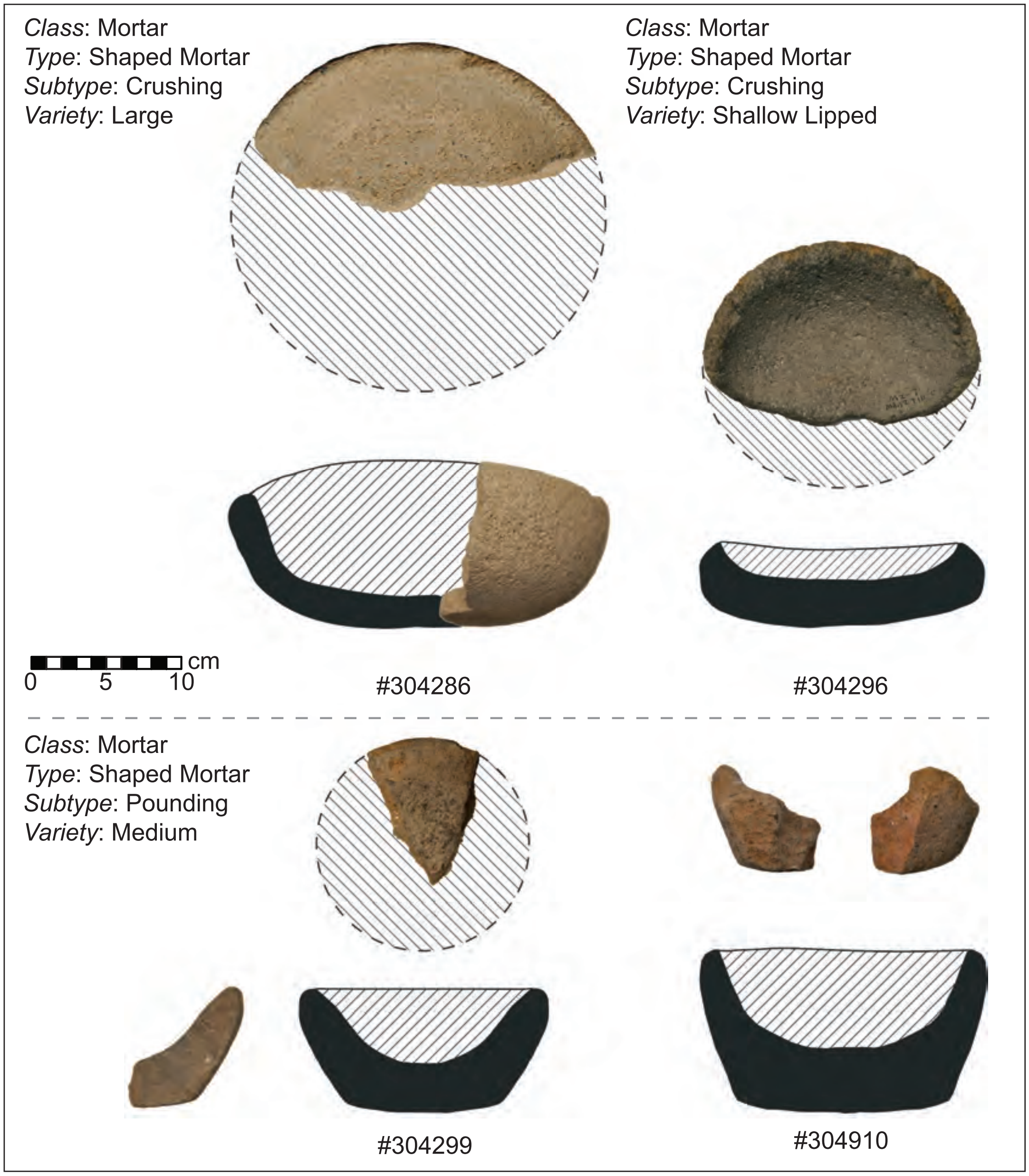


Figure 9.4. Large and medium-size crushing and pounding mortars.

posed on the ground mano surface. The relative intensity of grinding activities was also assessed by the amount and type of wear visible on the used surface (Table 9.1), and artifact maintenance was identified through use wear analysis, for example, by examining whether manos or metates were re-roughened to maintain grinding efficiency.

TEMPORAL CLASSIFICATION AND SAMPLE SIZE

A total of 927 artifacts are included in the assemblage (Figure 9.7). Of those, 476 artifacts could be assigned to Locona, Ocós, or Cherla contexts (Figure 9.8). Descriptions of the entire assemblage include all 927 specimens, while discussions of change through time include the 476 artifacts with detailed temporal information.

PASSIVE GROUND STONE

CLASS: METATE (*n* = 395)

The artifact class metate refers to the object against which material is processed using the friction created by drawing a handheld stone against a passive surface. Metates in the assemblage were classified into types based on the configuration of grinding surfaces (*sensu* Adams 2014:103–16). Artifacts were further classified into subtypes and varieties based on morphological attributes (Figure 9.9a, Table

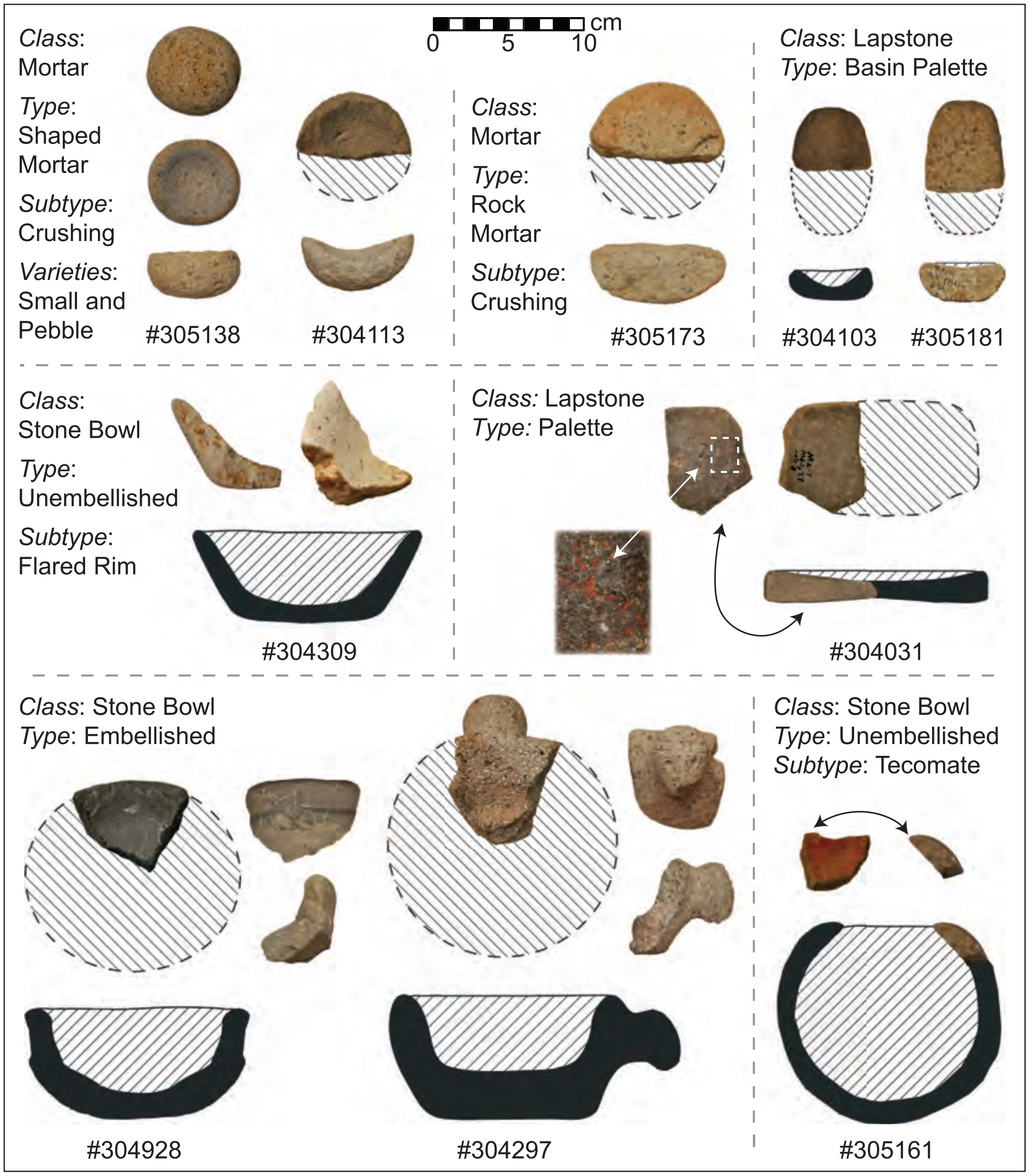


Figure 9.5. Small passive processing tools and stone bowls from Paso de la Amada. The inset of 304031 shows red pigment embedded in the pitted ventral surface of the artifact.

9.2). All 395 metates in the assemblage were fragmentary, and projections of length and width were made for only four objects. Metate fragments were the most common ground stone artifacts in the full assemblage (Figure 9.7) and each phase (Figures 9.8). Metates were classified as flat/concave or basin types (Figure 9.2), and two metate subtypes, oval and rectangular, were also identified (Figure 9.3). Twenty-six fragments could not be classified beyond class. A single metate with an intact width measuring less than 20 cm and a projected length less than 30 cm was classified as a small variety (Figure 9.3, 304070). Just over one-third of all metate fragments (n = 134) were fire-cracked, suggesting frequent recycling of worn-out and well-worn metates as hot rocks for stone boiling (Voorhies and Gose 2007).

Type: Flat/Concave Metate (n = 361)

Subtypes: oval (n = 76), rectangular (n = 16)

Varieties: bordered (n = 7), small (n = 1)

Flat/concave metates begin with a flat surface. Use wear from a back-and-forth (reciprocal) stroke eventually produces a shallow, elongated, concave basin and a gentle slope between the border and grinding surface. Artifacts comprising this type are morphologically similar

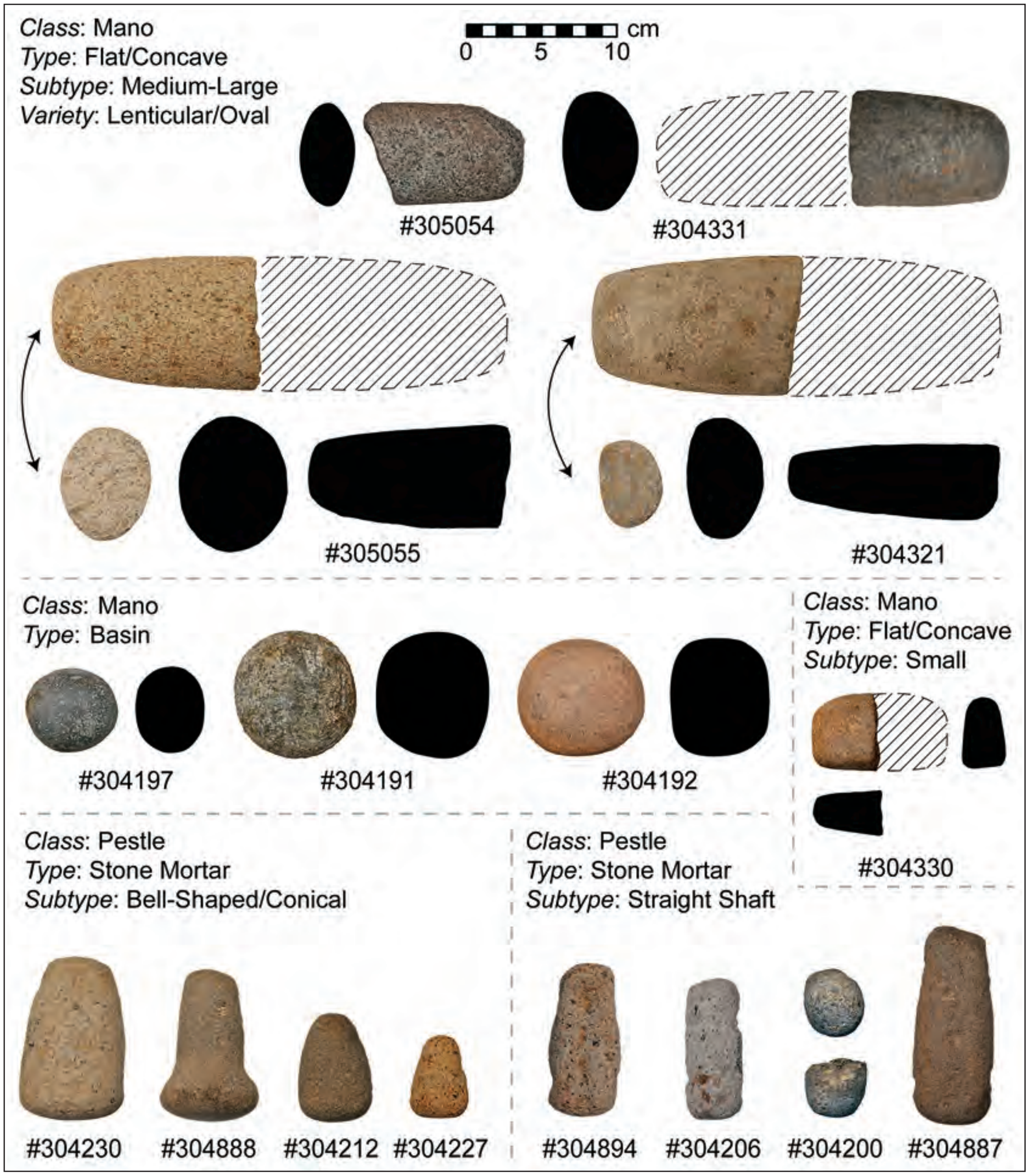


Figure 9.6. Manos and pestles from Paso de la Amada.

to Searcy's (2011) "western style" metate, Biskowski and Watson's (2013:215) "open style trough" metate, and particularly "ovoid plano-convex" metates from the Tehuacán Valley (MacNeish et al. 1967:118–20). In the current typology, the "trough metate" type is reserved for metates used with a reciprocal stroke that were intentionally manufactured with bordered rectangular basins prior to use. The term is not applied to the concave grinding slick that develops from use on a flat metate surface. Trough metates strategically designed with a border maintained through time exhibit a sharp angle between the restricted border and the edge of the grinding surface (see Adams 2014:107; Biskowski and Watson 2013:216). Metates that exhibit a far less pronounced rounded and obtuse juncture between the edge of the grinding surface and border are not considered trough metates since this shape can be formed by use. The current typology, therefore, contrasts with others that include any metate with a slight rim or a large deep basin in a "restricted" category (Clark 1988:94–95) and includes specimens previously considered bordered types (such as Clark's [1988:99–101] "shallow basin: boulder variety") and non-bordered types (such as Clark's [1988:106–07] "shallow basin: curve-sided" and "shallow basin: straight-sided" [109–110]) as flat/concave and not trough types. Several flat/concave metates did exhibit a rounded, obtuse, yet more distinctive border (Figure 9.3, 304291), comparing favorably with Searcy's (2011) "eastern style" metate and Biskowski's (1997) "closed style trough," but

Table 9.1. Nonmetric attributes recorded for ground stone artifacts

Attribute	First Trait	Second Trait	Examples
Design	strategic or expedient	comfort features	(a) strategically designed reciprocal mano (b) river cobble used as an expedient mano with a circular stroke
Use/reuse	primary, secondary, and tertiary uses	concomitant or sequential secondary uses	(a) nearly worn-out mano reused sequentially as a pestle (b) pestle used concomitantly as a hammerstone for bipolar reduction
Raw material	type and color of raw material	granularity,[a] durability,[b] and density[c] of raw material	(a) coarse-grained, durable, black vesicular basalt (b) medium-grained, less durable, white andesite
Use intensity[d]	degree of wear associated with primary use	degree of wear associated with secondary and tertiary use	(a) medium–large flat/concave mano with no evidence (unused/mano blank) or little evidence (light use) of modification from manufactured shape from use on a metate on either dorsal or ventral surfaces (b) strategically designed metate with a prominent, well-worn concave grinding surface (moderate use); a deep, strongly concave grinding surface (heavy use); or one that is worn through its thickness and is no longer usable (worn out)
Upkeep and maintenance	maintenance associated with primary use	maintenance associated with secondary use	(a) heavily worn metate with a repecked basin to maintain roughness (b) mano with a repecked ventral surface to maintain roughness
Use wear[e]	use wear associated with primary use	use wear associated with secondary use	(a) flat/concave mano with evidence of use with reciprocal strokes on dorsal and ventral surfaces (b) mortar with evidence of use with crushing strokes
Redesign and/or recycling	artifact intentionally redesigned for processing or manufacturing activities	artifact recycled for activity unrelated to processing or manufacture	(a) broken oval flat/concave metate fragment redesigned as a lapstone by smoothing out rough edges along break and reshaping (b) worn-out or nearly worn-out mano recycled as hot rock for stone boiling

[a] Granularity was classified into three categories: coarse-grained, medium-grained, fine-grained.
[b] Durability was classified on a scale of 1 to 5 (low to high).
[c] Density was measured by dividing mass by volume. Volume was documented by placing each artifact in a graduated cylinder and measuring water displacement.
[d] Wear was classified to one of five categories: (1) unused, (2) light use, (3) moderate use, (4) heavy use, (5) worn out.
[e] Use wear was documented using 10x and 20x magnification hand lenses and a stereoscopic microscope with 40x magnification.

these were rare in the assemblage (n = 7) and were classified as bordered varieties of flat/concave metates since they were also used with a reciprocal motion and did not exhibit evidence of upkeep along the border and the grinding surface.

Most flat/concave metates were strategically designed, usually from medium- to coarse-grained, moderately durable gray andesite or less durable white andesite, but higher-quality materials, including vesicular basalt and granite, were used in small quantities. Strategically designed, flat/concave metates have been used primarily to grind maize, and secondarily other foods, in Mesoamerica from the Formative period to modern times (Biskowski 1997; Biskowski and Watson 2013; Clark 1988, Hayden 1987; Searcy 2011). Ethnographic and archaeological research in Chiapas suggests that worn-out and broken flat/concave metates were used for a variety of less frequent processing tasks (Clark 1988:103; Hayden 1987:188; see also Searcy 2011:76), and the Paso de la Amada assemblage also exhibits common reuse of broken and worn-out flat/concave metates for grinding tasks that did not require a reciprocal stroke.

Two flat/concave metate subtypes were identified, although most specimens were too fragmentary to be classified to this degree of detail. The most common metate subtype had an oval shape in plan-view, with rounded corners (or lack of clear corners) and a slightly convex base (Figure 9.2, 304840, 304041). The four metates intact enough to project lengths and widths were oval- subtypes, measuring 40.0 x 27.1 cm (304041, width intact), 32.5 x 24.5 cm (304291), 32.1 x 23.1 cm (304840), and 22.5 x 17.7 cm (304070, width intact) respectively. The latter was classified as a "small variety" to distinguish this artifact from the overwhelming majority of oval flat/concave metate fragments in the assemblage, which were remnants of larger tools. Measurable specimens (n = 37) had a mean thickness of 4.6 cm. Oval metates resemble Clark's (1988:107–8) "shallow basin: boulder/thin boulder varieties" from La Libertad, "legless slab metates" from Chiapa de Corzo (Lee 1969:118), the "ovoid plano-convex metates" from the Tehuacán Project (MacNeish et al. 1967:118–19), metates from Altamira (Green and Lowe 1967:28–29), and metates from La Victoria and Salinas La Blanca (Coe and Flannery 1967:Plates 21–22). Oval flat/concave metates

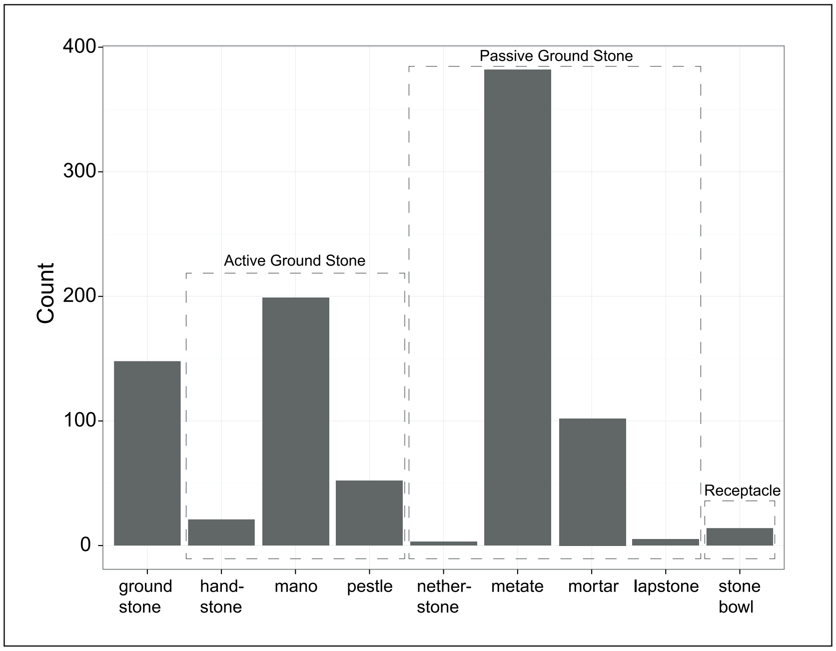


Figure 9.7. Ground stone tools organized by artifact class from the broader Initial Formative and Early Formative assemblage, 1700–1300 BC.

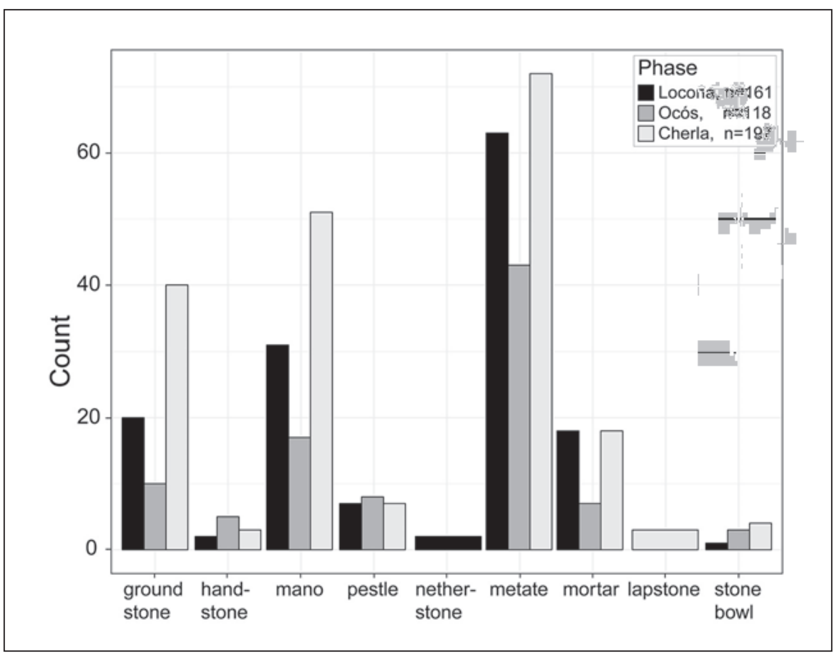


Figure 9.8. Ground stone tools organized by artifact class from Locona (1700–1500 BC), Ocós (1500–1400 BC), and Cherla (1400–1300 BC) contexts.

were the most common passive ground stone tools classified to subtype in the broader Initial Formative and Early Formative assemblage and were likely the most common passive food processing tools throughout the occupation at Paso de la Amada.

The second identified subtype had a sub-rectangular shape in plan-view with more prominent "corners" and parallel, flat to slightly convex margins nearly flush with the ventral surface (Figure 9.3, 304073, 304036). Projected widths for the two most intact specimens measure 22.6

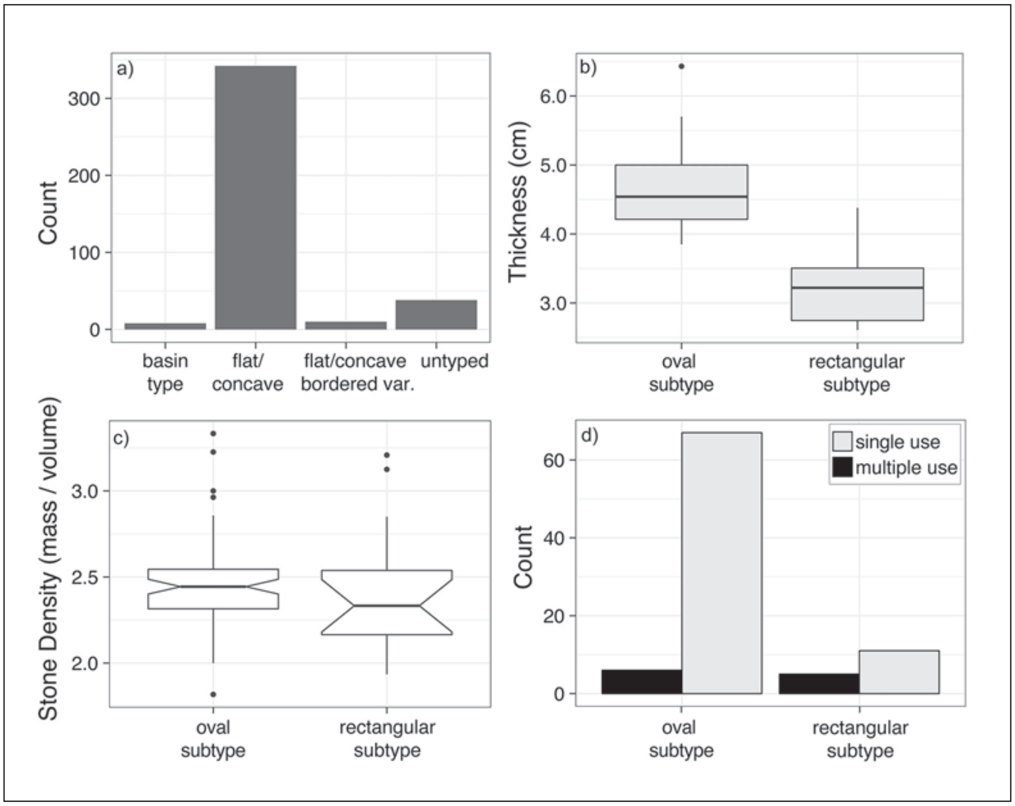


Figure 9.9. Analyses of metates in the broader Initial Formative and Early Formative assemblage: (a) counts of metate types; (b) oval and rectangular flat/concave metate thicknesses; (c) oval and rectangular flat/concave metate stone densities; (d) counts of single-use and multiple-use oval and rectangular flat/concave metates.

cm and 21.8 cm, respectively. No specimens were intact enough to project length. Although both oval and rectangular plan flat/concave metates were used with a reciprocal mano stroke, several lines of evidence suggest that rectangular metates were used for specialized functions. Oval metates are longer, wider, and thicker than their rectangular counterparts (Figure 9.9b). Oval metates were also made from higher-quality, coarser, and denser materials compared to rectangular metates (Figure 9.9c). Furthermore, while 31 percent of rectangular metates were used for pigment processing and manufacturing activities, only 9 percent of oval plan metates exhibited similar evidence (Figure 9.9d). Rectangular flat/concave metates compare favorably to Ceja Tenorio's (1985:112) "small slab-metates" and Clark's (1988:108) "thin, straight sided, square corner variety" (see also Coe 1961:102).

Type: Basin Metate (n = 8)

Basin metates have circular to oval grinding basins and are designed for, and primarily used with, a rotary motion using a small circular or oval mano that is held in a single hand. This sets basin metates apart from flat/concave and trough metates, which are designed for, and used exclusively with, a reciprocal motion (Adams 2014:104–7; Clark 1988:95). It should be noted that use of the term *basin metate* in this chapter differs from that of some previous research in the region in that others have referred to all tools used with a rotary motion as "mortars" (Biskowski and Watson 2013) and metates with pronounced concave grinding surfaces as "basin metates" regardless of whether they were used with a reciprocal or circular stroke (Clark 1988).

All examples recovered from Paso de la Amada were fragments too small to project length or width, but the mean thickness of three specimens with representative thickness intact measured 7.5 cm, greater than all other metate types and subtypes. Figure 9.2 displays a postulated reconstruction of a basin metate based on a fire-cracked shoulder fragment (304918) to illustrate the contrast between the thinner, more portable reciprocal stroke metates that dominate the assemblage and these thicker metates paired with a small circular mano, held in a single hand, and used with a circular stroke.

The basin metate fragments in the Paso de la Amada assemblage compare favorably to the "boulder metate milling stones" from the Tehuacán Project (MacNeish et al. 1967:117–18). Basin metates were used to process tougher foraged and cultivated foods throughout the Archaic pe-

Table 9.2. Attributes of metate types and subtypes

Type/Subtype	N	Maximum Length (cm)[1]	Minimum Length (cm)[a]	Mean Length (cm)[a]	Maximum Width (cm)[b]	Minimum Width (cm)[b]	Mean Width[b] (cm)	Mean Thickness[c] (cm)	Reuse
flat/concave type	361	40.0	22.5	–	27.1	17.7	–	4.1	7%
basin type	8	–	–	–	–	–	–	7.5	13%
oval subtype[d]	75	40.0	32.1	36.0	27.1	23.1	24.9	4.6	9%
rectangular subtype	16	–	–	–	22.6	21.8	22.1	3.2	31%
bordered variety	7	–	–	32.5	–	–	24.5	5.2	20%
small variety	1	–	–	22.5	–	–	17.7	4.6	–

[a] Length projected using the curvature of large metate edge fragments.

[b] Projected and intact widths included.

[c] Only metates with intact thickness included. However, many fragments represent the grinding surface and not the shoulder, and manufactured thickness would be greater (see Figures 9.2 and 9.3).

[d] Does not include small variety (n = 1).

riod (MacNeish et al. 1967) and have been found at preceramic sites in Chiapas (MacNeish and Peterson 1962). Basin metates were found in Locona (n = 2) and Ocós (n = 2) contexts.

CLASS: MORTAR (n = 93)

Mortars are distinguished from metates by being used primarily for crushing, pounding, and stirring actions with a pestle instead of a mano (Adams 2014:132–37). Mortars are usually circular and have basins deep enough to ensure that a substance is confined when processed using crushing or pounding strokes (Figure 9.4, 304286, 304299, 304910). I distinguished between stone bowls and shaped mortars on the basis of use wear in the mortar basin (see Adams 2014:140–41). A pounding action (raising a pestle high and thrusting it down into a mortar) produces deep impact fractures. A crushing action (using the weight of a pestle in a downward motion) produces flattened stone grains and far less dramatic impact fractures (Adams 2014:30, 45). The use of rotary strokes with a pestle in a mortar basin, here referred to as stirring, can obliterate evidence of both pounding and crushing. While rotary strokes in a basin metate and stirring in a mortar produce similar wear patterns, a basin metate is designed to maximize the efficiency (*sensu* Buonasera 2015) of rotary strokes with a mano, while a mortar is designed to maximize the efficiency of pounding and crushing strokes with a pestle.

Ethnographic research in Mesoamerica likely does not provide a suitable analog for Initial and Early Formative mortar use. For example, Hayden (1987) noted only a single household with a mortar and pestle (used primarily for making chile). At Paso de la Amada, the mortars and pestles together make up 15.6 percent of the ground stone assemblage. To the author's knowledge, only a single strategically designed mortar is represented from all Late Archaic contexts in the Soconusco (Clark 1994:145; Clark et al. 2007:29–30; Voorhies 2004:381–84), and this artifact is poorly provenienced since it was recovered by a landowner on the site of San Carlos (Clark 1994:142). In the Tehuacán Valley, however, mortars have been found in small quantities in Late Archaic deposits, and larger quantities in Early and Middle Archaic deposits (MacNeish et al. 1967:114–15).

It seems likely that mortars were used to process different types of food compared to flat/concave metates and basin metates, but it is currently unclear whether the mortars at Paso de la Amada represent continuity with Late Archaic food processing practices (see also Clark 1994:242). The latter point is addressed at greater length in the discussion portion of the chapter.

Two mortar types, rock mortars and shaped mortars, were identified based on differences in design (Figures 9.4, 9.5). Two mortar subtypes, crushing mortars and pounding mortars, were distinguished based on use wear and morphology (Figure 9.10a). Four mortar varieties were distinguished based on size, which likely corresponds to a degree with function (Figure 9.10b). Large varieties had an exterior diameter between 35 to 20 cm, medium mortars ranged from 20 to 10 cm, small mortars measured between 10 to 5 cm, and pebble mortars had an exterior diameter of less than 5 cm (Table 9.3). Seven mortar fragments were not categorized beyond class.

Type: Rock Mortar (n = 5)

Subtypes: pounding (n = 1), crushing (n = 2)

Rock mortars are portable rocks with pecked basins for pestle use but little evidence for shaping of the exterior of the object (Adams 2014:128). Rock mortars represent only 5 percent of the mortar assemblage at Paso de la Amada.

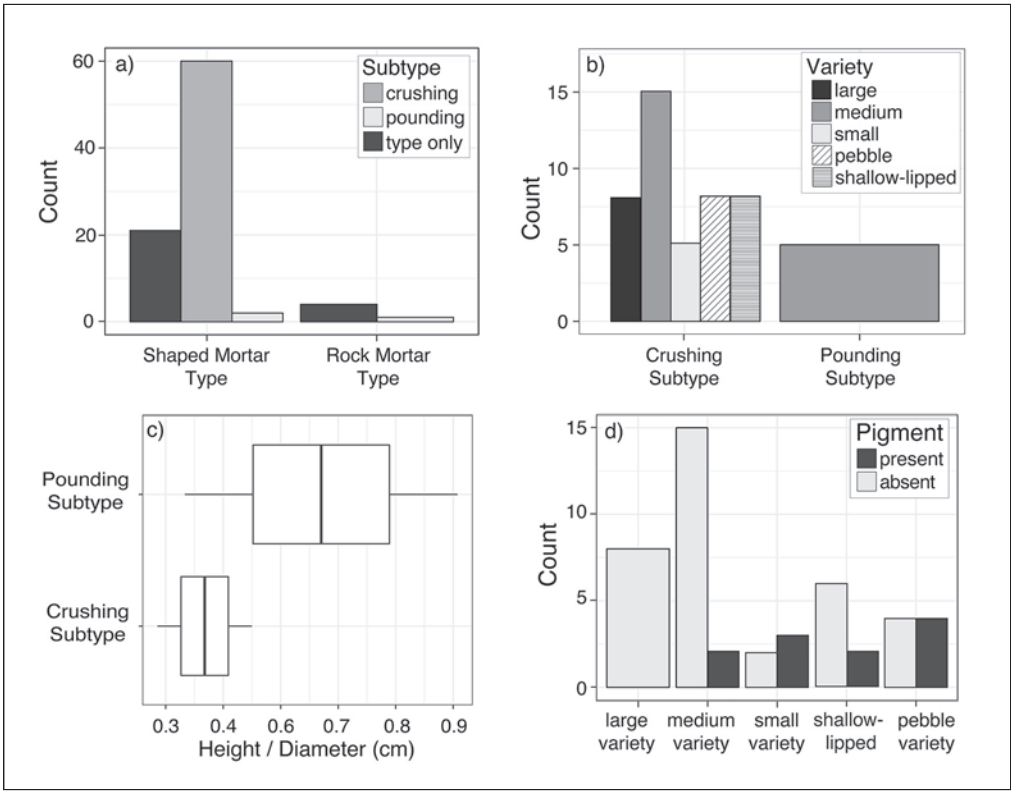


Figure 9.10. Analyses of mortars in the broader Initial Formative and Early Formative assemblage: (a) mortar type and subtype counts; (b) counts of crushing and pounding mortar varieties; (c) box plot showing the distinctive relationship between vessel height and vessel diameter when comparing pounding and crushing subtype mortars; (d) mortar varieties with evidence of pigment processing.

Table 9.3. Mortar type, subtype, and variety measurements and attributes

Type/ Subtype/Variety	N	Mean Diameter (cm)[a]	Mean Height (cm)	Mean Base Thickness (cm)	Mean Mortar Depth (cm)	Secondary Use	Pigment
rock mortar	5	7.0	5.4	4.9	0.5	20%	40%
shaped mortar[b]	81	16.8	5.1	2.6	3.0	7%	9%
crushing subtype	62	15.0	4.9	2.5	2.4	6%	11%
pounding subtype	5	14.7	6.5	3.9	5.3	0%	0%
large variety[c]	12	27.7	7.7	2.2	6.0	0%	0%
medium variety[d]	21	15.7	5.8	2.3	4.7	8%	8%
small variety	5	7.2	4.3	2.3	1.7	0%	40%
pebble variety	8	5.2	2.7	1.5	1.0	13%	50%
shallow-lipped variety[e]	8	15 x 13	4.1	2.5	1.6	13%	25%

[a] Diameter was estimated using a sheet with projections.
[b] Includes 14 designed artifacts designated to an undifferentiated mortar/stone bowl class.
[c] Includes four artifacts with a class of mortar/stone bowl.
[d] Includes three artifacts with a class of mortar/stone bowl.
[e] Lengths and widths are listed for this oblong variety.

One rock mortar was found in a Locona context and two in Cherla contexts. Use wear indicative of both pounding and crushing was visible in mortar basins. The single example of the pounding rock mortar subtype was larger (projected diameter of 15 cm) and taller (maximum height of 5.4 cm) compared to crushing subtype rock mortars, which ranged in thickness from 2.2 to 3.8 cm. All crushing rock mortars were classified as small or pebble varieties (Figure 9.5, 305173).

Type: Shaped Mortar (n = 81)

Shaped mortars are portable rocks with pecked basins that are intentionally manufactured into a particular shape. Shaped mortars were the most common mortar type at Paso de la Amada (with 81 of the 86 mortars identified to type classified as such). Two mortar subtypes were identified based on use wear and artifact morphology.

Subtype: pounding (n = 4)

Varieties: medium (n = 4)

Mortars interpreted as primarily used for pounding were identifiable from use wear in mortar basins and by distinct morphology. Pounding mortars were not common in the assemblage but had thicker bases and deeper basins compared to their crushing counterparts (Table 9.3). The juncture between the base and walls of a pounding mortar flares slightly outward, creating a rounded but obtuse angle. The base of the interior basin is flat to slightly concave and comprises far less surface area of the mortar basin due to the outward-flaring walls (Figure 9.5, 304299, 304910). These flaring walls and the small interior basin restrict the pounding action to direct contact with the substance being processed. This is quite different from crushing mortars, which have a larger interior basin area more suitable for crushing and stirring strokes. The morphological distinction between pounding mortars and crushing mortars is most succinctly displayed by dividing vessel height (maximum measurement of exterior rim to exterior base) by vessel diameter for these mortar subtypes (Figure 9.10c). Pounding mortars appear to be morphologically similar to the "flat-bottomed mortars with flaring rims" from the Tehuacán Project (MacNeish et al. 1967:116–17) and the "thick-walled bowls or mortars" from Conchas-phase deposits from La Victoria (Coe 1961:Plates 42, 61).

Subtype: crushing (n = 62)

Varieties: large (n = 8), medium (n = 15), small (n = 5), pebble (n = 8), shallow-lipped (n = 8)

Sixty-two of the 81 shaped mortars are classified as crushing subtypes. While these mortars may also have been used periodically with pounding strokes, artifact morphology and use wear suggest they were designed and used primarily with crushing and stirring strokes. Crushing mortars are round to oval in plan-view. They usually have shorter, gently sloping walls and very concave interior basins. Walls are generally thinner than bases, but this disparity is muted in comparison to pounding mortars. Thickness at vessel rim ranged from 0.4 to 2.1 cm, vessel height (maximum measurement of exterior rim to exterior base) ranged from 8.5 to 3.0 cm, basin depth ranged from 6.5 to 0.3 cm, and vessel diameter ranged from 5.0 to 32.5 cm. Crushing mortars appear generally similar to the "hemispherical mortars" identified from the Tehuacán Project (MacNeish et al. 1967:116), and "hemispherical bowls or mortars" from prior excavations at Paso de la Amada (Ceja Tenorio 1985:Figures 59m–p, 60o–p).

Forty-four crushing mortars were classified to variety, with medium (n = 15) and large (n = 8) varieties making up the bulk of the assemblage but with small (n = 5) and pebble (n = 8) varieties also represented. Nearly half of the small and pebble mortars in the assemblage were used to process red pigment (Figure 9.10d), and these tools and their active counterparts should not be considered food processing equipment.

Eight distinctive crushing mortars were classified as shallow-lipped varieties. These mortars are oval to oblong in plan-view and have short, thick, stubby walls that slope gently to a broad, shallow, slightly concave grinding area, with an average depth of 1.6 cm from the rim to the base of the grinding surface (Figure 9.4, 304296). Projected lengths and widths fall between 12 and 18 cm. Shallow-lipped mortars compare favorably to the "saucer shaped lipped" and "oblong lipped" metates found almost exclusively in Early and Middle Formative deposits in the Tehuacán Valley (MacNeish et al. 1967:115). Indeed, MacNeish et al. (1967:120) note that such passive tools reach their peak popularity during the Ajalpán phase, contemporary to our Initial Formative and Early Formative periods at Paso de la Amada. Many of the Tehuacán examples had red pigment adhering to the interior of grinding basins (MacNeish et al. 1967:120). Two of the eight specimens from Paso de la Amada contain visible pigment, but all artifacts were washed prior to analysis. Coarse-grained, soft, lightweight raw materials were preferentially used to manufacture these artifacts at both Paso de La Amada and in the Tehuacán Valley (MacNeish et al. 1967:120).

Shallow-lipped mortars occupy a gray area between metates and mortars. Use wear suggests a combination of crushing, circular, and reciprocal strokes. While no manos were clearly designed as the counterpart to shallow-lipped mortars, several small conical-shaped pestles in the assemblage have flat or slightly convex grinding surfaces used for crushing and stirring, and they are the most likely active complement to these artifacts (Figure 9.6, 304227; see pestle discussion). Similar to shallow-lipped mortars, small conical pestles were also made from less dense raw materials, usually a porous white andesite. Unlike pounding and crushing mortars, the low height of the shallow-lipped mortar walls would not preclude use of a handstone. Shallow-lipped mortars were a minor but important component of Initial Formative, Early Formative, and Middle Formative tool kits, used mainly to process non-food materials.

CLASS: NETHERSTONE (n = 3)

Netherstones are passive ground stones that are too large to fit in the user's lap but not manufactured to be used with a particular class of active ground stone. For example, a large unshaped object that exhibits use wear indicative of a reciprocal or circular stroke, and impact fractures associated with crushing activities, would be classified as a netherstone. The boundary between expedient metates and netherstones can be fuzzy, but in the current typology, an unshaped object repeatedly used as a passive ground stone with a reciprocal mano stroke was considered an expedient flat/concave metate (only 1 percent of this type), while a large unshaped passive ground stone used for general grinding activities was considered a netherstone. Production of ground stone ornaments and bone tools often requires the use of a generalized passive ground stone such as a netherstone. Three objects used primarily as netherstones were present in the assemblage, although broken metates were frequently reused as netherstones. Two netherstones, one made from a medium-grained gray andesite and another made from a fine-grained siltstone were associated with Locona contexts, while a less durable specimen made from a medium-grained white andesite could not be assigned to a phase.

CLASS: LAPSTONE (n = 6)

Lapstones are small, handheld, passive grinding stones used to shape objects or process substances. Lapstones are often associated with manufacturing activities such as shaping ornaments and tools but can also be used for pigment processing. Adams (2014:151) notes that the difference between abraders and polishing stones in comparison to lapstones is that lapstones are the passive stones against which a material is worked, while abraders and polishing stones are active objects that are used against another object. Although lapstones are often expedient, most in the Paso de la Amada collection were strategically designed. Forty percent of the lapstones had evidence of pigment processing.

Six lapstones were present in the assemblage, and two of these could be assigned to the Cherla phase. Two are expedient, and the four remaining artifacts were classified to two subtypes. Although few specimens were present, two distinct lapstone subtypes were identified.

Type: Palette

Two objects were classified as palette lapstones (Figure 9.5, 304031). Both are fragmentary but share morphological similarities, including squared-off margins and a sub-rectangular plan-view, and they measure between 1.5 and 2.5 cm in thickness. Both palettes displayed evidence of use with small, flat, or slightly convex handstones used with a reciprocal motion. This motion produced a slightly concave dorsal surface on both specimens. Abundant red pigment remains embedded in vesicles and pitted areas on the ventral surfaces of both palettes. It is somewhat counterintuitive that pigment is concentrated on the ventral surfaces of both palettes, but this is likely a result of the artifacts being washed prior to analysis or infrequent processing on the ventral surface that did not produce clear evidence of use wear. The dorsal surface of 304031, the palette from Cherla contexts, exhibited impact fractures along the broken edge that were not associated with artifact upkeep or reuse, and it seems likely that the palette was intentionally destroyed.

Type: Basin Palette

Two strategically designed lapstones were classified as basin palette types (Figure 9.5, 305181, 304103). These distinctive objects were oblong to oval in plan-view and exhibit a shallow elongated basin with gently sloping interior walls. Both examples had designed, flat bases on the exterior. These elongated interior basins were designed prior to use but were accentuated by repeated reciprocal strokes with a tiny active grinding stone. Although the two objects have a similar designed shape in plan-view and cross section, one was made from less durable, coarse-grained, porous white andesite (305181), and the other, dating to the Cherla phase, was made from a durable, very fine-grained material, possibly a siltstone (304103). The latter had experienced heavy use, with less than one-third of its manufactured thickness remaining. Red pigment and striations indicative of a reciprocal stroke were visible in the Cherla-phase example. The less durable example exhibited far less intensive use. Unlike the small and pebble mortars with pigment staining, evidence of crushing was not visible in either of the basin palettes.

Function and Dating

Although sample size is small (n = 25), the Paso de la Amada assemblage offers considerable evidence for changing pigment processing practices. During the Initial Formative, community members processed pigment in shallow-lipped mortars, small mortars, and pebble mortars (Table 9.4, Figure 9.11). Less dense raw materials were preferred in the design of the larger, oblong-shaped, shallow-lipped mortars (mean length 15.0 cm; mean stone density 2.16) in comparison to the smaller and rounder pebble and small mortars (mean diameter 6.1 cm; mean stone density 2.41). Contrasting design and raw material selection suggests that these Initial Formative passive pigment processing tools were designed and used for distinctive pigment processing activities. Following the onset of the Early Formative,

Table 9.4. Passive pigment processing tool counts

Phase	Shallow-Lipped Mortar	Small and Pebble Mortars	Palette	Basin Palette	Total
Locona	2	5	–	–	7
Ocós	1	–	–	–	1
Cherla	–	2	2	1	5
1700–1300 BC undifferentiated	5	6	-	1	12

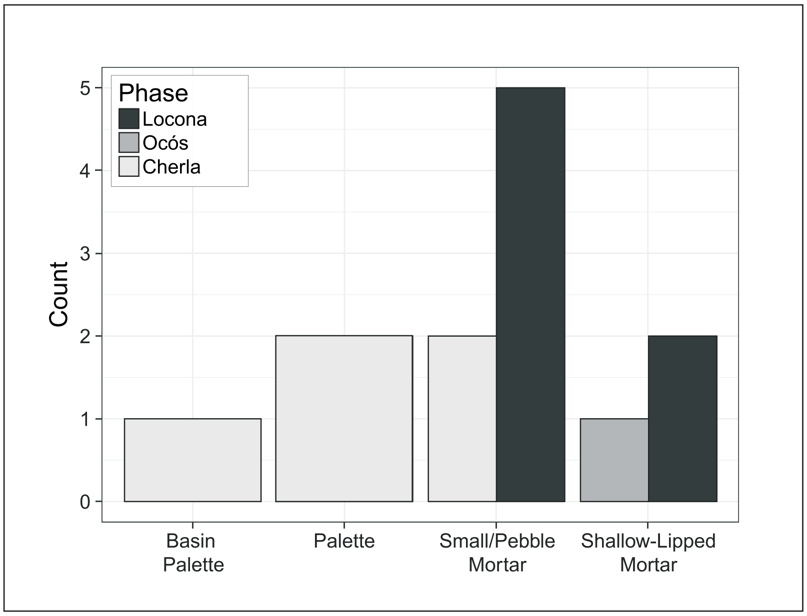


Figure 9.11. Counts of pigment processing tools from Locona, Ocós, and Cherla contexts.

shallow-lipped mortars fell out of use and were replaced by new pigment processing tools, palettes, and basin palettes made from dense, fine-grained raw materials (mean density 2.81). The use of small and pebble mortars for pigment processing continued, but these are present in lower frequencies. It seems plausible that such changes are related to decreasing production of red-slipped ceramics in the Soconusco (Chapter 8), changes to ceremonial dress at Paso de la Amada (see Lesure 2011:140), and broader social changes following the onset of the Early Formative phase, but a more thorough analysis of this relationship is beyond the scope of the current work.

ACTIVE GROUND STONE

CLASS: MANO (n = 200)

Manos are the active grinding stones used against their passive counterpart, metates. Manos can be strategically designed and pecked into a specific shape prior to use or can be expedient, with no modification other than the grinding. Of the 200 manos in the assemblage, 185 were classified to type, 80 were classified to subtype, and 74 were classified to variety (Figure 9.12a–b). Mano types were limited to flat/concave, used with a reciprocal stroke in flat/concave metates and basin types, used with a circular stroke in basin metates (see Adams 2014 regarding classifying active tools based on their passive counterparts). The latter are rare at Paso de la Amada. Two mano subtypes were identified for flat/concave manos: medium to large, and small. Some medium to large flat/concave manos were further subdivided into varieties. Varieties were delineated based on cross-section view, which is primarily the result of differential wear in a metate. Varieties include lenticular/oval, cylindrical, and plano-convex. Only seven complete manos were present in the assemblage, and few additional specimens were intact enough to permit inference of a projected length or width (about 50 percent intact). Complete

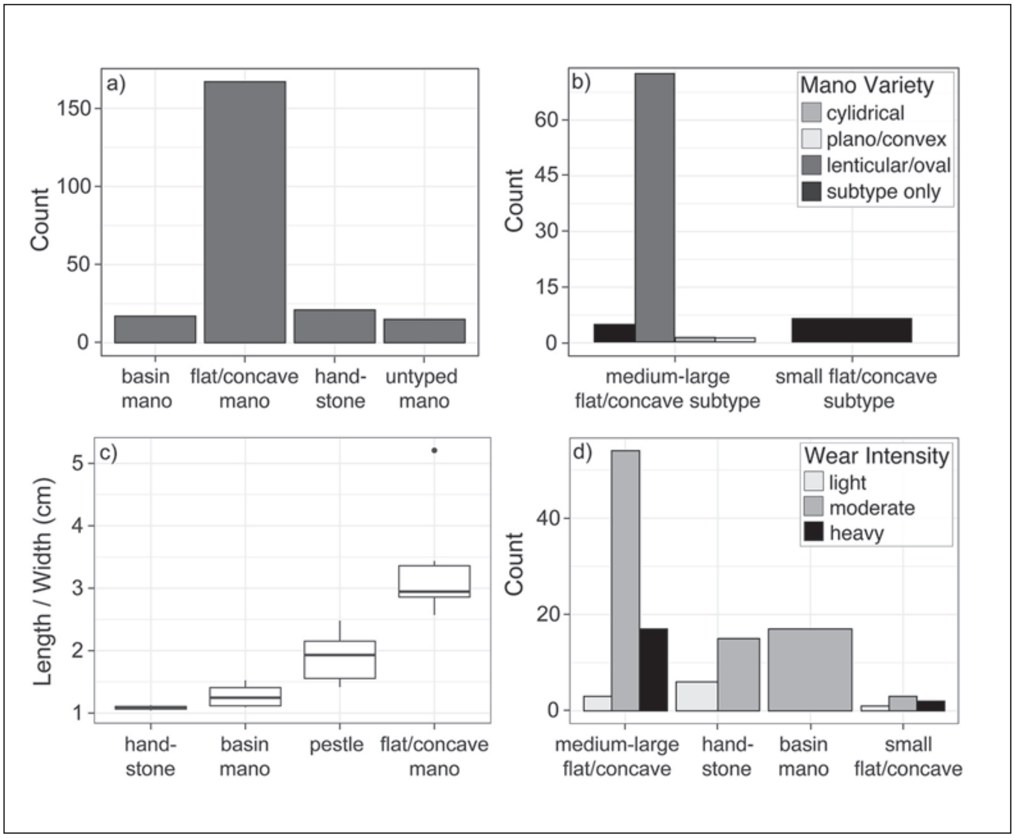


Figure 9.12. Analyses of manos in the broader Initial Formative and Early Formative assemblage: (a) counts of mano types and handstones; (b) flat/concave mano subtypes and varieties; (c) morphometric differences between active tool types; (d) wear intensity of mano types, subtypes, and handstones.

and nearly complete specimens in the Paso de la Amada assemblage are heavily biased toward smaller artifacts. For example, although active tools measuring less than 15 cm in length make up only 10 percent of the ground stone assemblage, 90 percent of the complete artifacts fit into this category. This dramatic overrepresentation is due to the more intensive reuse of larger broken and heavily worn artifacts as smaller active grinding and manufacturing tools, and the fact that the force load necessary to break a smaller, more circular object is far greater than that necessary to break an oblong or elongated object. Artifact reuse and recycling are explored in greater detail in the discussion portion of this chapter.

Type: Flat/Concave (n = 167)

Subtypes: medium to large (n = 74), small (n = 5)

Varieties: lenticular/oval (n = 71), cylindrical (n = 2), plano-convex (n = 1)

Flat/concave manos are substantially longer than they are wide. They are larger and more elongated in plan-view in comparison to basin manos, which tend to have roughly equivalent lengths and widths. The average length-to-width ratio of flat/concave manos in the Paso de la Amada assemblage was 3.2, while the same ratio for basin manos measured 1.2 (Figure 9.12c). This designed difference is related to grinding efficiency. Flat/concave manos are manufactured to increase the grinding efficiency of a reciprocal stroke using either two hands or a single hand, while basin manos are designed to increase the grinding efficiency of a circular stroke using only a single hand. The grinding surfaces of flat/concave manos are flat to slightly convex from reciprocal strokes on a flat/concave metate (Adams 2014:109–10; Searcy 2011:106). Eighty-two of the 167 flat/concave manos were collected from contexts with more detailed temporal information. Flat/concave manos were the dominant active ground stone tools in the broader Initial Formative and Early Formative assemblage, as well as contexts dating exclusively to Locona, Ocós, and Cherla.

Initially, flat/concave manos were identified to two-handed and one-handed subtypes, dependent on whether they measured greater or less than 20 cm in length. How-

Table 9.5. Metric and nonmetric attributes of manos and handstones

Class, Type, Subtype	N	Mean Length (cm)	Mean Width (cm)	Mean Thickness (cm)	Strategic Design	Polished Distal and Proximal Ends
flat/concave mano, medium–large subtype	74	23.1	7.1	5.0	100%	98%
flat/concave mano, small subtype	5	8.4	5.4	4.5	40%	0%
basin mano	17	8.4	7.1	5.2	60%	0%
handstone	21	8.9	6.4	4.9	0%	0%

ever, the overwhelming majority of flat/concave manos were fragmentary, which restricted the utility of a strictly size-based typology. In addition, during analysis it became clear that such a dichotomy would not be conducive to describing the dominant type of active ground stone tools at Paso de la Amada, as manos ranging in length from 15 to 30 cm were strategically designed and used in a similar fashion, for food processing on flat/concave metates.

Subtype: medium to large flat/concave manos

These manos, 15 to 30 cm long, exhibited a number of unique defining characteristics that allowed some fragmentary specimens to be distinguished from small flat/concave manos, which were rare and likely served a specialized function. Unlike other types of active ground stone tools in the assemblage, medium to large flat/concave manos were *always* strategically designed (Table 9.5). The distal and proximal ends of these tools were well shaped and often polished to a sheen (Figure 9.6, 304321, 305055), yet there was no evidence that this shaping was caused by wear against the wall of a trough or bordered metate. Several of the specimens on the smaller end of the medium–large subtype spectrum were manufactured from larger manos that had broken but continued to be used on a flat/concave metate (Figure 9.6, 305054), an analogous pattern to that noted for similar manos at La Libertad (Clark 1988:126).

Medium to large flat/concave manos were further classified into varieties based on their longitudinal and transverse cross-section morphology, which is largely dictated by wear on a metate surface. Most medium to large flat/concave manos had a lenticular cross section from moderate to heavy use on both dorsal and ventral surfaces on a flat/concave metate (Figure 9.6, 304331, 305054, 304321; Figure 9.12d). Similar manos with less intensive use on dorsal and ventral surfaces had a more oval appearance in cross section (Figure 9.6, 305055). Since these manos differed only in terms of grinding intensity, they are grouped together as a single lenticular/oval variety. These lenticular/oval, flat/concave manos are similar to Green and Lowe's (1967:29) "oblong" manos from Altamira, manos found at El Varal (Lesure 2009e:150), manos previously found at Paso de la Amada (Ceja Tenorio 1985:111, Figures 59d and 60u), "oval with plain end," "round section," and "triangular section" manos from Chiapa de Corzo (Lee 1969:114–17), and "long subrectangular manos" from the Tehuacán Valley (MacNeish et al. 1967:101–112). They are strikingly similar in manufacturing technique, plan-view, cross-section view, and stone density to "two faceted oval: lenticular variety" and "two faceted oval: oval variety" manos from La Libertad (Clark 1988:116–18). MacNeish et al. (1967:111) note that such manos are "the most common type in the two Formative phases of Ajalpan and Santa Maria," and this is also the case throughout the Initial Formative and Early Formative phases at Paso de la Amada, as well as the Middle Formative occupations at La Libertad, Chiapa de Corzo, and Altamira.

One mano with moderate use on only a single surface had a plano/convex appearance in cross-section view (similar to Clark's [1988:124] "single faceted plano-convex mano"). No specimens exhibit use wear similar to the "dog bone" manos seen in Mesoamerica later (Clark 1988:91; Searcy 2011:104–6), but cylindrical manos, although quite rare in the assemblage (n = 2), could have been used with a similar reciprocal "rolling" stroke (see also Ceja Tenorio 1985:110: Figures 59d, 59f). The eight medium to large flat/concave manos large enough to project measurements (using the method outlined by Clark 1988:96–97) measured 19.5 to 29.9 cm in length, 6.1 to 8.7 cm in width, and 4.5 to 7.5 cm in thickness, and had a mean projected length of 22.4 cm, a mean width of 7.3 cm, and a mean thickness of 5.4 cm.

Medium–large flat/concave manos were manufactured from a variety of material types, ranging from less durable white andesite to very durable granite and vesicular basalt, but most specimens were made from moderately durable gray andesite. There was a clear preference for use of vesicular material for both flat/concave metates and flat/concave manos. High-quality, vesicular material types widely preferred for intensive maize processing later in time, such as vesicular basalt, are rare in the assemblage.

Regarding the possible use of these manos, there is now abundant direct evidence across Mesoamerica and the neotropics that handheld stones used with circular and reciprocal strokes were used to grind maize, manioc, beans, squash, and foraged plants for thousands of years prior to the Initial Formative period (Aceituno and Loaiza 2018; Dickau et al. 2007, 2012; Haas et al. 2013; Pagan-Jimenez et al. 2016; Pearsall et al. 2004; Piperno 2011; Piperno et al. 2009; Pohl et al. 2007; Ranere et al. 2009; Zarrillo et al. 2008). However, Archaic-period ground stone assemblages with accompanying phytolith or starch grain evidence of maize are usually expedient, minimally shaped, and morphologically inconsistent. They were used to process a wide variety of foods. Similar ground stone tools have been documented on Late Archaic sites in the Soconusco (Voorhies 1976, 2004). In contrast, the dominant active ground stone tools at Paso de la Amada are designed in a consistent fashion and used exclusively with a reciprocal stroke on morphologically consistent flat/concave metates. Such routine food processing practices bear a far greater resemblance to traditions that come to dominate much of Mesoamerica from the Middle Formative onward. For example, designed manos used with a reciprocal stroke on both dorsal and ventral surfaces, with an oval to oblong shape in plan-view and an oval to lenticular shape in cross-section view, dominate the Middle Formative ground stone assemblage at La Libertad (Clark 1988:116–22), Tlapacoya-Zohapico (Niederberger 1976:72–73), the Tehuacán Valley (MacNeish et al. 1967) and Chiapa de Corzo (Lee 1969:114–17), and well-studied Late Formative–period assemblages across broader Mesoamerica (Biskowski 1997; Biskowski and Watson 2013). Researchers agree that changes during the Middle Formative period were related to a transition in food processing technology as intensive maize processing for daily meals became commonplace. In summary, if we are to believe that (a) Late Archaic ground stone assemblages lacking designed, morphologically consistent active and passive tools used exclusively with a reciprocal stroke were designed and used to process a wide variety of cultivated and foraged foods and (b) the reciprocal stroke manos that dominate Middle Formative assemblages in Soconusco and across Mesoamerica were *primarily* designed and used to process maize, it follows that the most parsimonious explanation for the dramatic increase in the relative proportion of similar tools in the Paso de la Amada assemblage is that they were also designed and used *primarily* to process maize. This does not mean that other foods were not processed using such tools, or that Initial and Early Formative foodways were identical (to those during the Middle Formative), but, given the makeup of the ground stone assemblage, it is likely that grinding maize was an important component of Initial and Early Formative routine food processing for daily meals. This argument is explored in greater detail in the discussion portion of the current chapter and in Chapter 26.

Subtype: small flat/concave manos

These manos were comparably rare in the assemblage (n = 5). No subtypes or varieties were identified. Specimens ranged in length from 7.0 to 10.0 cm, in width from 4.0 to 7.7 cm, and in thickness from 4.1 to 5.2 cm. Half of these were expedient tools used on flat/concave passive ground stones. Two of the designed examples (Figure 9.6, 304330) were made from durable very fine-grained materials and were likely paired with a palette (Figure 9.5, 304031), a small, oval flat/concave metate (Figure 9.3, 304070), or a rectangular metate (Figure 9.3, 304036, 304073). An additional specimen (305077) was the only flat/concave mano in the assemblage used with a rocking reciprocal stroke on a flat surface (Adams 2014:110), which resulted in five distinct flat grinding facets. These relatively rare manos were likely used to process non-food substances such as pigment (Table 9.5) or else to process small amounts of seasonings or medicinal substances (cf. Hayden 1987:202). Small flat/concave manos compare favorably to Ceja Tenorio's rare (n = 2) "miniature manos" (1985:110–11), several Crucero phase manos from Guatemalan Soconusco (Coe and Flannery 1967:Plate 22), and "oblong manos" from the Tehuacán Valley (MacNeish et al. 1967:110–11).

Type: Basin Mano (n = 17)

Basin manos are small handheld stones that are used with a rotary and/or a reciprocal motion on a basin metate. Basin manos have also been called "one-handed rotary manos" (see Clark 1988:95) and "pestles" (Biskowski and Watson 2013; Rosenswig 2010). The current typology distinguishes between basin manos and pestles, since they are paired with very different passive tools (mortars and basin metates) and have distinctive designs (see Figure 9.12c) to maximize the efficiency of different grinding actions (circular strokes in a basin metate versus crushing and pounding strokes in a mortar). Basin manos from Paso de la Amada are circular to oval in plan-view, measure 9.5 to 7.2 cm in length and width, and exhibit a round to slightly lenticular cross section (Figure 9.6). Most displayed use wear only on ventral surfaces, but five specimens displayed wear on dorsal and ventral surfaces (Figure 9.6, 304191, 304192). All basin manos exhibited evidence of use with a circular stroke in a basin metate, which produced wear along the edges of the tool (Adams 2014:108). Of the three intact basin manos, one was used for pigment processing. Sixty percent of basin manos were designed by being pecked into a circular shape; the others were naturally rounded river cobbles. Basin manos were likely used primarily to process a variety of tougher foraged, cultivated, and domesticated plant products but may also have been used for manufacturing activities.

CLASS: PESTLE (n = 52)

Types: Stone Mortar (n = 20), Flat Surface (n = 8)

Subtypes: conical/bell shaped (n = 23), straight shafted (n = 11), expedient (n = 6)

Pestles are the active tools paired with mortars to pulverize substances using a pounding or crushing action. At the coarsest level, pestles were split into two distinct types dependent on whether they were used in the basin of a stone mortar or on a flat surface (Figure 9.13a–b). These different uses are identifiable by the morphology of the distal end of the pestle (Adams 2014:144). Stone mortar pestles are slightly round at the distal end from repeated pounding, crushing, and stirring strokes in a concave mortar basin. At Paso de la Amada, wear on stone mortar pestles often extended just above the distal end and around the circumference of the shaft from contact with the walls of a stone mortar. Flat surface pestles are relatively flat on the distal end from crushing and pounding strokes on a flat surface instead of a concave mortar basin, and they lack wear extending above the distal end Pestles were further subdivided into subtypes based on the morphology of the shaft and distal end (Figure 9.13c–d). The latter attributes are exclusively the result of design prior to use. An expedient subtype was reserved for unmodified cobbles with wear attributable to use as a pestle in a stone mortar or on a flat surface.

Conical pestles progressively flare out from the proximal to the distal end, and bell-shaped pestles flare out dramatically just above to the distal end (Figure 9.6; see also Ceja Tenorio 1985:Figures 60e, 60i, 61c, 61d, 61h). Since both bell-shaped and conical pestles have much larger distal compared to proximal ends (thus increasing the area of the primary grinding surface), they were grouped together as a conical/bell-shaped subtype. Straight-shafted subtypes have a relatively consistent diameter along the length of the shaft. Shaft cross sections ranged from sub-square and sub-rectangular to ovate. Given these constraints on morphology, straight-shafted pestles are typically long and slender, while conical/bell-shaped pestles are usually short and wide.

Pestle Use and Temporal Trends

Several trends are identifiable in the pestle assemblage, particularly when comparing the manufacture, use, and reuse of conical/bell-shaped and straight-shafted pestles. In addition to the designed differences noted above, conical/bell-shaped pestles were primarily used on stone mortars, while straight-shafted pestles were used on both stone mortars and flat surfaces in equal proportions (Table 9.6). Across the broader assemblage, pestles were used for secondary activities in far greater proportions than all other active and passive tools (Figure 9.13e–f). However, two subtypes, straight-shafted and expedient pestles, were frequently used as hammerstones for bipolar reduction while pestle use continued (concomitant secondary use) (Table 9.6). Pestles are the only ground stone tools in the Paso de la Amada assemblage regularly used for concomitant secondary activities. (See "Ground Stone Reuse, Recycling, and Discard," below.) Since 80 percent of all complete, straight-shafted pestles display evidence for concomitant use as bipolar hammerstones (*sensu* Crabtree 1972; Odell 2001; Whittaker 1994) and since flaked stone reduction at Paso de la Amada was focused almost exclusively on obsidian (Ceja Tenorio 1985:107–8; Clark 1994), I find it unlikely that straight-shafted pestles were designed or used for food processing. In summary, design and use attributes indicate that straight-shafted pestles served as manufacturing and non-food processing tools, while larger bell-shaped and conical pestles were potentially designed and used to process food, albeit in small quantities given the small size of these tools (Clark 1994:235–36).

Further analysis of the raw materials used in pestle manufacture illustrates that softer, less dense raw materials were preferred (Figure 9.14). For example, the stone density of expedient pestles is significantly greater than that of designed pestles at the 95 percent confidence level (Kruskal-Wallis, p-value = 0.008721, chi-square = 9.484, df = 2), while the stone density of all pestles used as concomitant bipolar hammerstones is significantly lower than artifacts used exclusively as bipolar hammerstones at the 95 percent confidence level (Kruskal-Wallis, p-value = 0.01385, chi-square = 8.5592, df = 2). The former suggests that soft raw materials were preferred for the processing that took place with designed pestles, while the latter suggests that pestles were used as bipolar hammerstones when a soft percussor was preferred, a strategy long noted to reduce shatter and platform collapse in bipolar reduction (Crabtree 1967:61). Perhaps more significant, this supports a degree of intentionality in the design and use of multipurpose, non-food processing and manufacturing tools that contrasts with the generalized multiuse grinding and percussion tools used by Late Archaic groups in the Soconusco (Voorhies 2004:381–84). I return to the latter point in the discussion section of the current chapter.

CLASS: HANDSTONE (n = 21)

Handstone is a generic term that refers to active ground stone artifacts that were not clearly designed for or consistently used with a particular class of passive ground stone tools. All handstones were river cobbles used as expedient tools for a variety of processing tasks (Table 9.5). Use wear typically indicated a combination of circular and reciprocal strokes as well as percussion activities. Several exhibited

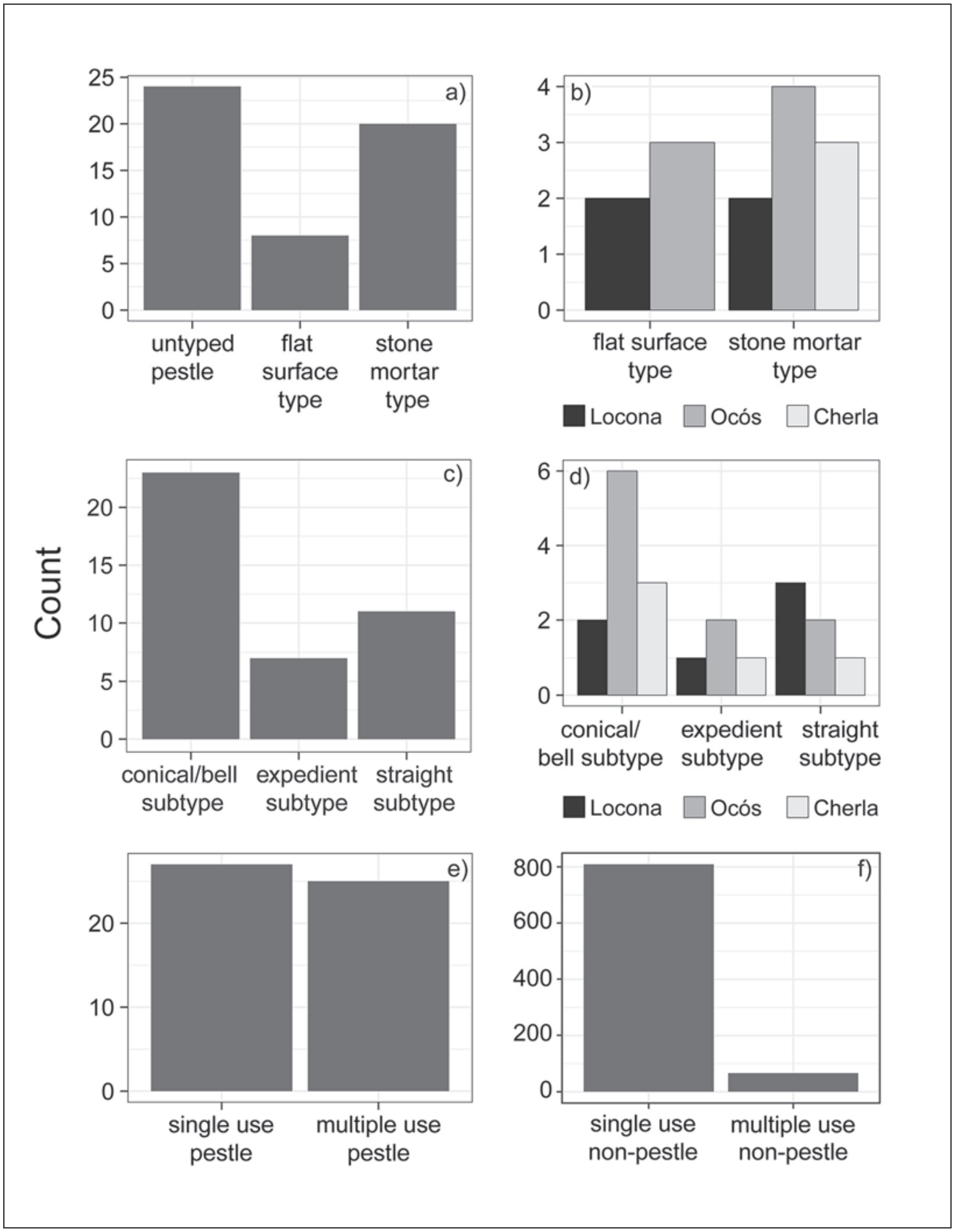


Figure 9.13. Analyses of pestles: (a) pestle type counts in the broader Initial Formative and Early Formative assemblage; (b) pestle type counts from Locona, Ocós, and Cherla contexts; (c) pestle subtype counts in the broader assemblage; (d) pestle subtype counts from Locona, Ocós, and Cherla contexts; (e) counts of pestles used only for their designed function and pestles used for multiple activities in broader assemblage; (f) counts of all ground stone artifacts in the broader assemblage used for single or multiple activities.

a heavy sheen and were likely used as polishing stones. These tools compare favorably to the Late Archaic handstones at shell mound and inland sites in the Soconusco described by Voorhies (2004) but are smaller in length and width. A total of 21 handstones were present in the Paso de la Amada assemblage.

Table 9.6. Pestle measurements and attributes

Pestle Type and Subtype	N=	Mean Length (cm)	Mean Width (cm)	Mean Density (mass/vol.)	Secondary Use	Concomitant Bipolar Hammerstone	Stone Mortar Use
all pestles	52	8.3	4.5	2.39	(f) 48% (c) 70%	(f) 44% (c) 60%	–
stone mortar type	20	8.9	4.7	2.33	(f) 45% (c) 63%	(f) 55% (c) 88%	–
flat surface type	8	6.3	4.1	2.36	(f) 25% (c) 40%	(f) 25% (c) 40%	–
conical/bell-shaped subtype	23	7.5	4.6	2.30	(f) 38% (c) 40%	(f) 33% (c) 20%	86%
straight-shafted subtype	11	9.7	4.4	2.32	(f) 45% (c) 80%	(f) 45% (c) 80%	50%
expedient subtype	7	8.4	4.9	2.70	(f) 43% (c) 66%	(f) 29% (c) 66%	43%

Note: Values marked with (f) include all fragmentary and complete artifacts; values marked with (c) include only complete objects.

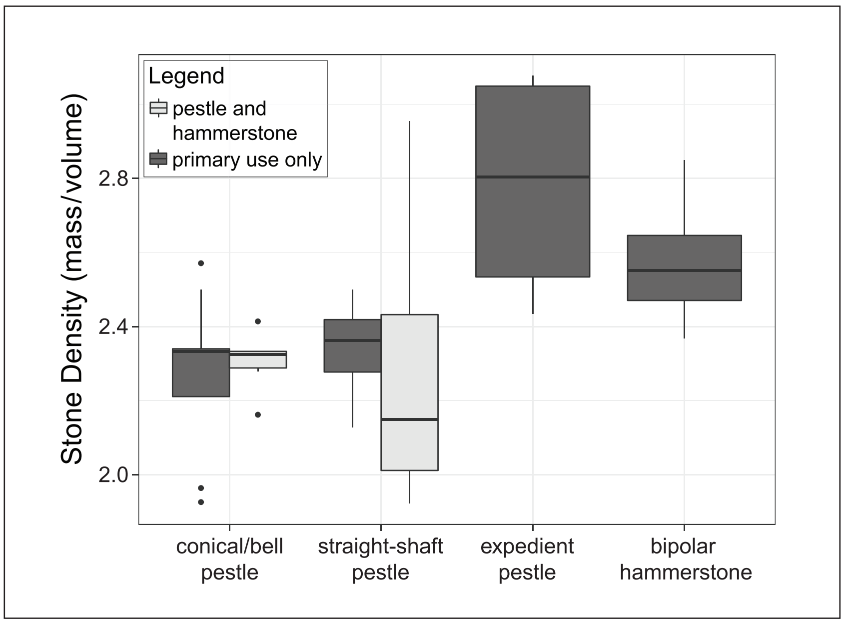


Figure 9.14. Stone density of single-use and multiuse pestles, single-use expedient pestles, and single-use bipolar hammerstones.

RECEPTACLES

CLASS: STONE BOWLS (n = 18)

Types: Unembellished (n = 15), Embellished (n = 3)

Subtypes: flared rim (n = 6), tecomate (n = 2), hemispherical (n = 1), beveled-rim (n = 1)

Artifacts were identified as stone bowls (rather than mortars) when no use wear was visible on the base and lower walls of interior basins. Similar to the mortars in the assemblage, stone bowls have tall, clearly defined walls that were designed to contain a substance. Stone bowls tend to have thinner bases and walls compared to shaped mortars of a similar diameter, but they still exhibit substantial overlap with crushing mortars (Table 9.7, Figure 9.15). A total of 16 stone bowls was present in the assemblage, with at least one vessel appearing in each phase.

Stone bowls were classified into two types, embellished and unembellished (Figure 9.5). One embellished stone bowl from Mound 12 Ocós deposits has an effigy of

Table 9.7. Stone bowl metric attributes and vessel counts per phase

Stone Bowl Type and Subtype	N	Mean Diameter[1] (cm)	Mean Wall Thickness (cm)	Mean Basal Thickness (cm)	Locona Vessel Count	Ocós Vessel Count	Cherla Vessel Count
embellished type	3	14.5	1.8	2.2	–	1	1
unembellished type	15	20.8	1.6	1.9	1	3	4
flared-rim subtype	6	18.1	1.7	2.1	1	1	1
hemispherical subtype	1	22.0	1.9	2.2	–	–	–
tecomate subtype	2	–	1.5	–	–	2	–
beveled-rim subtype	1	30.0	–	–	–	–	1
embellished type with zoomorph	1	15.0	1.8	2.4	–	1	–
embellished type with clapboard	1	14.0	1.8	2.0	–	–	1
embellished type with tripartite stand	1	–	–	–	–	–	–
Total	18	19.5	1.6	1.9	1	4	5

a probable zoomorphic face protruding from the exterior wall (Figure 9.5, 304297), and the second, from Mound 1 Cherla deposits, has a deeply incised line running around the exterior of the vessel, which gives the it a clapboard appearance (Figure 9.5, 304928). The third and last example of an embellished stone bowl, recovered from undifferentiated Initial/Early Formative deposits, had a "leg" protruding from the juncture between the wall and base of the vessel, likely part of a tripartite stand (304917). The fragment was reused as an abrader along the break. Ceja Tenorio (1985:109–11) uncovered three similar objects, but these were also fragmentary.

Half of the stone bowls were further classified to subtypes based on morphology. Most stone bowls had a circular shape in plan-view, a flat exterior base, a flat to slightly convex interior base, and relatively straight to slightly flaring walls that made an obtuse angle at the point where the base meets the vessel walls. These flared-rim stone bowls are morphologically similar to several pounding mortars in the assemblage but have far thinner walls and bases (see description above) and compare favorably to "flaring rim bowls" from the Tehuacán Valley (MacNeish et al. 1967:116–17), "hemispherical bowls or mortars" previously described from Paso de la Amada (Ceja Tenorio 1985:110–11), "round bowls" from La Victoria (Coe 1961:101), and vessels from Altamira (Green and Lowe 1967:28, 130) (Figure 9.5, 304309). Locona, Ocós, and Cherla deposits each contained a single example of a flared-rim stone bowl. A single hemispherical stone bowl from undifferentiated Initial/Early Formative deposits had a circular shape in plan-view, gently sloping slightly excurvate walls on the exterior, a slightly convex exterior base, and a slightly concave interior base. The morphology of this specimen is similar to many of the "crushing-style" mortars and roughly similar to the "hemispherical bowls" from the Tehuacán Project (MacNeish et al. 1967:116–17). Two small rim fragments of stone vessels from Mound 12 and Mound 32 Ocós deposits are classified as of the tecomate subtype. Both are made from unidentified high-quality, fine-grained materials (likely basalt) and were very well made. These artifacts and another rim fragment from a stone bowl dating to the Cherla phase were initially thought to be ceramic bowl rim sherds, but upon further inspection they are clearly ground stone vessels. The entire interior of one tecomate-shaped rim fragment was coated in a uniform thin layer of red pigment (Figure 9.5, 305161). MacNeish et al. (1967:117) also report tecomate-shaped stone vessels with very thin walls from the Tehuacán Valley. The sherd-like specimen from Mound 1 is well made from gray andesite and is in the form of a common Locona-phase ceramic vessel type, the beveled rim bowl (305196). It is possible that this specimen is a Locona-phase carry-up in the Mound 1 Cherla deposit.

Due in part to the small size of the sample, little can be said about differences between the types and subtypes of stone bowls in the assemblage. The average diameter of embellished stone bowls is smaller, and mean wall thickness and base thickness are greater compared to unembellished types (see Figure 9.15 and Table 9.7), but this only includes measurements from two embellished artifacts (Figure 9.5, 304928, 304297). Vessel diameters range from 10 to 30 cm among eight measurable specimens. (Specific measured rim diameters in centimeters are 10, 15 [Ocós], 15.8 [Locona], 18, 22, 23 [Cherla], 27, and 30 [Cherla deposit, the possible Locona carry-up.]) A high proportion (50 percent) of the stone bowls, including both embellished examples, are made from lightweight, soft, and less durable materials

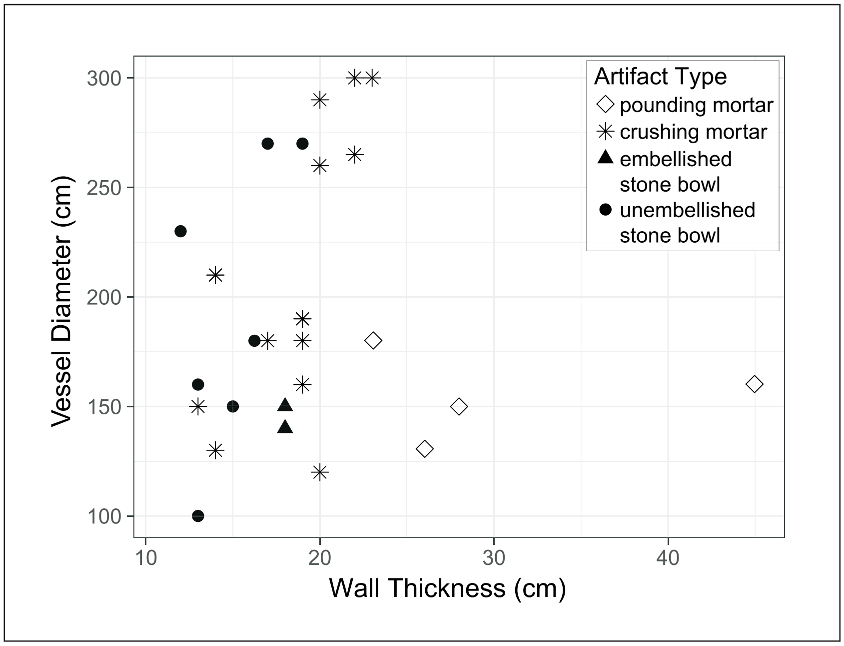


Figure 9.15. Scatter plot comparing the diameter and wall thickness of pounding mortars, crushing mortars, and stone bowls.

such as white andesite, limestone, and volcanic tuff. From a functional perspective, this might be because these materials are easy to shape, and the durability of a stone bowl probably was not as important as the durability of passive ground stone. Many examples from the Tehuacán Valley were also made from lightweight and less durable materials (MacNeish et al. 1967:116–17).

TRENDS IN GROUND STONE MANUFACTURE AND USE

The Paso de la Amada assemblage provides an opportunity to explore change in ground stone manufacture and use during the Initial and Early Formative periods. While ground stone tools were undoubtedly used to process a wide variety of domesticated, cultivated, and collected plants during the second millennium BC in the Soconusco, prior studies of Initial Formative and Early Formative food processing have been hampered by small sample sizes. Researchers have interpreted the low densities of such ground stone tools as evidence for a lack of reliance on maize or the relative unimportance of stone-ground plant foods more broadly, or have drawn similar inferences from more detailed analyses of small assemblages (Clark 1994:234; Lowe 1967:50, 1975; Rosenswig 2006, 2010). It is clear that mobile farmer-foragers cultivated maize for thousands of years in the Soconusco prior to the formation of sedentary villages (Kennett et al. 2010; Voorhies 2004), but whether or not the onset of the Initial Formative involved any significant change in foodways now seems uncertain. Given the deep history of this particular question in the Soconusco (Lowe 1967:50, 1975), it will therefore receive ample attention in the remaining portion of the chapter.

We divide the topic of the role of maize in the subsistence economy of Soconusco villages during the second millennium BC into three basic questions. First, was there an *early tipping point* in maize orientation at around 1900 BC? Second, was there a trajectory of *amplification* in the use of maize (or, instead, stability) *during* the second millennium? Third, how strongly do changes around 1000 BC indicate a *late tipping point* in the emergence of maize as a staple crop? The remainder of this chapter concentrates on the second of those questions; the full set of questions is considered in Chapter 26.

ACTIVE GROUND STONE USE AND MANUFACTURE

Researchers considering whether or not maize was processed for daily meals during the Initial, Early, and Middle Formative periods have compared and contrasted the relative proportion of active ground stone tools presumed to process maize compared to tools used to process other plants foods (Arnold 2009; Blake and Neff 2011; Clark 1994; Clark et al. 2007; Rosenswig 2006, 2010). At Cuauhtémoc, Rosenswig (2006:Figure 3) found a sharp increase in the ratio of manos and metates to mortars and pestles in the Conchas phase (5:1). In Clark's (1994:Table 9) Mazatán data, that ratio is quite noisy, ranging to twice the Conchas-phase Cuauhtémoc value in Ocós before declining.

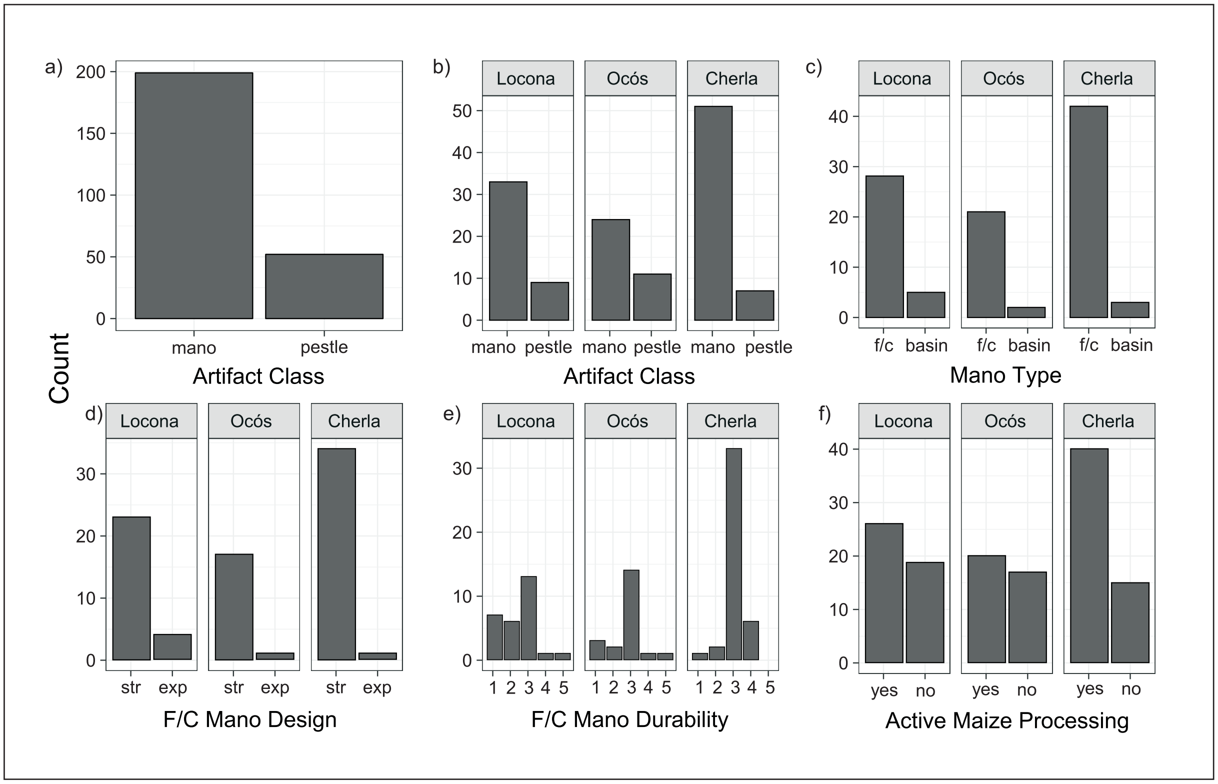


Figure 9.16. Active ground stone tool use and manufacture through time at Paso de la Amada: (a) counts of manos and pestles in the broader Initial Formative and Early Formative assemblage; (b) mano and pestle counts from Locona, Ocós, and Cherla contexts; (c) counts of flat/concave and basin manos; (d) counts of strategically designed and expedient flat/concave manos; (e) durability of flat/concave manos; (f) active ground stone tools likely designed to process maize compared to active tools likely designed or used to process other foods.

Manos dominate active ground stone tool classes in the Paso de la Amada assemblage compared to pestles throughout the sequence (Figure 19.16a, Table 9.8). A sharp increase in the relative frequency of manos is registered between Ocós and Cherla (Figure 9.16b). In the Cherla-phase sample, the ratio of manos to pestles is more than 7:1.

More importantly, the frequency of flat/concave manos—likely used to process maize—increases through time at Paso de la Amada in relation to the frequency of basin manos (Figure 19.16c). Further, the percentage of flat/concave manos that were strategically designed rose in the Cherla phase (Figure 9.16d). Community members also began favoring more durable materials for flat/concave manos. The Locona assemblage contains a greater relative frequency of less durable material (mainly soft white andesite). This is visible as a left-skewed distribution in Figure 9.16e. During the Ocós phase, less durable materials began to drop out of use. During the succeeding Cherla phase, moderate-durability materials (mainly gray andesite) dominate the assemblage and less durable materials become rare (visible as a right-skewed distribution in Figure 9.16e). It is noteworthy, however, that the rare examples of highest-quality materials, in this case granite and vesicular basalt, mostly occur in Locona and Ocós contexts.

In the typology portion of this chapter, I argue that not all manos were used to process maize. It is therefore important to compare not only manos to pestles or basin manos to flat/concave manos, but active grinding stones likely used to process maize (flat/concave manos other than small subtypes) to active tools likely used to process other foods (basin manos, pestles, handstones, and small flat/concave manos). That analysis is shown in Figure 9.16f. Maize processing tools are more ubiquitous compared to non-maize processing tools during Locona and Ocós, but there is a dramatic shift in the Cherla phase, with maize processing tools at that point dominating the assemblage. This analysis should be considered very cautious, since it includes pestles likely used exclusively for manufacturing activities, and other small active tools likely used to process spices, medicines, condiments, or pigments, along with the non-maize food processing tools.

Raw data and the above patterns are brought together in Table 9.8. The pattern to note is that in each analysis, the Cherla sample of active grinding stones emerges as more appropriate for intensive grinding of maize than

Table 9.8. Counts of and proportions of active ground stone tools per temporal phase

Phase	Flat/Conave Manos (not small)	Small Flat/Concave Manos	Basin Manos	Untyped Manos	Pestles	Handstones	Percent Active Maize Tools	Percent Designed Flat/Concave Manos	Maize Processing Durability Index[a]
Locona	26	2	5	-	9	2	59.1%	85.2%	2.42
Ocós	20	1	2	1	11	6	50.0%	94.4%	2.85
Cherla	40	2	3	6	7	3	72.7%	97.1%	3.02
Undifferentiated 1700-1300 BC	75	1	7	9	25	10	63.6%	97.2%	2.88
Total	*161*	*6*	*17*	*16*	*52*	*21*	*62.6%*	*94.7%*	*2.84*

[a] Mean durability index, which ranks all raw materials on a scale of 1 to 5 from least to most durable.

[b] Maize processing tools include flat/concave manos other than small subtypes; non-maize food processing tools include small flat/concave manos, basin manos, handstones, and pestles.

Table 9.9. Counts of and proportions of passive ground stone tools per temporal phase

Phase	Flat/Concave Metates (not small or rectangular)	Rectangular and Small Flat/Concave Metates	Basin Metates	Untyped Metates	Mortars (not medium and large)	Medium and Large Mortars[a]	Percent Maize Processing[b]	Percent Designed Flat/ Concave Metates	Flat/Concave Metate Durability Indexc
Locona	63	2	2	6	12	6	81.8%	95.0%	2.68
Ocós	42	7	2	1	2	4	85.7%	97.5%	2.60
Cherla	67	5	0	1	11	6	90.5%	98.4%	2.88
Undifferentiated 1700-1300 BC	172	3	4	18	29	23	79.3%	97.2%	2.73
Total	*344*	*17*	*8*	*26*	*54*	*39*	*82.5%*	*97.9%*	*2.72*

[a] Includes undifferentiated stone bowls/mortars.

[b] Maize processing tools include flat/concave metates other than rectangular subtypes and small varieties; non-maize food processing tools include basin metates, undifferentiated metates, medium and large mortars, and undifferentiated medium and large stone bowls/mortars.

[c] Mean durability index, which ranks all raw materials on a scale of 1 to 5 from least to most durable.

the samples of previous phases. In some cases, the Cherla sample constitutes a jump with respect to the Locona-Ocós pattern (for example, percent of flat/concave manos in the active tool assemblage), whereas other measures suggest a steadier trajectory of change across the three phases (for example, the mean durability indices, flat/concave mano design). In the Late Formative period in Mesoamerica, maize grinding equipment certainly became even more oriented to intensive grinding (e.g., Biskowski 1997, 2015). Yet given recent emphasis on 1000 BC as a tipping point in the emergence of maize as a staple, discovery of a clear trajectory toward intensified maize grinding at Paso de la Amada in the mid–second millennium BC is particularly important.

Passive Ground Stone through Time

Analyses of passive ground stone use and manufacture through time show similar trends to those observed among the active grinding stones (Table 9.9). Metates are present in far greater quantities compared to mortars when the assemblage is viewed as a whole (Figure 9.17a). While the ratio of metates to mortars is slightly greater during the Cherla phase compared to the Locona phase, the Ocós phase assemblage has the greatest metate-to-mortar ratio (Figure 9.17b). I note, however, that this ratio includes three mortar types used primarily for pigment processing. (see the section on mortars). The ratio of flat/concave to basin metates is high throughout the occupation, with the most prominent increase taking place during the Ocós to Cherla transition (Figure 9.17c). Similar to the pattern documented for flat/concave manos, flat/concave metates were strategically designed more often during the Cherla phase compared to both Locona and Ocós (Figure 9.17d). Although the pattern is not as dramatic in comparison to flat/concave manos, the use of less durable materials for manufacturing flat/concave metates decreased during the Ocós to Cherla transition (Figure 9.17e). This less dramatic shift is likely due to the size of raw material necessary to manufacture a metate compared to mano and the scarcity of large-enough high-quality raw material near Paso

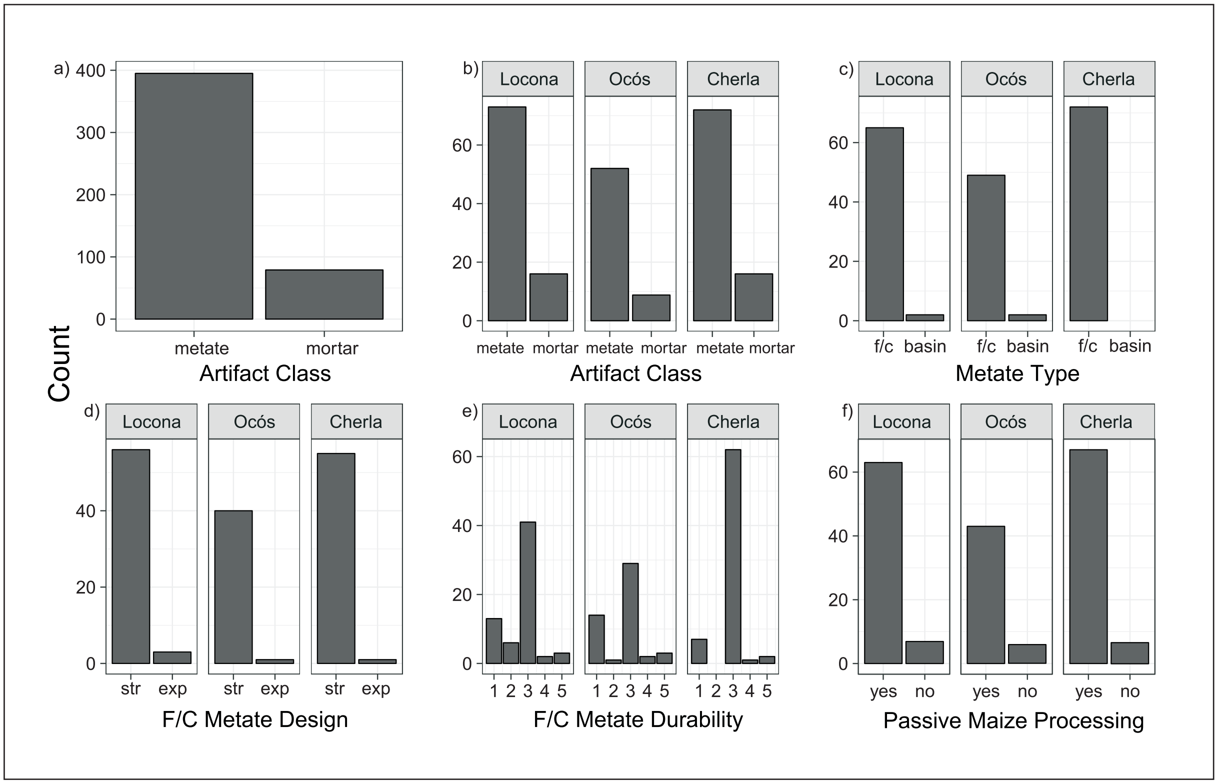


Figure 9.17. Passive ground stone tool use and manufacture through time at Paso de la Amada: (a) mano and mortar counts in the broader Initial Formative and Early Formative assemblage; (b) metate and mortar counts from Locona, Ocós, and Cherla contexts; (c) counts of flat/concave and basin metates; (d) counts of strategically designed and expedient flat/concave metates; (e) durability of flat/concave metates; (f) passive ground stone tools likely designed to process maize compared to passive tools likely designed or used to process other foods.

de la Amada. Finally, similar to the trends noted for active ground stone, the ratio of passive tools likely used to process maize to tools that were likely used to process foods other than maize increases through time, with the greatest ratio during Cherla and the lowest ratio during Locona (Figure 9.17f, Table 9.9). The pattern of using higher-quality raw materials for active and passive maize processing equipment is also illustrated by comparing the stone density of maize processing tools to non-maize processing tools (Figure 9.18). Active maize processing ground stone is denser compared to non-maize processing tools from Locona through Cherla, while the Locona to Ocós transition marked a decrease in the relative density of non-maize processing tools. The density of passive maize processing tools, however, remains relatively stable at values well above those of non-maize processing, likely due to a lack of access to higher-quality raw materials.

Ground Stone Reuse, Recycling, and Discard

Researchers have argued that multiuse tools are a hallmark of Late Archaic, Initial Formative, and Early Formative groups that retained a high degree of residential mobility and were less invested in agricultural pursuits (Arnold 2009:404; Clark et al. 2007:29; McCormack 2002:170–82; Rosenswig 2010). While ground stone tools at Paso de la Amada were frequently reused and redesigned for a range of activities that differed from their designed primary function (Figure 9.19), the assemblage does not exhibit clear diachronic trends in the reuse of artifacts through time (Figure 9.20a–b, Table 9.10). Instead, food processing and non-food processing tool classes display distinctive yet stable patterns of reuse and discard that span the Initial through Early Formative transition (Table 9.11). For example, in the full assemblage, manos (11.1 percent), oval flat/concave metates (9.8 percent), and mortars (8.9 percent) were used *sequentially* for processing or manufacturing that differed from their designed function in similar frequencies (Figure 9.20c–d). Such sequential reuse of food processing equipment is well documented for intensive agriculturalists in the ethnographic and archaeological records (Clark 1988:94, 103; Hayden 1987:188; see also Searcy 2011:76). In contrast, pestles were used for *concomitant* manufacturing activities (while use as a pestle continued; see Figure 9.19, 304887, 304206, 304894) in far greater relative pro-

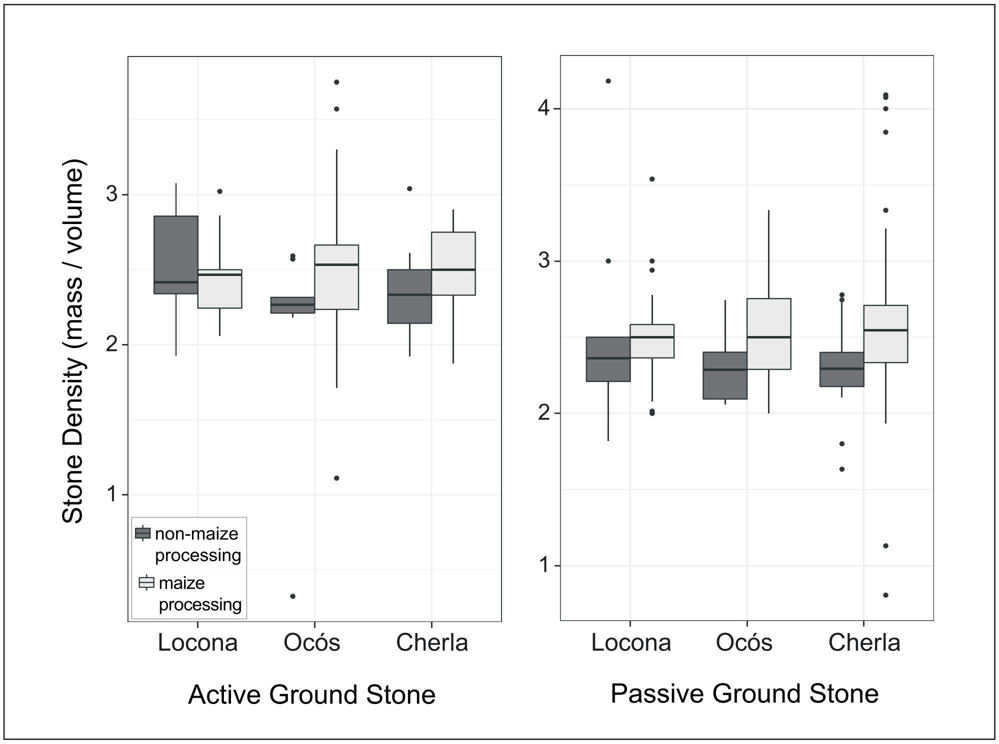


Figure 9.18. Stone densities of active and passive ground stone tools likely designed primarily to process maize compared to tools designed or used primarily to process other foods or materials.

portions compared to all other expedient or strategically designed active and passive tool classes. This pattern remained stable throughout the occupation (Figure 9.20c–d).

In addition, the discard and recycling behavior associated with these tool classes also exhibited strongly patterned differences that remained consistent through time (Table 9.12). All but a single specimen of the most common food processing equipment at Paso de la Amada (medium to large flat/concave manos, flat/concave metates, and medium to large mortars) were recovered in fragmentary condition (Figure 9.21a). In contrast, more complete pestles (20 of 53) were recovered than complete tools from all other artifact classes combined (15 of 874), and this pattern remains consistent through Locona, Ocós, and Cherla. I acknowledge that this is in part due to the smaller size of pestles (see left side of Figure 9.21a), but one would expect that basin manos and handstones, with their circular shape and more durable raw materials, would be found complete in higher frequencies compared to pestles. Moreover, the recycling behavior associated with pestles also stands in contrast to all other active tools in the assemblage (Figure 9.21b). For example, in the full assemblage, more than half of all manos (53.5 percent), nearly half of all medium to large manos (45.9 percent), and nearly one-third of basin manos and handstones (30.8 percent) were recycled as hot rocks for stone boiling, but less than 10 percent of pestles were found in fire-cracked condition. This pattern remains fairly stable during the occupation (Table 9.12). This suggests different cultural practices associated with the recycling and disposal of food processing and non-food processing/manufacturing tools. Perhaps these pestles, frequently used for bipolar reduction, were not considered appropriate for food preparation even in recycled form.

In summary, the stable yet distinctive trends noted for the design, use, reuse, recycling, and discard of food processing and manufacturing tools at Paso de la Amada demonstrate strongly patterned cultural behaviors associated with all phases of the life-history of ground stone artifacts. This extends to not only food processing equipment, such as manos and metates, but also tools designed and used for multiple concomitant processing and manufacturing tasks. Such strongly patterned behavior suggests a degree of intentionality in the manufacture, use, and reuse of designed multiuse pestles at Paso de la Amada that does not bear a close resemblance to the expedient multiuse grinding and percussion tools common on Late Archaic sites in the Soconusco (Voorhies 2004).

Beyond Paso de la Amada: Ground Stone in Late Archaic through Middle Formative Chiapas

One research question posed in the introduction to this chapter was what the Paso de la Amada assemblage tells us

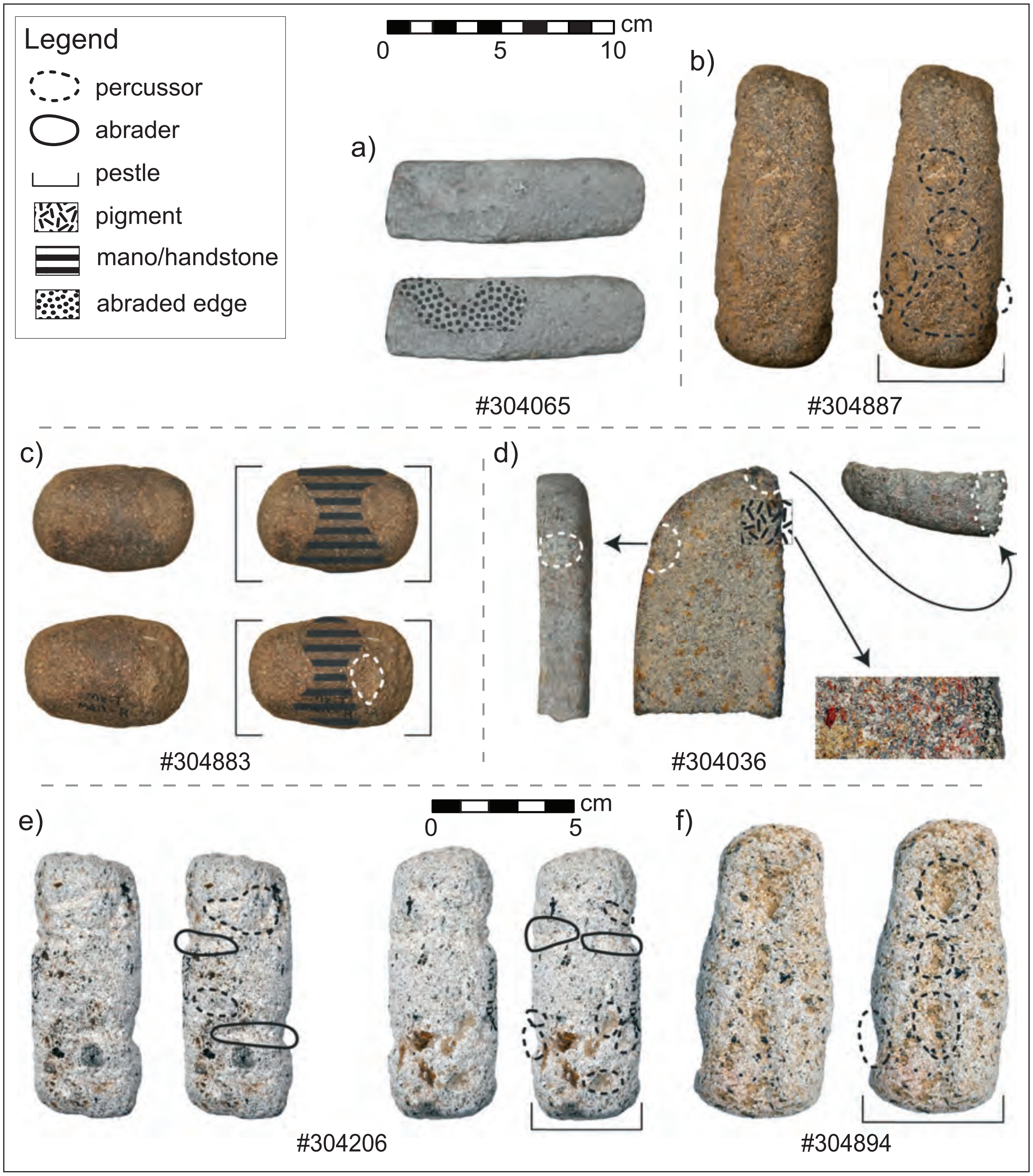


Figure 9.19. Select examples of sequential and concomitant secondary tool use at Paso de la Amada. A photograph of each artifact with and without reuse coded is displayed. Note that subfigures e and f are shown at a larger scale in comparison to all other subfigures: (a) cross-section view of a rectangular flat/concave metate edge fragment. The artifact was redesigned into a lapstone after breaking, by squaring off the broken edge, and was then used for manufacturing activities and pigment processing; (b) dorsal surface of a pestle with abundant percussion scars along length of the shaft from concomitant use as a bipolar hammerstone; (c) dorsal and ventral surfaces of a small flat/concave mano. The artifact was used with a reciprocal stroke on its dorsal and ventral surfaces, sequentially reused as a pestle in a stone mortar on its proximal and distal ends, and, finally, sequentially reused as a percussor; (d) rectangular metate sequentially reused as a percussion tool along a broken edge and used as a lapstone for pigment processing after breaking. The inset shows pigment extending over and into the broken edge of the artifact; (e) dorsal and ventral surfaces of a straight-shafted, lightweight pestle made from white andesite. The artifact was used concomitantly as a pestle, a bipolar hammerstone, and an abrader. The latter two uses are likely both associated with bipolar obsidian reduction; (f) dorsal surface of a lightweight, straight-shafted pestle, used concomitantly as a pestle in a stone mortar on its proximal end and as a bipolar hammerstone across the length of its shaft.

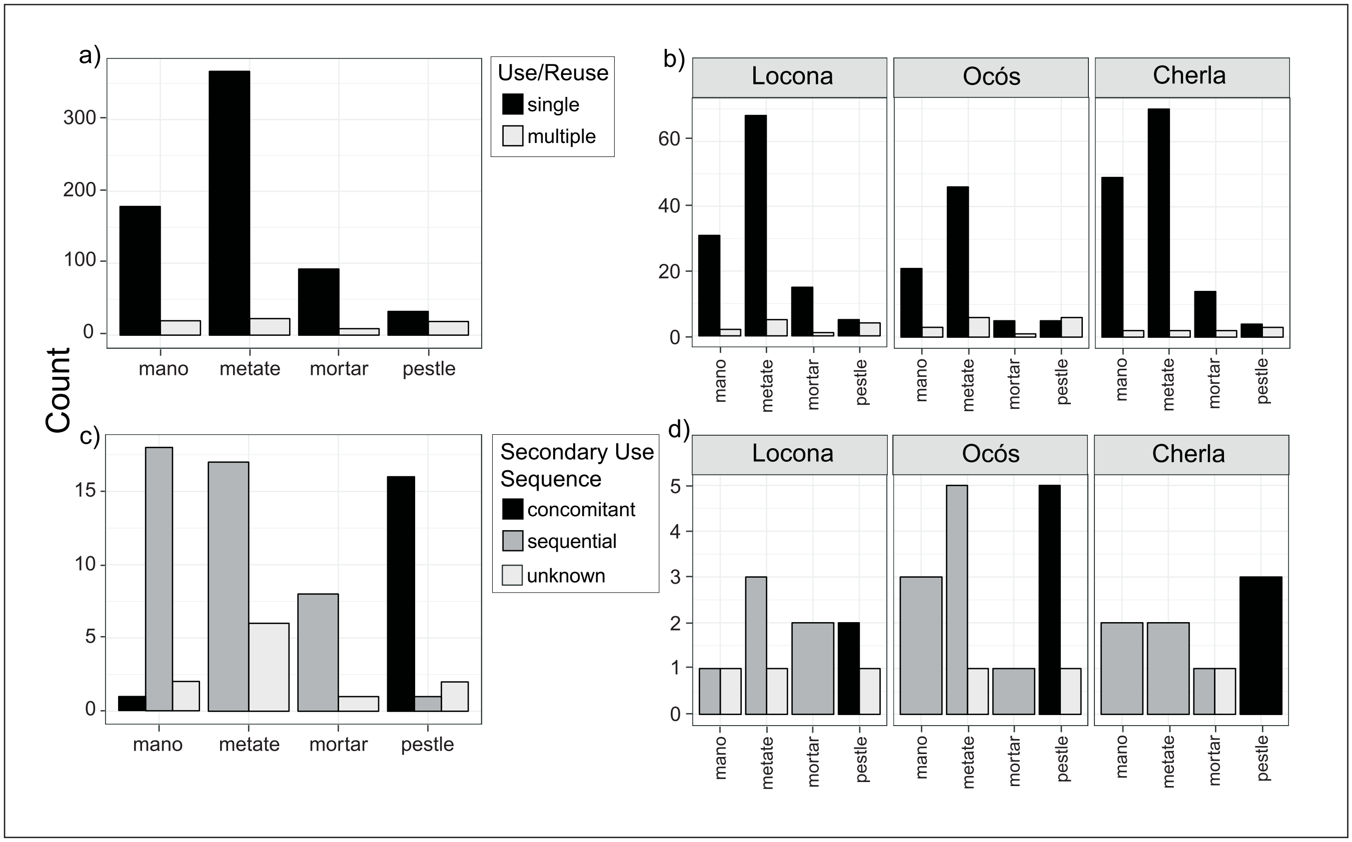


Figure 9.20. Tool use and reuse patterns among the four most common artifact classes: manos, metates, mortars, and pestles: (a) counts of single and multiple-use tools in the greater 1700–1300 BC assemblage; (b) trends in artifact reuse through time; (c) sequence of secondary tool use in the greater 1700–1300 BC assemblage; (d) sequence of secondary tool use through time.

Table 9.10. Ground stone reuse at Paso de la Amada

Phase	Secondary Use, All Ground Stone	Secondary Use, Manos	Secondary Use, Metates	Secondary Use, Mortars	Secondary Use, Pestles
Locona	7.5%	6.1%	6.9%	6.3%	44.4%
Ocós	16.1%	12.5%	11.5%	16.7%	54.5%
Cherla	6.1%	3.9%	2.9%	12.5%	42.9%
1700–1300 BC	10.8%	10.0%	6.3%	8.9%	40%

Table 9.11. Reuse of food processing and nonfood processing tools at Paso de la Amada

	Food Processing				Non-Food Processing/Manufacture		
Interval	Basin Manos	Flat/Concave Manos	Oval Plan Flat/Concave Metates	Medium/Large Mortars	Pestles	Rectangular Flat/Concave Metates	Handstones
1700–1300 BC	5.9% (s)	10.1% (s)	9.8% (s)	3.8% (s)	40% (c)	31.3% (s)	38% (c)

Note: Letters in parentheses indicate the dominant reuse sequence associated with each tool: (s) sequential reuse; (c) concomitant reuse.

Table 9.12. Ground stone recycling at Paso de la Amada

Phase	All Fire-Cracked Ground Stone	Fire-Cracked Manos	Fire-Cracked Pestles	Fire-Cracked Metates	Mortars	Fire-Cracked Medium–Large Flat/ Concave Manos	Fire-Cracked Flat/ Concave Metates
Locona	37.3%	45.5%	0%	45.2%	6.3%	26.7%	44.6%
Ocós	28.8%	50.0%	0%	19.2%	16.7%	42.9%	20.4%
Cherla	38.6%	60.8%	14.3%	31.9%	31.3%	53.3%	68.1%
1700–1300 BC	36.3%	53.5%	9.6%	33.9%	24%	45.9%	33.5%

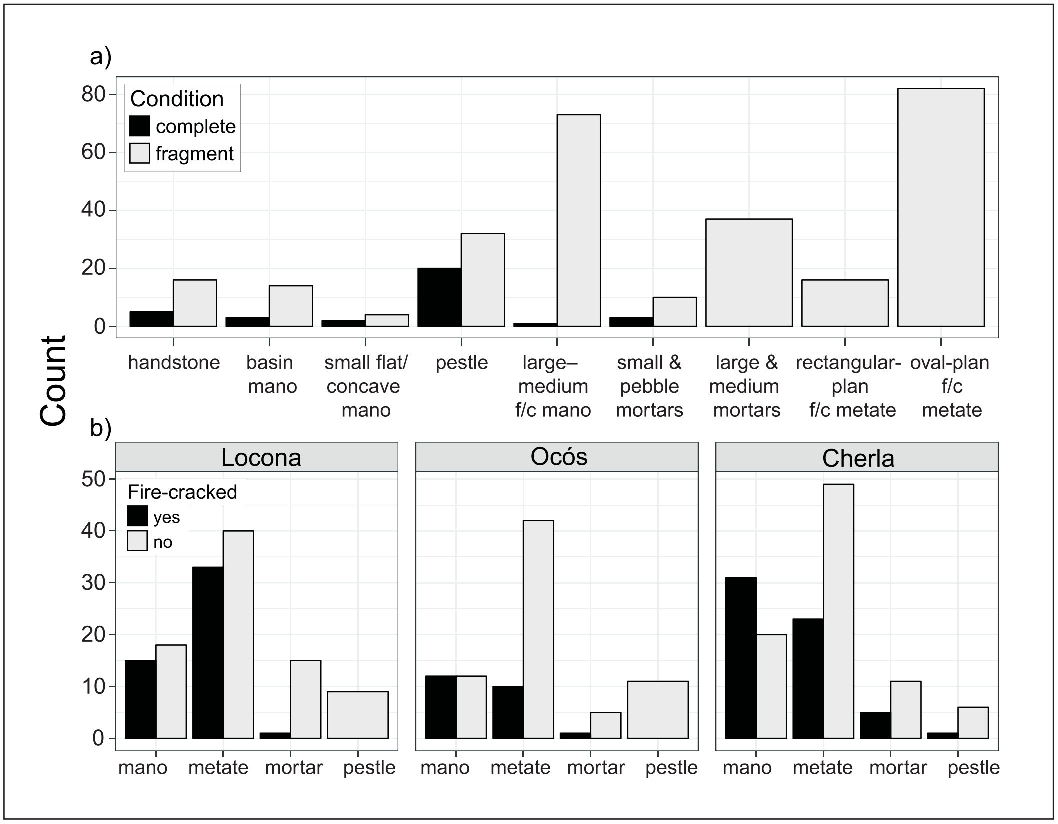


Figure 9.21. Ground stone artifact condition at Paso de la Amada: (a) condition of passive and active tools in the broader Initial Formative and Early Formative assemblage; (b) counts of manos, metates, mortars, and pestles recovered as fire-cracked rock or recovered with no evidence of thermal alteration.

about foodways during the second millennium BC. Comparing the ground stone tools from Late Archaic sites and a well-published Middle Formative site in central Chiapas (La Libertad) to the ground stone assemblage from Paso de la Amada exhibits both continuity and change in food processing activities. For example, handstones and basin manos comprise 95 percent of the active ground stone assemblages at coastal and inland sites in the Soconusco during the Late Archaic (Voorhies 1976:71–80, 2004:381–84) (Table 9.13). While these tools continued to be used between 1700 and 1300 BC, flat/concave manos (reciprocal stroke) outnumber other active food processing tools (Figure 9.22a). The ratio of basin manos and handstones to flat/concave manos decreases steadily during the Cherla phase and the Middle Formative (Figure 9.22b). Thus the assemblage at Paso de la Amada shows some continuity with Late Archaic traditions, in the form of handstones and rotary manos, but displays a punctuated shift, with routine food processing focused on reciprocal grinding with designed manos and metates, as 94 percent of all metates at Paso de la Amada were used exclusively with a reciprocal stroke. (Table 9.14).

The well-documented ground stone assemblage from La Libertad shows an even narrower focus on reciprocal

Table 9.13. Rotary and reciprocal mano type counts from the Soconusco and southern Chiapas

Period	Mano Type/Subtype						
	Rotary/Handstone	Small Reciprocal	Medium–Large Reciprocal	Untyped Reciprocal Mano	Percent Rotary/ Handstone	Percent All Reciprocal	Percent Medium–Large Reciprocal
All Late Archaic	22	1	0	0	95%	5%	0%
Paso	38	5	74	87	19%	81%	75%
La Libertad	2	1	31	12	4%	96%	94%

Note: Late Archaic data are derived from Voorhies (1976, 2004); La Libertad data are derived from Clark (1988).

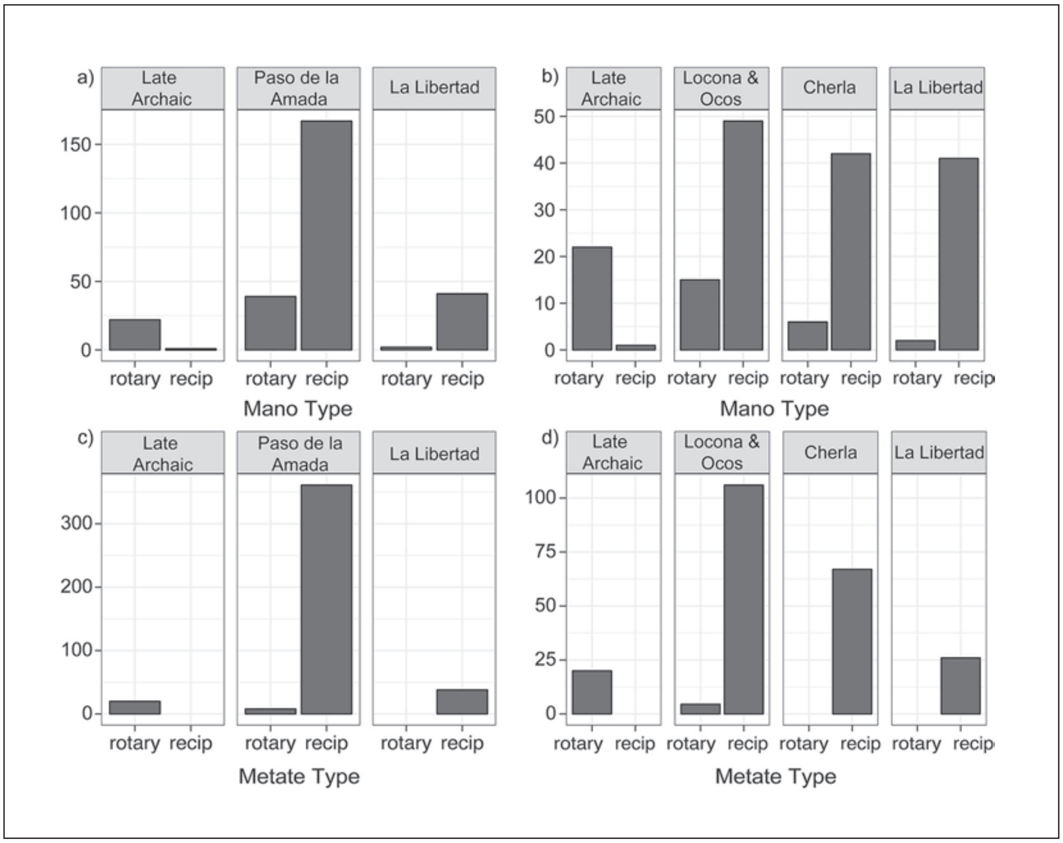


Figure 9.22. Counts of rotary and reciprocal active and passive ground stone tools from Late Archaic sites in the Soconusco, Paso de la Amada, and La Libertad: (a) counts of reciprocal and rotary manos; (b) counts of reciprocal and rotary manos at a finer temporal scale; (c) counts of rotary and reciprocal metates; (d) counts of rotary and reciprocal metates at a finer temporal scale. Late Archaic data are derived from Voorhies (1976, 2004); La Libertad data are derived from Clark (1988).

grinding with designed manos and metates (Figure 9.22c–d). All but two manos (n = 44) and all metates (n = 40) at La Libertad were used with a reciprocal grinding motion, and an even larger portion of the assemblage is dominated by medium–large manos (Tables 9.13, 9.14). The mean length and width of reciprocal manos at La Libertad are also greater than those at Paso de la Amada (Table 9.15, Figure 9.23), and the same is true of the mean thickness of oval-plan and rectangular-plan metates (Table 9.16, Figure 9.24). Moreover, the designed maize grinding manos at La Libertad display greater morphological consistency, with reduced standard deviations in length (Table 9.15). Yet the low standard deviations in metate and mano thicknesses, and the widths of medium to large flat/concave manos in the Paso de la Amada assemblage, suggest that these were intentionally designed differences, and these track with a

Table 9.14. Rotary and reciprocal metate type counts from the Soconusco and southern Chiapas

Period	Metate Type/Subtype					
	Rotary/Netherstone	Strategic Reciprocal	Expedient Reciprocal	Footed Metate	Percent Rotary/Netherstone	Percent Reciprocal
All Late Archaic	20	0	0	0	100%	0%
Paso	11	289	6	0	4%	94%
La Libertad	0	29	11	1	0%	100%

Note: Late Archaic data derived from Voorhies (1976, 2004); La Libertad data derived from Clark (1988).

Table 9.15. Projected lengths and widths of medium to large flat/concave manos

Site	Projected Length N =	Mean Length (cm)	SD Length (cm)	Projected Width N =	Mean Width (cm)	SD Width (cm)	Thickness N =	Mean Thickness (cm)	SD Thickness (cm)	Mean Area (cm^2)	SD Area (cm^2)
Paso de la Amada	8	22.4	3.5	19	7.3	0.8	32	5.6	1.5	165.7	41.4
La Libertad	15	26.1	1.6	24	10.4	1.1	24	6.7	1.5	270.9	31.8

Note: La Libertad data are derived from Clark (1988). Mean area values only include specimens with projected lengths and widths.

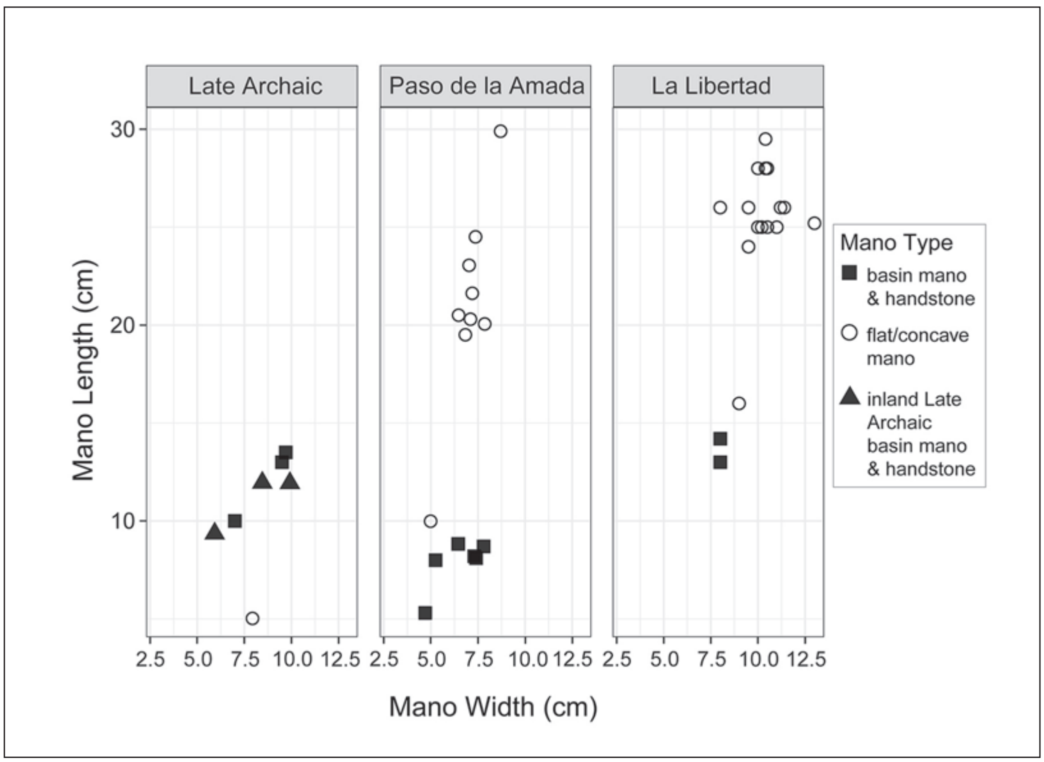


Figure 9.23. Metric attributes of manos and handstones from Late Archaic sites in the Soconusco, Paso de la Amada, and La Libertad. Note that the single flat/concave mano outliers at La Libertad and Paso de la Amada are the rare "small" subtypes described in the current chapter. Late Archaic data are derived from Voorhies (1976, 2004); La Libertad data are derived from Clark (1988).

Table 9.16. Mean thickness of flat/concave metate subtypes

Site	Oval Plan Metate Thickness N =	Mean Oval Plan Metate Thickness	SD Oval Plan Metate Thickness	Rectangular Plan Metate Thickness N =	Mean Rectangular Plan Metate Thickness	SD Rectangular Plan Metate Thickness
Paso de la Amada	41	4.6 cm	0.9 cm	10	3.2 cm	0.6 cm
La Libertad	11	7.5 cm	2.0 cm	5	5.9 cm	1.2 cm

Note: La Libertad data derived from Clark (1988).

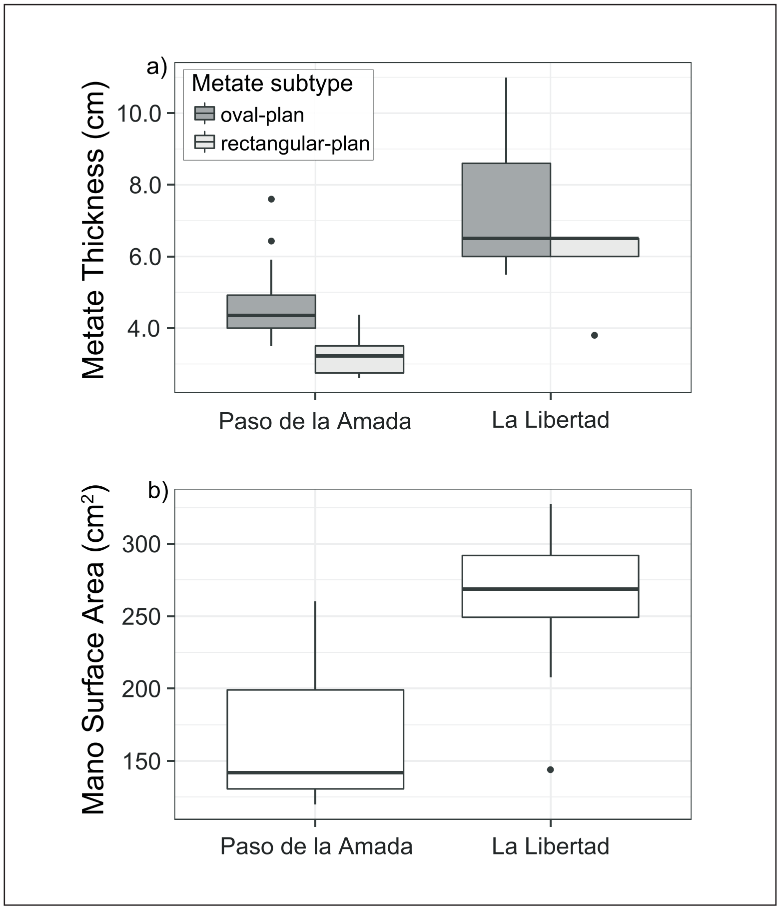


Figure 9.24. Metric attributes of designed, reciprocal-stroke, active and passive ground stone tools from Paso de la Amada and La Libertad: (a) thickness of oval-plan and rectangular-plan flat/concave metates; (b) surface area (length * width) of medium to large flat/concave manos. La Libertad data are from Clark (1988).

broader focus on tool portability during the Initial Formative and Early Formative periods.

However, the assemblages from La Libertad and Paso de la Amada have far more in common than the Late Archaic and Early Formative assemblages of interest. Even seemingly nonfunctional design attributes of manos at Paso de la Amada and La Libertad bear a resemblance to one another. For example, the ends of most manos at La Libertad were well shaped or polished during manufacture, even though few were used on bordered reciprocal metates (Clark 1988:116–27). This description, verbatim, also applies to the dominant mano style at Paso de la Amada, although there no manos showed evidence of use in a bordered reciprocal metate (Figure 9.6). These data suggest that the Late Archaic to Early Formative transition represented a qualitative change in food processing for daily meals, while the Early Formative to Middle Formative transition is better characterized as an intensification of the maize processing tradition.

Clark (1988:129) argues that the maize processing manos at La Libertad were made by craft specialists. The morphological consistency displayed in Figure 9.23 lends support to this. I doubt that this was the case at Paso de la Amada and find it likely that the greater standard deviations in the lengths of maize processing tools at Paso de la Amada are related to manufacture at the household level.

Discussion

In-depth analysis of 927 ground stone tools from Paso de la Amada supports the basic premise that maize was processed for daily meals with increasing frequency between the Late Archaic and the Middle Formative but makes clear that the technological style associated with such culinary traditions were in place by 1700 BC and intensified through time. Although the current research cannot provide insight into plant food processing traditions during the Barra phase (1900–1700 BC), previous assessments suggest a greater affinity with Late Archaic traditions (Clark 1994:234–36; Clark et al. 2007:29; Lowe 1967). If this is indeed the case, Locona plant food processing represents a dramatic shift, with early villagers converging on a shared set of routine practices that currently have no known antecedent at coastal or inland Late Archaic sites in the Soconusco. This is not surprising considering the pace, scale, and scope of social change that occurred between 2200 and 1700 BC and Paso de la Amada's status as the largest known community center during the Locona phase. Instead, the focus on reciprocal-stroke grinding using designed manos and metates shares a greater affinity with maize-centric food processing practices at community centers during the Middle Formative, albeit with tools that were not as efficient as those used later in time.

Focus on processing maize for daily meals intensified in the Cherla phase. That may have been a hinge point, when maize processing equipment became relatively standardized with respect to the selection of higher-quality raw materials and formally shaped tools. The tool kit associated with pigment processing also changed at this time (see previous discussion), and such shifts and are likely related to broader social changes at Paso de la Amada following the onset of the Early Formative. Nevertheless, it is clear that the technological style associated with reciprocal-stroke grinding tools used to intensively process maize in Mesoamerica for 2,000 years preceding Spanish arrival has its roots in the Initial Formative.

Toward a Cuisine of the Initial Formative

The current study also suggests that even while the shift toward more frequent maize processing for daily meals was under way, community members continued using mortars, pestles, and rotary-stroke manos. While strategically designed mortars and pestles are well represented at Paso de la Amada (albeit in far smaller relative proportions compared to maize processing tools) and other Initial/Early Formative sites, few have been found at coastal or inland Late Archaic sites in the Soconusco. Formal mortars and pestles were therefore used in greater quantities at Paso de la Amada compared to the current Late Archaic sample, even as formal maize processing tools began dominating ground stone equipment. Thus the designed pestles and mortars widely noted from Initial and Early Formative contexts may represent a *break* with local Late Archaic culinary traditions, or at the very least a break with Late Archaic stone grinding traditions in the Soconusco. This compares favorably to Clark's (1994:242) proposal that the mortars and pestles used during the Late Archaic are far more robust in comparison to the lightweight, thin mortars and pestles manufactured during the Initial and Early Formative.

In general, these findings bear a resemblance to those from large projects in Central Mexico that span the Late Archaic to Formative divide. For example, the Tehuacán Valley Project uncovered a far greater relative frequency of strategically designed flat/concave metates, medium to large flat/concave manos, *and* strategically designed pestles from Early Formative contexts compared to Late Archaic contexts. Furthermore, Initial and Early Formative deposits also contained new pestle (bell-shaped) and mortar (shallow-lipped) types, both of which are represented in the Paso de la Amada assemblage. I therefore contend that setting up a dichotomy between intensive maize processing and the use of mortars and pestles during the Initial and Early Formative may in fact mask evolving culinary traditions, even if these artifact classes largely fell into disuse by the Middle Formative. Given the persistence of medium and large size crushing mortars in the Early Formative assemblage, even when use of formal reciprocal-stroke manos and metates intensifies, it seems clear that these tools were all part of a single culinary tradition that uncoincidentally emerged during a period of dramatic social and political change.

CONCLUSION

Given the myriad of social changes that accompanied the shift to village life (Bandy and Fox 2010; Kohler and Varien 2012), and the importance of daily meals in the construction and maintenance of a collective identity (Hastorf 2010, 2016; Pollock 2015; Twiss 2007), a shared cuisine was likely crucial for the growth and success of Paso de la Amada. I argue that the appearance of designed and morphologically consistent food processing equipment with no currently known local precedent is evidence for the emergence of a shared cuisine capable of integrating community members into the grind of early village life. From the social learning associated with the initial manufacture of ground stone tools with a strong technological style to the routine food processing associated with daily meals and communal events, individuals and households at Paso de la Amada reproduced and negotiated the social fabric of Initial

Formative and Early Formative society through emerging and evolving foodways. Previous studies have considered the relationship between food, identity, and social change at Paso de la Amada primarily through a focus on prestige foods and competitive feasting (Blake and Clark 1999; Blake et al. 1992a, 2006; Clark 2004; Lesure and Blake 2002; Smalley and Blake 2003). However, archaeological studies of food and feasting in more egalitarian early village dwelling societies illustrate an emphasis on the collective, with feasting foods often comprised of scaled-up versions of daily meals (Dietler and Hayden 2001; Mills 1999, 2004; Potter 2000; Wills and Crown 2004). Given that leadership in such societies is contingent on group consensus (e.g., Carballo 2012; Carballo et al. 2014; DeMarrais and Earle 2017; Halperin 2017; Mills 2000), and that the labor associated with financing such meals extends well beyond a single household (Gumerman 1997; Pollock 2015), the emergence of shared food processing traditions and morphologically consistent tools also provided an opportunity for incipient elites to draw on the labor of community members for communal events. If we are interested in understanding the relationship between food and social change at Initial Formative villages in the Soconusco, a focus on quotidian household practices would help untangle the relationship between daily meals and feasts (see Pollock 2015). I find it likely that there was a reciprocal relationship between the development of a shared Initial Formative cuisine and its promotion by elites who could benefit from the labor of community members using a standardized set of tools and recipes (cf. Joyce and Henderson 2007). This may in part explain the increasing manufacture and use of designed, reciprocal, passive, and active ground stone tools during the Initial Formative to Early Formative transition. These tools share many functional and stylistic characteristics with maize processing tools found at proto-urban centers in southern Mesoamerica during the Middle Formative and Late Formative periods (see previous discussion), and I argue that the tools at Paso de la Amada and these later sites are part of a technological style (*sensu* Dietler and Herbisch 1998) associated with strongly patterned social and cultural behaviors.

In summary, Paso de la Amada residents manufactured and used a distinctive suite of food processing, non-food processing, and manufacturing ground stone tools with no currently known precedent in the Soconusco from 1700 BC onward. This suggests that a distinctive cuisine either accompanied the shift to settled village life or developed soon thereafter alongside dramatic social changes during Locona phase. Initial Formative and Early Formative ground stone tool manufacturing traditions and food processing practices at Paso de la Amada share a greater affinity with Middle Formative practices than those during the Late Archaic. This pattern intensifies through time, with a narrower focus on reciprocal-stroke maize grinding tools of a technological style that remains in place through the Early Formative and Middle Formative periods. At the same time, aspects of Initial and Early Formative ground stone tool manufacture and use are unique in comparison to both Late Archaic and Middle Formative strategies. Unique elements include (1) the manufacture and use of lightweight pestles and a mortars; (2) designed multi-use pestles used for concomitant processing and manufacturing activities; (3) formal yet more portable reciprocal-stroke metates compared to similar passive reciprocal tools dating to the Middle Formative period; (4) less wide and less thick reciprocal-stroke manos of a technological style that continued to be used primarily for maize processing during the Middle Formative and Late Formative periods; and (5) strongly patterned behavior associated with the use, reuse, recycling, and discard of these food processing, non-food processing, and manufacturing ground stone tools. The latter point deserves greater attention in the future, as our understanding of changing culinary traditions in the Soconusco would benefit from starch grain and phytolith studies focused on the direct identification of the types of foods that were prepared with these unique tools, which undoubtedly extended well beyond *Zea mays*.

ACKNOWLEDGMENTS

I thank Richard Lesure for providing me with the opportunity to study the ground stone tools from Paso de la Amada and spend time in San Cristóbal de las Casas while conducting this research. I also thank John Clark and Artemio Villatoro for sharing their knowledge of local geology and ground stone tool manufacturing traditions in Chiapas. In addition, I thank Mike Blake for offering insight into historic and modern uses of ground stone tools in the Soconusco and greater Chiapas. I offer additional thanks to Martin Biskowski, who made drawings and sketches of some of the tools included in the current analysis prior to my involvement in the project, and these proved useful during analysis. I also thank Jorge Eduardo Flores for collecting stone density measurements on nearly 1,000 artifacts; Anna Bishop and Carlos López for help with photographs used in the current chapter; Katelyn Bishop, Thomas Wake, and Mike Blake for offering insight into Early Formative foodways in the Soconusco; and Sonia Zarrillo for insight into late preceramic and early ceramic foodways to the south. Finally, I thank John Clark for an attentive review that improved the quality of this chapter.

Table 10.1. Analyzed units of obsidian from Paso de la Amada by phase or subphase

						Grams of Obsidian per Kilogram of Sherds		Average Flake Weight (g)[b]		Percent with Use Wear[c]	
Phase	Number of Samples[a]	Weight of Obsidian (g)	Total Count of Obsidian	Count of Sizes 1 and 2	Grams of Obsidian per m^3		Percent of Locona Value		Percent of Locona Value		Percent Change Relative to Locona
Early Locona	2	1179.7	1888	640	292.0	44.0		0.62		17.8	
Locona	26	13,144.8	17,733	7909	182.5	55.0	100	0.74	100	20.3	0.0
Late Locona	13	4799.6	9015	3574	386.0	19.0	35	0.53	72	22.0	+1.7
Ocós	26	8375.2	18,373	6334	394.6	17.4	32	0.46	62	22.4	+2.1
Md12-IV	3	522.9	963	404	350.9	16.0		0.54		17.8	
Cherla	27	9404.5	17,944	7076	691.4	20.3	37	0.52	71	21.2	+0.8
Totals	97	37,426.7	65,916	25,937							

[a] Initial Refuse Samples, with some of those divided into multiple samples based on excavation unit or stratigraphy.
[b] Calculated as total weight of obsidian over total count.
[c] Percentage of Sizes 1 and 2 sample.

CHAPTER 10

Obsidian

John E. Clark and Richard G. Lesure

THE PREDOMINANT flaked stone industry at Paso de la Amada was obsidian, which contributed more than 99 percent of the recovered chipped stone. The industry was a simple one that yielded large numbers of small flakes and no bifaces (Clark 1981; Clark and Lee 1984). Projectile points were absent. Raw material was imported to the site as spalls of perhaps 10 x 10 x 4 cm. Spalls were reduced by direct percussion to produce usable flakes and casual cores. The latter were further reduced by bipolar percussion to make more usable flakes.

Three obsidian sources are represented, all from the Guatemalan highlands. Tajumulco is closest, but the obsidian is lowest in quality. The obsidian of San Martín Jilotepeque and El Chayal is of higher quality, but they are farther away. All obsidian sources were determined by eye, as described elsewhere (Clark and Lee 1984).

Excavations reported in this volume yielded 212,594 fragments of obsidian, weighing 132.8 kg. Raw counts and weights are considered briefly in Chapter 25 of this monograph. The focus here is on a subset of the collection analyzed for source and use wear (54,780 fragments weighing 29.2 kg), augmented with 10 samples from Mounds 5 and 6 previously reported by Clark (1994a) and totaling 11,136 fragments weighing in at 8.2 kg. Here we describe changing preferences for different kinds of obsidian from Locona through Cherla times and variations in the percentages of flakes used for tools at different mounds.

SAMPLE AND METHODS

Clark made the final determinations of obsidian sources and types of use wear after Artemio Villatoro had done a preliminary sort. In the early 1990s, an initial set of samples was analyzed (17,965 flakes, weighing 9.8 kg). In 2017–2018, another 51 samples were studied (36,815 flakes, 19.5 kg). The samples referred to here are mostly a set of the Initial Refuse Samples discussed in Chapter 2, some of which include multiple individual proveniences. In analysis of the obsidian, some of the larger samples were divided by excavation unit and/or stratigraphy. For instance, Sample 3205A was divided into three separate samples based on excavation units (Unit 1 versus T1K and T1L) and stratigraphy (in Unit 1, Lots 193 and 196 versus Lots 200, 202, 204, 213, and 219).

All obsidian analyzed came from deposits screened through a 5 mm mesh. Fragments of each source were sorted through nested screens of 1.5 and 1.0 cm mesh. The three resulting sets were labeled Sizes 1, 2, and 3, with Size 1 being flakes retained in the 1.5 cm mesh and Size 3 those that passed through the mesh of 1.0 cm. The resulting groups were counted and weighed. Flakes with traces of cortex were counted in the Size 1 and 2 categories. In the 2017–2018 analysis, bipolar corner flakes were also tabulated in all three size categories.

Obsidian fragments were visually sourced following procedures described by Clark and Lee (1984). Fragments of all size categories were analyzed for source. Only two out of the more than 53,000 fragments analyzed were identified as likely from sources other than the three primary ones from Guatemala. Both specimens were from Cherla contexts. A Size 2 bipolar corner flake weighing 0.9 g from Mound 1 H8/11 is visually consistent with obsidian from Zaragosa, Mexico, and a Size 1 fragment weighing 1.1 g from Mound 13 P1/1 is visually consistent with obsidian from Ixtepeque, Guatemala.

Use wear traces were identified on Size 1 and 2 flakes based on inspection with the naked eye, supplemented as needed with 10x magnification. Use traces appeared mainly on otherwise unaltered flakes. Based on Clark's (1988) experiments, the main categories distinguished were "cutting of hard materials" (CH), "cutting of medium materials" (CM), "scraping of hard materials" (SH), and "scraping of medium materials" (SM). Altogether, those categories constituted 77.9 percent of specimens observed to have traces of use. Rare tools included drills, perforators, and a likely lapidary tool (0.3, 0.02, and 0.02 percent, respectively, of specimens with use wear). *Pièces esquillées*, or battered flakes (10.1 percent), appear to have had some particular, unidentified use. The frequency of unidentified use traces was 11.7 percent.

For most of the samples analyzed in the early 1990s, analysis of use was conducted on the full Size 1 and Size 2 sets, not divided by source. In 2017–2018, the sources were kept separate for the use wear evaluation. In analyses for this chapter, use wear is considered separate from source identifications to allow inclusion of as many samples as possible. In the analyses described here, frequencies were generally either converted to relative percentages or standardized by weight of associated sherds.

RESULTS

Basic characteristics of the analyzed assemblage, split by phase, are shown in Table 10.1 (see page 251). The early Locona assemblage is small and was included with Locona in most of the analyses. Also, only a few units of the mixed Ocós-Cherla ground surface under the Mound 12 platform were analyzed (Md12-IV)—and none from the corresponding layer under the Mound 1 platform (Md1-V). Finally, two of the larger Cherla samples from locations other than Mound 1 (the Tr.1B and Tr.1T trash pits) have not yet been studied, limiting the analysis of intra-site variability for that phase.

The table provides two estimates of the relative overall amount of obsidian in different eras, based on standardization by volume (grams of obsidian per m^3) and by weight of associated sherds (grams of obsidian per kilogram of sherds). As noted in Chapter 2 and elsewhere in this volume, standardizations by volume are greatly affected by the high density of artifacts generally in the Cherla deposits at Mound 1 and unusually low overall densities in some Locona deposits. We are strongly inclined toward standardization by sherd weight. (A combined measure introduced by Clark and Salcedo [1989], grams of obsidian per 10 ceramic kg m^3, proved volatile and not readily interpretable in the current sample.)

Standardized against weight of associated sherds, the overall amount of obsidian used and discarded at Paso de la Amada declined to approximately a third of its Locona-phase peak in late Locona and then remained stable for the rest of the occupation, as indicated in Table 10.1. Given that pattern, one might expect a greater percentage of utilized flakes in the post-Locona deposits and perhaps evidence of conservation of materials, such as an overall reduction in the size of flakes entering the archaeological record. Only the latter pattern is clearly registered in the collection. The crude measure of average flake weight (calculated from total weight over total count) declines to about 70 percent of its Locona peak in late Locona. There is only a slight uptick in the percentage of utilized flakes between Locona and late Locona, even though the overall amount of obsidian declined dramatically.

The following sections look further at aspects of production, the representation of the three sources, and traces of use divided by phase and excavation location.

Some Aspects of Production

Whereas direct production of obsidian nodules would be expected to yield an assemblage with traces of cortex on about 50 percent of flakes, previous work on the obsidian industry of Paso de la Amada indicated that the observed cortex frequency was much lower, in the neighborhood of 10 percent. Such observations led to the suggestion that raw material arrived at the site as small spalls (Clark 1981). Those conclusions are supported by evidence from the assemblage reported here. Table 10.2 provides median values of percentage of flakes with cortex, split by source and phase. All are low, generally somewhat less than 10 percent.

Also provided in Table 10.2 are data on bipolar corner flakes as a percentage of all flakes. The idea is that these data should provide a way of assessing the relative balance between direct and bipolar percussion between sources and phases. Bipolar percussion was clearly practiced on casual cores and large flake fragments from all three sources, perhaps—in a pattern that persists through time—at somewhat greater frequency with Tajumulco obsidian than with that from the other sources.

Representation of the Three Sources

Consideration of the changing representation of the three sources provides a glimpse into some of the processes behind the overall decline in availability of obsidian after the Locona-phase peak. The percentages of the three types, shown in the top chart in Figure 10.1, reveal a decline in Tajulmulco and a rise in El Chayal, with San Martín Jilotepeque fairly stable.

More interesting is the bottom chart, in which weights of obsidian from each source are standardized independently against weight of sherds. (Note the logarithmic scale on the y-axis.) It turns out that the dramatic overall decline in the rate of obsidian discarded can be accounted for entirely as a decline in material from Tajumulco, the closest and lowest quality of the three sources. There is a decline also in obsidian from San Martín Jilotepeque, but

Table 10.2. Indicators of obsidian production[a]

	Percent of Flakes with Cortex[b]			Percent Bipolar Corner Flakes[c]		
Phase	Tajumulco	San Martín Jilotepeque	El Chayal	Tajumulco	San Martín Jilotepeque	El Chayal
Locona	8.0	8.5	4.2	4.1	1.4	2.0
Late Locona	5.8	2.1	4.7	5.1	2.5	3.6
Ocós	9.5	6.3	7.2	4.4	2.8	3.7
Cherla	11.5	9.1	9.0	5.0	4.9	3.4

[a] Analysis by sample; numbers are medians for each phase or subphase. Early Locona included with Locona.
[b] Percentage of Sizes 1 and 2.
[c] Bipolar corner flakes as a percentage of all obsidian fragments.

discard of flakes from El Chayal increases steadily through the sequence, and median values of these two high-quality sources combined increase as well.

So, on further inspection, what at first glance looks like a decline in the availability of obsidian partway through the occupation is reconfigured as a shift toward higher-quality sources. Over time, consumers at Paso de la Amada chose to use smaller amounts of higher-quality obsidian. Discard of the higher-quality material gradually increased through the end of the occupation.

There is one other important pattern in the bottom chart of Figure 10.1. Although the rates of decline are different, both Tajulmulco and San Martín Jilotepeque decrease phase by phase, whereas El Chayal exhibits a completely different trend. These results support previous suggestions by Clark and Lee (1984:246–47) and Clark and Salcedo (1989:19–21) that exchange systems for the different sources were distinct. Tajulmulco and San Martín Jilotepeque obsidian probably arrived through overland routes, while El Chayal was transported by canoe along coastal waterways. El Chayal had a significantly larger interregional distribution than the other two sources, and its increase over the sequence at Paso de la Amada may indicate either steadily increasing access to interregional exchange networks or growth in the networks themselves (a greater volume in the flow of materials). It is interesting that access to the El Chayal network appears to have collapsed in the Soconusco region during the Jocotal phase, when the abandonment of Canton Corralito marked an end to what had been for a couple of centuries a close and ongoing connection between that site and the Gulf Coast Olmec site of San Lorenzo. In Jocotal times, Tajulmulco obsidian once again became the predominant type used (Clark and Salcedo 1989:Figure 1.5). Still, the shift from Tajulmulco and San Martín Jilotepeque to El Chayal started 150 years or so before any close connection between communities of the Soconusco and the Gulf Coast. The political and economic machinations of the Gulf Coast Olmecs affected the interregional exchange of obsidian, but the exchange system predated such effects and exhibited a history in which one can perceive the operation of other factors as well.

Mechanisms of Distribution

Building on work by Pires-Ferreira (1975) in Oaxaca, Clark and Lee (1984) and Clark and Salcedo (1989) noted a pattern in the Soconusco of inter-site homogeneity and intercommunity heterogeneity in the relative amounts of obsidian from the three sources. This, they argued, was evidence of some kind of community-level management of obsidian exchange and access thereto, potentially by village chiefs of the Initial Formative. Clark (1994a:277–91) explored some of the complications of that argument using an expanded and refined dataset.

At the site level, there is a fair amount of variation even within a given phase, yet the sample from Paso de la Amada presented here exhibits the same kinds of patterns previously reported for the site, including temporally persistent differences from patterns observed at Aquiles Serdán and San Carlos (Clark and Salcedo 1989:Figures 1.4, 1.5). Thus our new evidence seems consistent with previous data from Paso de la Amada and also with a community-level mechanism for household procurement, such as redistribution by a chief. Since comparisons between sites are crucial to the argument, what we really need now is more data from other sides in the Mazatán region or other zones of the Soconusco.

We offer two brief additional points. First, as can be seen in the ternary plot of the relative proportions of the three sources (Figure 10.2), there is a strong temporal component, particularly in the balance between Tajulmulco and El Chayal obsidian, to the extent that Late Locona emerges as transitional between Ocós and Locona. Second, the extreme scarcity of San Martín Jilotepeque and El Chayal obsidian at Mz-250—the location farthest

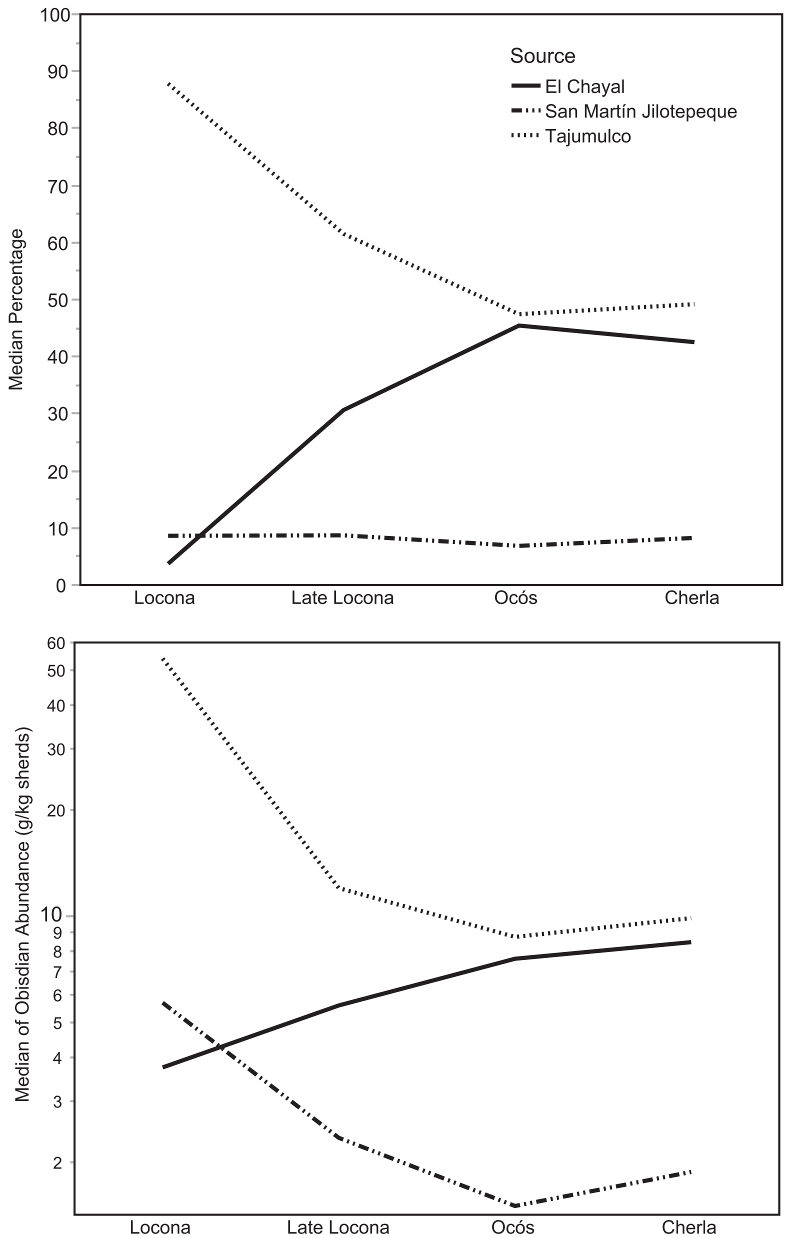


Figure 10.1. Change in representation of obsidian from the three sources. Top: percentages of obsidian from the three sources; bottom: weight of obsidian standardized by sherd weight (grams per kilogram of sherds). The value plotted is the median of the samples for a given phase/subphase. *Illustration by R. Lesure.*

from "downtown" Paso de la Amada considered in this volume—raises the question of whether there may have been, during the Locona phase, status-related differences in access to the highest-quality obsidian (in contrast to the previously observed pattern of inter-site homogeneity). That is a topic that needs to be investigated further, with additional samples from within Paso de la Amada's postulated polity but distant from the site core.

Spatial Differences in the Percentage of Utilized Flakes

Lower percentages of utilized flakes (among all Size 1 and Size 2 flakes) in elite contexts might indicate that high-status groups had more reliable access to obsidian. We looked for such a pattern but found no evidence of it among the samples from Paso de la Amada.

We divided the samples chronologically into three groups: (1) Locona, (2) Late Locona and Ocós, and (3) Cherla, including three samples from Md12-IV. In the first two groups, the Mound 6 contexts were considered elite and all other locations non-elite. In the third group, both Mound 1 and Mound 13 were considered elite contexts, but they were compared separately to the non-elite Cherla contexts. For each of the three groups, we calculated median values of the percentage of utilized flakes in elite and non-elite samples and compared the distributions with Wilcoxon rank sum tests. The question was whether the elite contexts would have significantly lower percentages of utilized flakes.

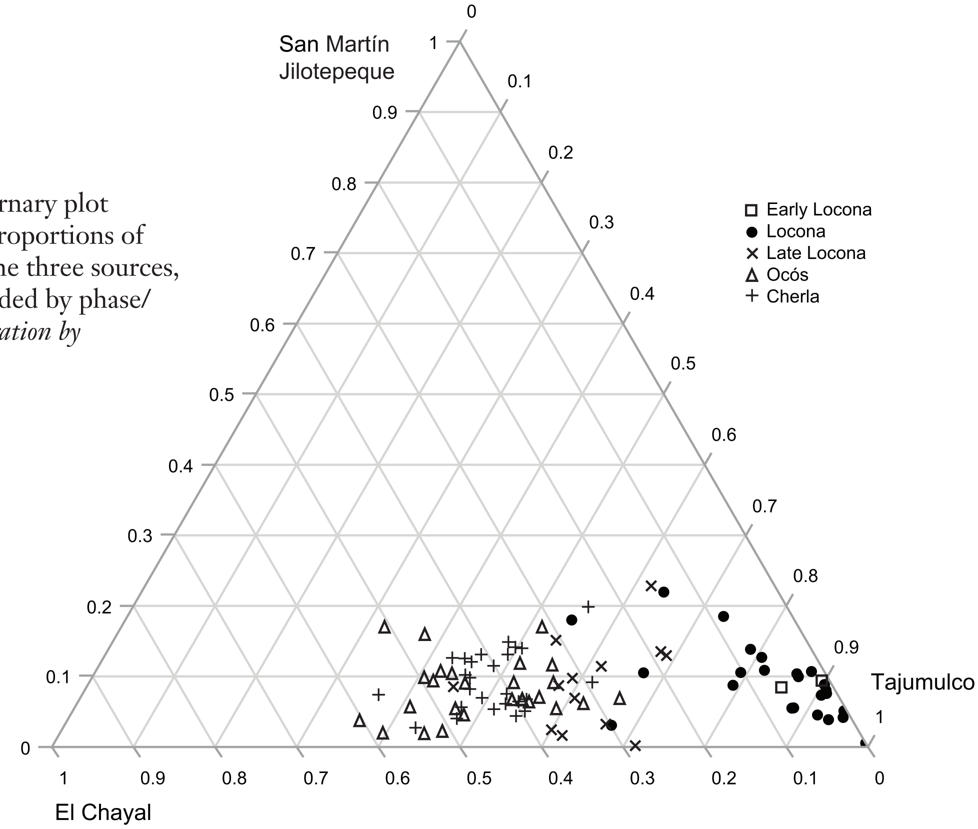


Figure 10.2. Ternary plot of the relative proportions of obsidian from the three sources, with samples coded by phase/subphase. *Illustration by R. Lesure.*

In the Locona group, the median value for proportion of utilized flakes at Mound 6 (0.198) was slightly less than that for non-elite contexts (0.206), but the difference was not significant ($p = 0.77$). The comparison for Late Locona and Ocós was hampered by the availability of just one sample from Mound 6. The value for that elite sample (0.177) was lower than the median for non-elite contexts (0.217), but the difference was not significant ($p = 0.267$).

Finally, for the Cherla phase, results were the reverse of expectations. Median values for the proportion of utilized flakes in the elite contexts (0.217 at both Mounds 1 and 13) were *higher* than those for the non-elite contexts (0.618). The difference in the case of Mound 1 versus non-elite contexts was significant ($p = 0.032$). Caution is in order here, since the number of Cherla-phase, non-elite samples is small (and the Trench 1B and 1T samples still unanalyzed). Still, the data as they stand provide no basis for arguing that elite households utilized obsidian at lower rates than other households.

Spatial Differences in Use Wear Traces

The final topic to be considered is variation among excavation locales in the uses of obsidian flakes. The general issue of interest is the degree of variation in productive activities among households. Here, at the beginning of the Formative, we would expect little differentiation, with most activities replicated in each household (mechanical rather than organic solidarity). That expectation is borne out, overall, in that the four basic categories of use wear (cutting of hard materials, cutting of medium materials, scraping of hard materials, scraping of medium materials) appear in every location. Yet detailed analysis reveals a surprising degree of variation in those and even more variation in two peripheral categories (*pièces esquillées* and other/unidentified).

For the analyses, we pooled the samples for each phase and excavation locale. These raw data, presented in Table 10.3, were explored by chi-square analysis of three tables, corresponding to Locona, Late Locona plus Ocós, and Cherla. Based in part on the large counts for some categories, most of the analyses indicate different distributions with a high level of significance ($p < 0.0001$). We have found it more useful to explore patterns by examining the contribution of individual cells to the total chi-square. The Locona table is shown as an example (Table 10.4). The Ocós and Cherla tables yielded similar patterns. We briefly describe those; interested readers can readily generate the corresponding tables from data provided in Table 10.3.

For each Locona-phase excavation locale and use wear trace, the cells in Table 10.4 provide the *observed* followed by the *expected* count. Where the chi-square value of an individual cell constitutes 2 percent or more of the total chi-square for the table, that percentage is noted in the corresponding cell. Also, the percentage contribution to total

Table 10.3. Raw counts of use wear traces split by phase and location

	Use Wear Type[a]								
Phase and Location	CH	CM	SH	SM	PE	Drill	Lapidary Tool	Perforator	Other, Unidentified
Locona									
Md. 1	3	15	9	17	0	0	0	0	0
Md. 12	6	48	19	31	2	0	0	0	33
Md. 13	2	9	7	3	0	0	0	0	0
Md. 14	10	31	25	15	3	0	0	0	0
Md. 21	8	53	20	28	0	0	0	0	24
Md. 32	11	38	16	17	16	1	0	0	0
Md. 5	15	40	30	26	3	0	0	0	0
Md. 6	76	244	302	180	0	0	0	0	90
Mz-250	6	36	16	51	0	0	0	0	32
P32	9	11	19	13	3				0
Late Locona									
Md. 1	11	26	33	17	0	0	0	0	0
Md. 12	44	114	48	67	9	0	0	0	42
P32	47	117	71	51	74	0	0	0	15
Ocós									
Md. 12	53	259	125	174	10	1	0	0	303
Md. 32	55	137	67	67	56	0	0	0	49
Md. 6	9	16	21	14	4	0	0	0	0
Md12-IV									
Md. 12	11	25	14	16	6	0	0	0	0
Cherla									
Md. 1	126	308	190	205	339	16	1	1	1
Md. 11	5	14	20	14	7	0	0	0	0
P29	3	10	6	5	0	0	0	0	0
Md. 13	13	66	36	21	7	0	0	0	52
Md. 32	0	6	3	5	17	0	0	0	0
Totals	**523**	**1623**	**1097**	**1037**	**556**	**18**	**1**	**1**	**641**

[a] CH = cutting of hard materials; CM = cutting of medium materials; SH = scraping of hard materials; SM = scraping of medium materials; PE = *pièces esquillées*.

chi-square of each excavation locale and type of use wear is noted at the right and bottom of the table, respectively.

The main pattern is that a substantial percentage of the total chi-square (360.030, with 45 degrees of freedom) is generated by the distributions of the PE and other/unidentified columns. That result recurs in the Ocós table (PE 38.5 percent, other/unidentified 42.8 percent, chi-square = 444.354, with 25 degrees of freedom) and in the Cherla table (PE 20.2 percent, other/unidentified 42.8 percent, chi-square = 359.667, 30 degrees of freedom, with “drill” included as a seventh type of use wear, whereas it was included with “other/unidentified” in the other tables).

Table 10.4. Results of chi-square analysis of Locona-phase obsidian use wear traces, by location[a]

	Use Wear Type						Percent Contribution to Chi-Square
Location	CH	CM	SH	SM	PE	Other	
Md. 1	3/3.7	15/13.4	9/11.8	17/9.7	0/0.7	0/4.6	3.3
Md. 12	6/11.8	48/42.4	19/37.4 (2%)	31/30.8	2/2.2	33/14.5 (6%)	10.0
Md. 13	2/1.8	9/6.4	7/5.6	3/4.6	0/0.3	0/2.2	1.3
Md. 14	10/7.1	31/25.6	25/22.6	15/18.6	3/1.3	0/8.8 (2%)	3.9
Md. 21	8/11.3	53/40.5	20/35.8	28/29.4	0/2.1	24/13.9 (2%)	5.9
Md. 32	11/8.4	38/30.2	16/26.6	17/21.9	16/1.6 (37%)	1/10.3 (2%)	42.0
Md. 5	15/9.7	40/34.8	30/30.6	26/25.2	3/1.8	0/11.9 (3%)	4.6
Md. 6	76/75.6	244/272.0	302/239.8 (4%)	180/197.4	0/14.0 (4%)	90/93.2	9.6
Mz-250	6/12.0	36/43.0	16/37.9 (4%)	51/31.2 (3%)	0/2.2	32/14.7 (6%)	14.4
P32	9/4.7	11/16.8	19/14.8	13/12.2	3/0.9	0/5.7	5.1
Percent Contribution to Chi-Square	4.4	4.4	14.3	6.1	45.0	25.8	

[a] Cells provide, for each location and use type, the observed followed by the expected frequency. Where the chi-square for a given cell contributes 2 percent or more of the total chi-square for the table, the corresponding percent is noted. Columns at the far right and the bottom provide the total percentage contribution to the table chi-square of the individual locations and use types, respectively.

It is difficult to know what to make of the discordance in the other/unidentified category, particularly because this could include more than one distinct but unidentified use. We can more confidently say that the PEs—which, in the analyses, were systematically distinguished from spent bipolar cores—were differentially distributed between residential locations. We infer that the original associated activities (as yet unidentified) were undertaken more frequently by some households than others. Interestingly, in the two cases in which we have samples from a single location that straddle a phase/subphase boundary, there is consistency in the under- or overrepresentation of PEs. In the Pit 32 Excavation, PEs are more common than expected in both Locona and Late Locona samples, whereas at Mound 12 they are less common than expected in both the Late Locona and Ocós samples (but, we should note, present in the amount expected in the smaller Locona sample from Mound 12).

We tried an analysis for each phase leaving out *pièces esquillées* and other/unidentified (with drills included in the Cherla version). Only in the Cherla version—in which the large sample from Mound 1 overwhelms all the others—did the p-value rise above 0.05 (total chi-square 22.540 with 15 degrees of freedom, $p = 0.0944$). The Ocós results (chi-square = 53.825, 15 degrees of freedom, $p < 0.0001$) were affected particularly by a low CH in Mound 12-Ocos (a pattern *not* seen in the Late Locona sample from that mound) and a high SH in the Late Locona sample from Mound 1. The Locona results (chi-square 100.765, 27 degrees of freedom, $p < 0.0001$) were affected by high CM and low SH at Mounds 12 and 21, high SH at Mound 6, and low SH/high SM at Mz-250. It is telling that, in this table, samples from different phases/subphases in the same location (Mound 12 and P32) yield discordant results in terms of underrepresentation/overrepresentation when analysis is restricted to the four primary categories. That finding tends to support the original hypothesis of mechanical solidarity, albeit with considerable noise in the data.

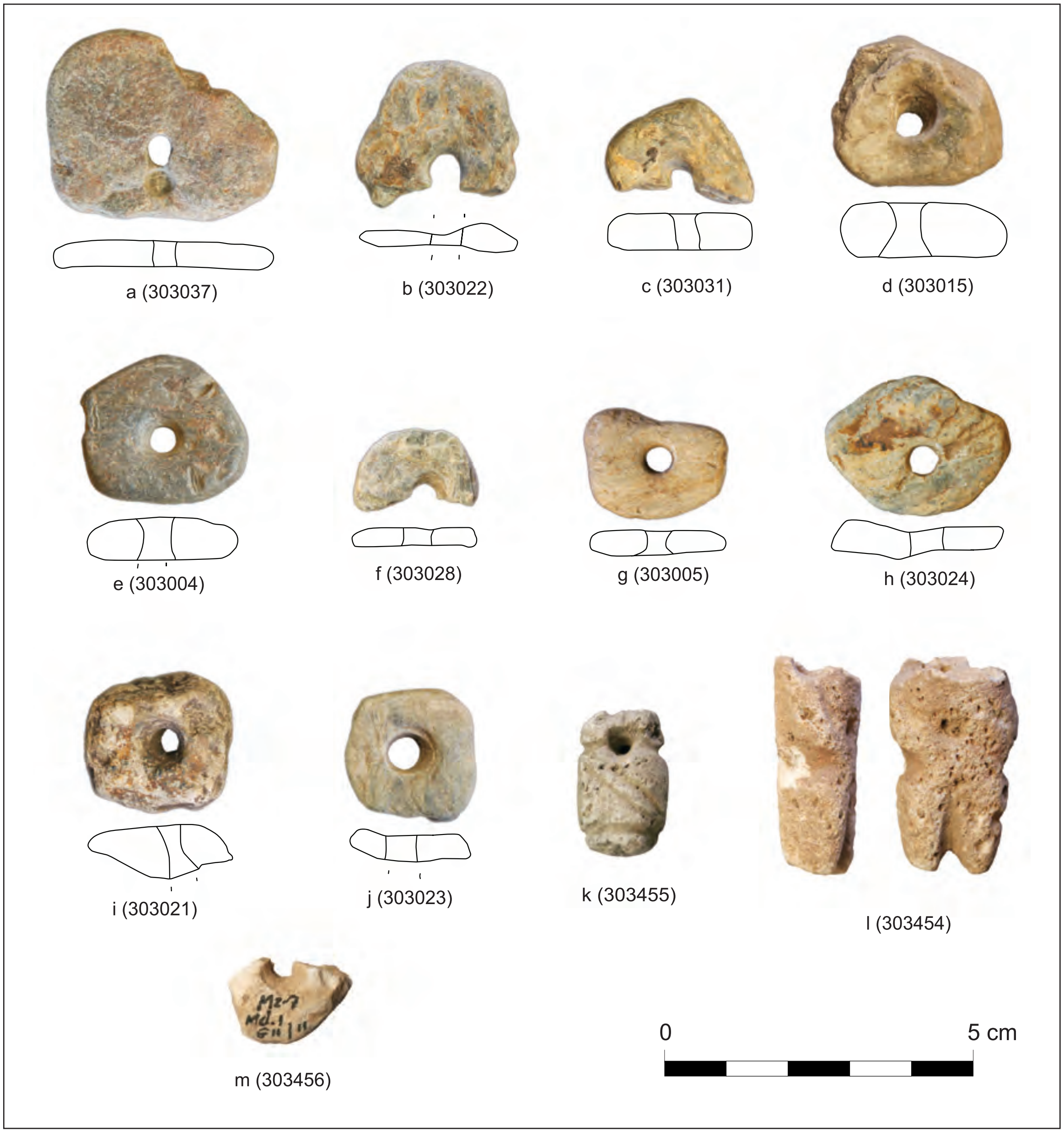


Figure 11.1. Disk-shaped beads and pumice ornaments: (a–j) disk-shaped beads, mainly of soapstone; (k–l) pumice pendants; (m) pumice bead. Proveniences: (a) Md. 12 E–F 1/21; (b) Md. 12 T1A/5; (c) Md. 12 G6/33; (d) Md. 12 I5/28; (e) Md. 1 F9/9–10; (f) Md. 1 J7/5; (g) Md. 12 I6/26; (h) P32 Z4/4; (i) P32A/2; (j) P32 E3/4; (k) Md. 1 F9/11; (l) Md. 1 I13/7; (m) Md. 1 G11/11. *Illustrations in this chapter by R. Lesure, Anna Bishop, Katelyn Jo Bishop, Alana Purcell, and project staff.*

CHAPTER 11

The Stone Ornaments

Richard G. Lesure and Paola Demattè

THE EXCAVATIONS AT Paso de la Amada yielded 110 stone ornaments, an impressive collection considering that only two are from special contexts such as burials or caches. The others, many still in usable condition, were apparently lost or discarded. Lesure (1999b) has discussed implications of the relatively high rate of loss/discard of greenstone ornaments at the site, a topic considered also in Chapter 27.

FINISHED ORNAMENTS AND FRAGMENTS THEREOF

The four primary categories of stone ornaments recovered in finished form are: disk-shaped beads of soapstone or basalt, greenstone beads, greenstone pendants, and iron ore mirrors. A few other unique items are also described. No finished ornaments of mica were recovered.

Disk-Shaped Beads of Soapstone or Basalt

Forty-two disk-shaped stone beads were recovered, mainly from Ocós and Cherla deposits (Data Record 11.1). Thirty-nine are made of soapstone, two of basalt, and one of an unidentified stone. They are usually only roughly round with "diameters" ranging from 0.9 to 4.0 cm (Figure 11.1a–j). Two measurements across each disk were taken, perpendicular to each other. Those are labeled Diameter 1 and Diameter 2 in Data Record 11.1. Only dimensions of intact pieces were recorded. The average of all recorded "diameters," was 2.3 cm with a standard deviation of 0.51. The beads are generally 5 to 8 mm thick (range 3.3–11.3 mm). Hole diameter ranges from 2.8 to 6.0 mm, with most between 3 and 4 mm. Weights of whole or nearly whole specimens range from 1.5 to 12.6 g. The biconically drilled perforations are often only approximately in the center of the disk. In one case (303037), there is an unfinished drill hole that would have been radically off center and a finished hole that is more central but still only approximately so. Another bead (303041), which had been rendered unusable by a break across the hole, was re-drilled to form a usable bead without any effort to shape the broken edge. Half the specimens are either complete or still usable as beads in that the perforation remains intact.

These artifacts were most likely used as personal ornaments. They were probably strung either singly or in sets as necklaces or perhaps overlapping to form head ornaments across the forehead (perhaps along the lines of the diadem of K'inich Janaab' Pakal of Palenque; see Filloy Nadal 2016:Figure 2.18). An alternative potential use would be as spindle whorls. The range of weights of the soapstone beads (1.5–12.6 g) is similar to that of the modeled spindle whorls described in Chapter 18 (2.9–11.3 g). However, we think the soapstone beads were ornaments rather than whorls. The shapes are haphazard, the holes not carefully centered—and why not use more easily obtainable clay?

Disk-shaped beads, mainly of soapstone, were introduced sometime in the Locona phase, reached their peak in Ocós, and continued in use during the Cherla phase. None of the specimens is definitively earlier than Late Locona. However, it would not be surprising if earlier cases were to be found. Twenty-two of the beads are from refuse deposits. Two of those are Late Locona (303008, 303037), seven Ocós (303006, 303018, 303022, 303025, 303031, 303038, 303042), six from the Ocós-Cherla ground surface under the Mound 12 platform (303015, 303016, 303026, 303027, 303030, 303032), one from the Locona-Cherla ground surface under the Mound 1 platform (303010), and six Cherla (all from Zone IV of the Mound 1 platform; 303003, 303004, 303007, 303012, 303033, 303034). Specimens from mixed deposits include seven from Zones I or III of the Mound 1 platform (303001, 303002, 303009, 303011, 303013, 303028, 303035) and two from mixed deposits off the platform (303014, 303017). Four specimens from the Pit 32 excavations are likely either Locona or Ocós, as is one of the Mound 12 specimens (303029) and three from Mound 32 (303039, 303040, 303041). The three remaining specimens are from the very mixed platform fill in Mound 12 and could be Locona, Ocós, or Cherla (303005, 303019, 303036).

In Data Record 11.1, the disk beads are classified as "complete" if they are fully intact or nearly so, with merely a few chips around the edges. "Usable" indicates that there is substantial edge damage but the central perforation remains intact. "Broken" refers to fragments of various sizes, the key point being that the break runs through the central perforation, making them no longer usable as beads. The Cherla-phase disk beads from Mound 1 are mostly in complete or usable condition, whereas the Locona and Ocós specimens (from Mounds 12 and 32) are mainly broken. The Cherla pattern seems to be replicated in the Zone IV ground surface (mixed Ocós-Cherla) under the Mound 12 platform. The pattern is significant in a two-way test between Locona-Ocós, with seven broken and two usable or complete, and Cherla (including the ground surfaces under the Mounds 1 and 12 platforms), with four broken and nine usable or complete (chi-square = 4.7009, p = 0.030148). A more permissive tabulation that counts, for instance, the Pit 32 excavation specimens as Locona-Ocós and the Mound 1 Zone III cases as Cherla yields: Locona-Ocós, 11 broken and six usable or complete; Cherla, six broken and 13 usable or complete (chi-square = 3.9506, p = 0.046854). The implication is that the people who generated the Cherla-phase deposits were more careless or wasteful with these beads than people of the earlier phases.

Ceja Tenorio (1985:108, Figure 58n) found one similar bead at Paso de la Amada. There are two somewhat similar discoidal beads in serpentine from the San Lorenzo B phase at San Lorenzo (Coe and Diehl 1980:241, Figure 240).

Greenstone Beads

Twenty-two complete or at least usable beads of greenstone (hard, green, metamorphic stone) were recovered (Table 11.1). The collection is quite diverse. Colors vary considerably, from a cloudy, whitish green to very dark green. The form of the beads varies considerably as well (Figure 11.2a–p). Except for two that were excavated from a burial (P32E/Burial 5: 303044, 303045), the beads come from midden deposits. They may have been discarded or lost. These circumstances make it difficult to reconstruct how they were strung and used.

Colors and Materials

Three main color groups are evident: green, white or whitish, and black.

Green beads, which are the most numerous (11 out of 21), can be divided into two groups based on shades of color, material, and possibly use. Seven (303043, 303048, 303051, 303052, 303054, 303056, 303062) are made of yellowish- or grayish-green stone of a hardness around 7 on the Mohs scale. These have a smooth surface and are probably jadeite. Three beads (303058, 303047, 303059) are made of blue-green stones of lower hardness (around 3). Some have shiny specks, perhaps of mica. One (303064) is a dark green fragment of a soft material (hardness 2) with shiny specks.

Eight beads are made of whitish stones ranging from pale yellow to very pale gray-green. Though it is unclear what type of stones were used to manufacture these beads, except for one whose hardness reaches 7 and that may be jadeite (303063), the rest (303057, 303053, 303046, 303050, 303060, 303044, 303045) are made of softer materials (hardness around 3–4). Given that some of the beads' surfaces are smooth and polished and others are rough or matte, it is likely that the materials vary considerably.

Three black or partially black beads also vary in terms of size, shape, polish, and material. One (303061) is an almost perfect sphere of a shiny and hard black stone. Another (303055) is an irregularly shaped discoid of a composite, perhaps ferrous, material that ranges from black to dark brown.

Shapes and Manufacturing Techniques

There is considerable variation in shape. Ten beads are sub-spherical, eight discoidal, two cylindrical, one spherical, and one irregularly shaped after reworking from a broken sphere (303064). A few have biconically drilled holes. At least two discoids (303052, 303053) appear in contrast to have been manufactured by slicing a drilled cylinder—in other words, a tubular preform—to produce multiple thin beads with flat faces.

Chronology

The specific proveniences for the beads are provided in Table 11.1. Specimen 303043 is from a Locona occupation surface at Mound 12 not included in the Refuse Study Sample, while 303044 and 303045 are from Burial 5 in the Pit 32 Excavations, either Locona (most likely) or Ocós. The two beads were recovered from the head region. They were probably worn by the deceased, but whether around the neck or at the ears could not be determined.

Table 11.1. Greenstone beads (all are in usable condition)

Cat. #	Provenience	Shape	Hole Diameter (mm)	Diameter (mm)	Thickness (mm)	Weight (g)	Color	Hardness	Probable Material	Notes
303043	Md. 12 P5/7	sub-sphere	1.8, biconic	6	3.7	0.1	5G7/2 pale green	7		
303044	P32E/Burial 5	sub-sphere	2.9, biconic	7.2	5.7	0.2	2.5Y8.5/2 pale yellow	3		from burial
303045	P32E/Burial 5	sub-sphere	2.8, biconic	7.3	5.8	0.3	2.5Y8/2 pale yellow	3		from burial
303046	Md. 12 T1B/F.2 fin	discoid	2.4, biconic	7.9	4.8	0.5	*2.5Y8/2 pale brown with black spot	3–4		not shiny, buff
303047	Md. 12 J5/32	sub-s phere	2.4, biconic	12.9	7.3	2	*5G5/2 blue-green with shiny (mica?) specks	3	composite	
303048	Md. 12 I5/29	sub-sphere	2.8	6.8	4.3	0.3	5GY6/4 pale yellowish green with brown spots	7	jadeite	polished shiny
303049	Md. 12 G7/F.21E	sub-sphere	3	12.7	8	2.1	10Y2.5/1 greenish black	3	serpentine?	polished flat ends
303050	P32D/2	discoid	1.7	5.2	2.8	0.1	5Y8/2 pale yellow	3		flat ends
303051	Md. 13 P2/2	sub-sphere	1	3.6	2.3	< 0.1	5GY6/1 greenish gray	7	jadeite	very small
303052	Md. 1 H10/1	discoid	2.1	6.3	3.5	0.2	10Y4/1 dark greenish gray	7+	jadeite	sliced
303053	Md. 1 J7/1	discoid	1.8	4.9	1.8	0.1	10Y8/1 light greenish gray	4–5		sliced
303054	Md. 1 H12/1	sub-sphere	2.1	6.6	5.8	0.3	5GY5/1 grayish olive	7	jadeite?	
303055	Md. 1 G12/5	discoid/irregular	1.8	8.5	4.5	0.8	5YR3/3 dark reddish brown and black	black 7 red 3	composite hematite?	rough, reddish, shiny black top
303056	Md. 1 L9/6	discoid	1.9	5.9	2.4	0.15	10Y6/2 light grayish olive	7	jadeite?	flat top
303057	Md. 1 K8/7	discoid	1.8	6.1	4	0.2	2.5Y6/2 light brownish gray	3		flat ends, rounded sides
303058	Md. 1 H12/8	cylindrical	1.9	5.6	5.1	0.2	*5G6/2 light greenish gray	3		flat ends, rounded sides
303059	Md. 1 L11/10	sub-sphere	2.1	6.6	5.3	0.3	*2.5Y3/1 brown-black	3		flat ends, irregular circle
303060	Md. 1 G11/11	cylindrical	2.3	5.2	5	0.1	5GY7/1	3–6?		
303061	Md. 1 I6/11	sphere	2.2	9.7	8.4	0.9	*2.5/N black	7	compact and heavy black stone	chipped on one side, polished shiny
303062	Md. 1 G8/9	sub-sphere	2.2	9.6	6.7	0.8	5GY6/1 greenish gray	7	jadeite?	
303063	P32E2/1	discoid	2.3	6.8	4.4	0.25	2.5Y7/2 light gray	7	jadeite?	flat ends, off-center hole
303064	Md. 21 P2/1	irregular	1.7	7.1	3.1	0.2	5G4/1 dark greenish gray	2	schist?	reworked from broken bead

*Available Munsell tables are not a good match for these pieces.

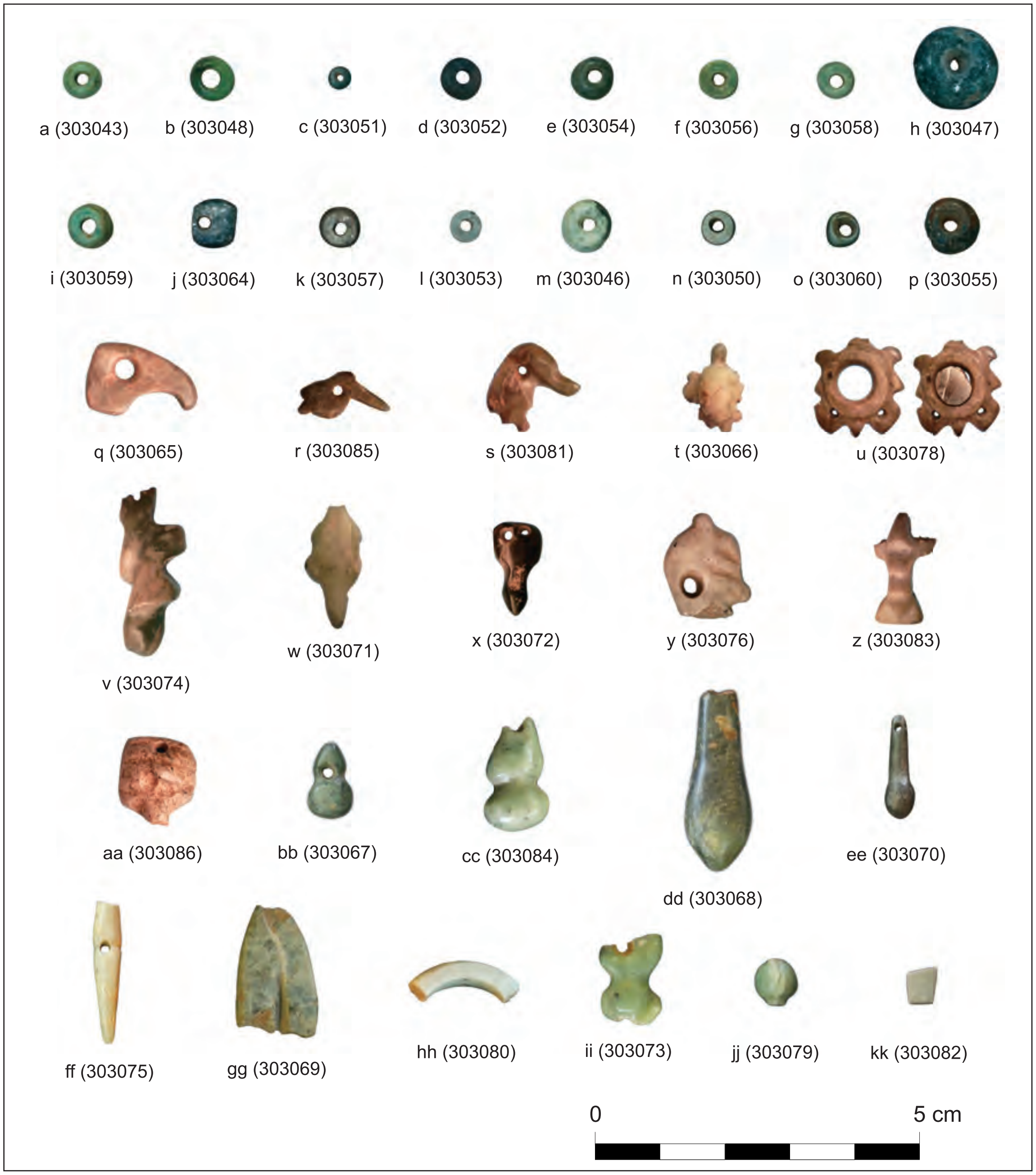


Figure 11.2. Small greenstone ornaments: (a–p) beads; (q–kk) pendants and possible pendant fragments. The colors of the zoomorphic pendants are somewhat off in our photos; they are greener than they appear here. Proveniences: (a) Md. 12 P5/7; (b) Md. 12 I5/29; (c) Md. 13 P2/2; (d) Md. 1 H10/1; (e) Md. 1 H12/1; (f) Md. 1 L9/6; (g) Md. 1 H12/8; (h) Md. 12 J5/32, sitting on Floor 1; (i) Md. 1 L11/10; (j) Md. 31 P2/1; (k) Md. 1 K8/7; (l) Md. 1 J7/1; (m) Md. 12 T1B-C/ F.2 fin; (n) P32D/2; (o) Md. 1 G11/11; (p) Md. 1 G12/5; (q) Md. 21 P2/5; (r) Md. 1 T3/3; (s) Md. 1 F11/7; (t) Md. 12 E3/12; (u) Md. 1 I7/5; (v) Md. 1 I7/11; (w) Md. 1 J7/8; (x) Md. 1 J9/10; (y) Md. 1 K10/1; (z) Md. 1 J9/7; (aa) Md. 32 T4E/179; (bb) Md. 12 H7/28; (cc) Md. 1 platform fill; (dd) Md. 12 H6/26; (ee) Md. 1 I9/8; (ff) Md. 1 K8/1; (gg) Md. 1 H11/21; (hh) Md. 1 K8/5; ii, Md. 1 F9/11; (jj) Md. 12 H6/26; (kk) Md. 1 I13/7.

Specimens 303046 and 303047 are both late Locona, the first from a midden and the second from a cemented occupation surface. Ocós specimens are 303049 and 303048, the latter from an unscreened lot. Specimen 303050 is either Locona or Ocós, from a level that may originally have been part of Feature 3 in the Pit 32 Excavations.

A tiny bead, 303051, is from the Cherla refuse pit at Mound 13, a feature that also contained an iron ore mirror. Specimens 303057 through 303062 are from the redeposited high-status Cherla midden of Zone IV of the Mound 1 platform. Specimens 303052 through 303056 are from the more mixed Zones I and III of that platform. Finally, 303063 and 303064 are from mixed surface layers at Pit 32 and Mound 21.

Greenstone Pendants

Twenty-one other small greenstone ornaments or fragments thereof were recovered (Table 11.2). Most appear to have been pendants, of which six are complete and 11 broken (Figure 11.2q–kk). The four other pieces are fragments of either pendants or other unidentified artifacts. Color and form are again diverse.

In terms of form, most appear to be zoomorphic, though in some cases it is difficult to determine with certainty the animal represented. Three represent birds or bird heads (Figure 11.2q–s; subsequent references to that figure are with letters only). Specimen 303065 is complete and represents in profile a bird's head with a large curving beak, possibly a bird of prey. Specimen 303085 represents in profile a very small bird with a long, prominent, sharp beak, perhaps a hummingbird. Specimen 303081 appears to show a three-dimensional bird's head.

Two specimens represent turtles (t, u). Specimen 303066 is damaged at the feet where the front-to-back holes for suspension were located. Specimen 303078 has front-to-back holes in the hind legs for hanging and one large hole at the center where the carapace would be. Running around the inside of the hole is a slight ledge that would have supported an inset in another material (for the carapace), as suggested in Figure 11.2u using an iron ore mirror from the excavations. That particular mirror does not fit perfectly, but it gives the basic idea. Besides iron ore, obsidian would be another possibility for the inset (see Figure 16.8e). The head of the turtle is broken off.

Specimen 303074 is a schematic monkey, similar to two previously illustrated by Clark (1991:Figure 7a, b). The tail is broken at the hole that ran from side to side (v).

Specimen 303071 is a crocodile with the head broken off at the transverse suspension hole (w). A coiled snake or lizard head (303072) is complete, with two holes for hanging (x). A feline head (303076) is broken at the neck (y). What appears to be a lobster or shrimp (303083) is missing its claws. (Something is broken off on each side.) The side-to-side hole is through the tail (z).

Specimen 303086 is zoomorphic but not identifiable. With two eyes and a broken snout or beak, it might be the face of a bird or reptile (aa).

The non-zoomorphic pendants include four bulbous fragments, perhaps inspired by gourds (bb–ee). Two are shaped like figure eight gourds (303067 complete; 303084 broken), and two are more elongated (303068; 303070). One specimen (303075) is shaped as a claw or fang and may be an effigy of some sort (ff). Specimen 303069 is a flat, pointed fragment, angular on one side and grooved on the other (gg). Piece 303080 is a tapering curved band fragment, perhaps originally a claw effigy (hh). The remaining three pieces are small fragments (ii–kk).

Iron Ore Mirrors

Nineteen small mirrors of polished iron ore were recovered (Table 11.3). The material is tentatively identified as ilmenite; the mirrors are either not magnetic or weakly magnetic and can be quite reflective on the polished surface. A variety of shapes is represented, most common being circular or oval (Figure 11.3a–s). Several are rectilinear in form, and two are fragments of washer-shaped objects (round with a central hole). The largest is 303105, a fragment of a circle with an original diameter of approximately 2.5 cm; the smallest complete oval is 0.5 x 0.4 cm (303098). The two washer-shaped pieces (303096, 303109) are 2.0–2.4 cm in outer diameter with central holes of 0.8–1.2 cm. Thickness of the mirrors ranges from 0.07 to 0.24 cm.

The iron ore mirrors are entirely from Cherla-phase or predominantly Cherla-phase deposits. Ten are from Zone IV at Mound 1, the redeposited high-status Cherla midden that forms the lower part of the platform fill (303093 through 303097). A final mirror from Mound 1 (303109) was found on the sorting table after initial analysis of small items from that mound; its original provenience is lost, but it most likely derives from the platform fill at that mound. Two iron ore mirrors are from other mounds. Specimen 303092 is from the Cherla pit at Mound 13 (Figure 11.3g). Specimen 303091 is from the mixed fill of the Cherla-phase platform at Mound 12, in a level that yielded Locona, Ocós, and Cherla sherds (Figure 11.3h). All 19 mirrors most likely date to the Cherla phase.

The mirrors were surely costume components. The round and washer-shaped forms may have been components of earspools, as suggested by Ceja Tenorio (1985:108–9) and Clark and Colman (2014:149–50); for further comments, see Chapter 17.

Bead of Unidentified Yellow Stone

A small bead of an unidentified bright yellow stone was recovered from Mound 1 J7/1 (303119; Figure 11.3t).

Button or Bead

From the pre-platform ground surface at Mound 1 (F12/25, 303090), there is a tiny, complete dumbbell-shaped artifact in brown stone that may have been a costume fastener such as a button. The form is ovoid with a circumferential groove; the piece is not perforated. The length is 1.0 cm.

Table 11.2. Greenstone pendants

Cat. #	Provenience	Maximum Length (mm)	Weight	Condition	Color	Hardness	Probable Material	Description
303065	Md. 21 P2/5	14.7	0.4	complete	5GY6/1 greenish gray	7	jadeite	zoomorphic, bird head, condor?
303066	Md. 12 E3/12	12.1	0.4	broken	10Y6/2 light grayish green	7	jadeite	zoomorphic, turtle, damaged at the feet, evidence of two holes no longer extant at feet
303067	Md. 12 H7/28	11.7	0.4	complete	5GY4/2 dark grayish green	7 or more	jadeite	bulbous end, gourd shape
303068	Md. 12 H6/26	22.3	1.5	broken	5GY3/2 very dark grayish green	2–3		bulbous pointed end, broken at the hole
303069	Md. 1 H11/21	15.6	0.8	broken	10Y5/2 grayish olive	3		fragment of possible pendant, no hole extant, spear shape with groove on one side
303070	Md. 1 I9/8	16.3	0.3	complete	5Y2.5/1 black	3		bulbous end
303071	Md. 1 J7/8	16.6	0.5	broken	5GY6/2 light grayish green	7		zoomorphic, crocodile
303072	Md. 1 J9/10	13.6	0.2	complete	5Y2.5/1 black	7+	black shiny stone	zoomorphic, possibly coiled snake, two holes
303073	Md. 1 F9/11	11.3	0.5	broken	5GY5/2 grayish green	7	jadeite	fragment, broken and reworked, evidence of two holes no longer extant
303074	Md. 1 I7/11	22.6	1.1	broken	5GY5/2 5GY4/2 grayish green with light/dark striations	7	jadeite	zoomorphic, monkey
303075	Md. 1 K8/1	21.1	0.5	broken	10Y7/1 light greenish gray	7	jadeite	spike-shaped pendant, possibly tooth or claw effigy
303076	Md. 1 K10/1	15	1.3	broken	10Y8/1 light greenish gray	7		zoomorphic, mammal, vaguely feline
303078	Md. 1 I7/5	13.9	0.6	broken	5Y5/2 olive	7		zoomorphic, turtle, with central biconic hole, 4.3 mm, width 12.3 mm
303079	Md. 1 J9/5	6.9	0.3	broken	5GY6/2 light grayish green	7 or more	jadeite	possible pendant
303080	Md. 1 K8/5	13.6	0.5	broken	5GY7/1 grayish olive	7	jadeite	curved fragment, possible pendant or ring fragment
303081	Md. 1 F11/7	11.1	0.4	complete	10Y5/2 grayish olive	7		zoomorphic, possible bird, biconic hole
303082	Md. 1 I13/7	5.4	0.1	broken	10Y4/1 dark grayish olive	4		possible pendant fragment
303083	Md. 1 J9/7	16.1	0.5	broken	10Y5/2 from grayish olive to light gray-green	3–4		zoomorphic, probably lobster, missing claws, hole at tail
303084	Md. 1, fill of platform	13.9	0.9	broken	5GY6/2 light grayish green	7		bulbous end, gourd shape, broken at hole
303085	Md. 1 T3/3	12.1	0.1	complete	10Y3/2 very dark grayish olive			zoomorphic, bird, probably a hummingbird, very small
303086	Md. 32 T4E/179	13	0.7	broken	10Y8/1 light greenish gray with darker specks	7		probably zoomorphic

Table 11.3. Iron ore mirrors[a]

Cat. #	Provenience	Shape	Thickness (cm)	Weight (g)	Comments
303091	Md. 12 T1E/5	unknown	0.08	0.3	reflective face, reverse unpolished but reflective
303092	Md. 13 TP2/2	roughly circular*	0.13	0.4	very reflective face, reverse not reflective
303093	Md. 1 I6/1	rectangular	0.14	0.3	very reflective, reverse not reflective; weakly magnetic
303094	Md. 1 F9/5	unknown; one side straight	0.2	0.3	very reflective, reverse not reflective; not magnetic
303095	Md. 1 L9/1	truncated triangle*	0.15	0.8	very reflective; notches at one end; not magnetic
303096	Md. 1 L9/1	washer shaped	0.13	0.4	very reflective face, reverse not reflective; weakly magnetic
303097	Md. 1 H12/5	unknown; one edge straight	0.15	< 0.1	very reflective, reverse not reflective; magnetic
303098	Md. 1 K8/5	oval*	0.07	< 0.1	very reflective, reverse broken; not magnetic
303099	Md. 1 J12/7	rough circle*	0.15	0.9	very reflective both sides
303100	Md. 1 H10/8	polygonal	0.2	0.7	slightly reflective both sides; slightly magnetic
303101	Md. 1 K10/9	ovaloid	0.08	0.1	reflective; not magnetic
303102	Md. 1 M10/9	unknown	0.06	< 0.1	very reflective; magnetic
303103	Md. 1 I7/9-10	roughly circular	0.22	1.5	very reflective, reverse not reflective; not magnetic
303104	Md. 1 I9/9-10	roughly circular	0.24	0.6	reflective, reverse less so; magnetic
303105	Md. 1 J9/10	fragment of large circle	0.15	1.4	reflective both sides; magnetic
303106	Md. 1 H8/11	rough circle*	0.16	0.5	very reflective, reverse not reflective
303107	Md. 1 H9/11	rectangular with rounded edges	0.15	< 0.1	very reflective; magnetic
303108	Md. 1 I8/11	unknown	0.15	0.2	reflective; not magnetic
303109	Md. 1; unit and lot unknown	washer shaped	0.13	0.2	very reflective; not magnetic

*Indicates complete, unbroken mirror. All the rest are broken.

Fragment of Large Jadeite Ornament

From Mound 1 H8/1 (303087), a fragment of a highly polished greenstone object was distinctly larger than the beads and pendants reported above (Figure 11.3u). The material appears to be jadeite; it is polished to a shiny greenish black and has a hardness of 7-plus on the Mohs scale. The specimen is a small fragment of an object with two flat parallel faces, both highly polished. It was 1.05 cm thick, and the edge was flat and polished as well as the two faces. The surviving fragment is 2.4 cm in maximum length and weighs 5.2 g. It seems likely to have been an ornament, such as a pectoral or mirror.

Pumice Bead

From Mound 1 G11/11 (303456) there is a fragment of a small, perforated pumice disk (Figure 11.1m). The original was approximately the same size and shape as the disk-shaped soapstone beads. This pumice artifact was also probably a bead.

Pumice Pendants

Two pumice pendants were recovered in the redeposited Cherla midden of Zone IV in the Mound 1 platform. From F9/11 (303455), there is a complete pendant (2.2 x 1.5 x 0.7

Figure 11.3. Mirrors and miscellaneous ornaments: (a–s) iron ore mirrors; (t) front and back views of quatrefoil bead of unidentified yellow material; (u) fragment of large jadeite ornament; (v–x) greenstone ornaments abandoned during manufacture; (y–z) polished greenstone bead blanks; (aa–cc) jadeite flakes; (dd–ee) mica fragments. Proveniences (all Md. 1 unless otherwise noted): (a) J9/10; (b) K8/5; (c) L9/1; (d) unit and lot unknown; (e) F9/5; (f) H12/5; (g) Md. 13 P2/2; (h) Md. 12 T1E/5; (i) J12/7; (j) K10/9; (k) H10/8; (l) H9/11; (m) M10/9; (n) I7/9–10; (o) H8/11; (p) I9/9–10; (q) L9/1; (r) I8/11; (s) I6/1; (t) J7/1; (u) H8/1; (v) Md. 12 E4/15; (w) Md. 12 F3/5; (x) H11/21; (y) T1/5; (z) Md. 12 H7/30; (aa) H7/Floor B; (bb) I9/11; (cc) G10/8; (dd) Md. 32 T2D/83; (ee) Md. 32 T2D/53.

cm) decorated with grooves and small punctuations (Figure 11.1k). It appears that the biconically drilled hole was front to back, since it joins the two faces, which are each decorated with diagonal incised grooves. The other pendant (I13/7, 303454) was a schematic anthropomorph (Figure 11.1 l). Legs and arms are roughly delineated. The piece is broken at the biconically drilled hole that went through the neck side to side. The head is missing. The remaining fragment is 3.3 x 2.0 x 1.2 cm, the last two measurements being original dimensions.

EVIDENCE OF MANUFACTURE

No evidence for the production of iron ore mirrors was recovered, and it seems likely that those arrived at the site ready-made. Likewise, no unfinished soapstone beads were found, though as noted in the description of those ornaments, one specimen was re-drilled after a break and another has one partially drilled and one complete hole. There is evidence of manufacture of mica and greenstone ornaments in the form of flakes and unfinished specimens. See also Chapter 12 for a description of sandstone abrading tools appropriate for lapidary work.

Mica Fragments

Clark (1991:201, Figure 5) describes a child buried at El Vivero (not far from Paso de la Amada) dating to the Locona phase. The 11-year-old had a mica mirror with a sherd backing on the forehead, apparently part of a headdress.

No definite finished mica ornaments or pieces thereof were recovered in the small-mound excavations at Paso de la Amada. Six small fragments of mica were identified (Figure 11.3dd–ee). They may represent debris from the manufacture of mica ornaments or fragments of completed pieces.

The following contexts yielded fragments of mica: Md.10 P1/2 (mixed, possibly Cherla), Md.12 F4/15 (late Locona midden), Md.12 J5/32 (late Locona occupation surface), Md.12 P5/10 (Locona), Md.32 T2D/53 (Barra-Locona ground surface), Md.32 T2D/83 (Barra-Locona, beneath the previous).

Greenstone Ornament Blanks

Three cases of greenstone ornaments abandoned during manufacture can be confidently identified and two others tentatively identified (Figure 11.3v–z). These specimens shed light on the processes involved in the manufacturing of jade ornaments and on the locations of manufacture.

Specimen 303110, from a late Locona ditch (Md.12 E4/15), is an unfinished bead or pendant with two polished surfaces and irregular edges. The overall shape is roughly triangular. There is evidence of bilateral drilling from both sides; drilling was abandoned before breaking through. The thickness of the piece is 3 mm, the approximate diameter 6.2 mm (weight 0.1 g). The light grayish-olive (10Y6/2) stone of a hardness of 7 is likely to be jadeite.

Another piece (303111) is from an Ocós-Cherla midden above the same ditch (Md.12 F3/5). This is also a flat jade disk with the faces roughly polished (striations are still visible). The edges are not polished. The thickness is 4.8 mm; the diameter is 12.6 mm (weight 1.1 g). The dark olive (10Y3/4) stone is of a hardness above 7 and it is likely to be jadeite.

Specimen 303112 (Md.1 H11/21), from the pre-platform Locona-Cherla ground surface at Mound 1, is an unfinished disk-shaped pendant (thickness 4.2 mm, diameter 22.6 mm, weight 4.1 g). The intention seems to have been to create a circular pendant with two front-to-back suspension holes. Two unfinished holes are present on one face, one hole deeper than the other. On the reverse face is the beginning of an attempt to meet the deeper hole. The dark greenish-gray (5GY4/1 to 3/1) stone is of a hardness of about 4, possibly serpentine.

Two other cases of interest are small, faceted, highly polished pieces of greenstone about the size of beads (Figure 11.3y–z). Specimen 303113 (Md.1 Tr.1/5) is an irregular discoid cylinder (height 7 mm, diameter 9 mm, weight 0.9 g). The light grayish-olive (10Y6/2) stone with darker specks is of a hardness of 7 and it is likely to be jadeite. The piece is from just beneath the pre-platform ground surface at Mound 1, in a layer with Locona sherds and some Cherla admixture.

Specimen 303114 (Md.12 H7/30), from an Ocós layer with some Locona sherds, is roughly shaped as a cylinder (height 8.6 mm, diameter 8 mm, weight 0.9 g). The sides show evidence of various planes of abrasion. Though unpolished, the surface of the piece is smooth. The piece is made of light olive stone with darker striations (10Y5/4). It is likely jadeite, as it has of a hardness above 7 on the Mohs scale. This and the previous piece could be bead blanks, but they have not been drilled. Since they are polished, they may be finished items with some other purpose altogether—perhaps divination.

Greenstone Chunk with Polished Facet

A chunk of greenstone with one polished facet (two measured dimensions were 3.0 and 3.5 cm) was recovered from Mound 12 T1B/8 (303238) in a late Locona midden. The stone appears softer than jadeite but harder than soapstone. (It could not be scratched with a fingernail.) In contrast to the objects just described, this specimen is notable in that it resembles early stage manufacturing debris.

Greenstone Flakes

In addition to the above, three small jadeite flakes were found at Mound 1 (Figure 11.3aa–cc). Specimen 303116 (Md.1 H7/piso B) has the following dimensions: maximum length 12.7 mm, thickness 2.8 mm, weight 0.6 g. The stone is dark greenish gray (5GY4/2) of a hardness around 7. It is possibly jadeite.

Specimen 303117 (Md.1 I9/11) has the following dimensions: maximum length 9.6 mm, thickness 1.7 mm, weight 0.1 g. The stone is grayish olive (10Y5/2) of a hardness around 7. It is possibly jadeite.

Specimen 303118 (Md.1 G10/8) has the following dimensions: maximum length 18.2 mm, thickness 2 mm, weight 0.6 g. The greenish-gray (5GY5/1) stone has lighter and darker spots and has a hardness above 7. It is possibly jadeite.

Specimen 305324 (Md.12 T1B/8) is a chunk from a bright green greenstone cobble that bears no trace of working. It is trianguloid, 3 by 3 x 3 cm. Note that this is from the same minimal provenience as 303238, the chunk of greenstone with polished facet described above.

General Comments on Production Debris

Although the evidence for production of greenstone ornaments at Paso de la Amada may seem modest, the collection is actually larger than those reported from most early Mesoamerican sites. It also ranges across most of the different categories of debris reported by Rochette (2009) from a single Classic-period production center in the Motagua Valley of Guatemala. Specimen 303238 needs to be reinspected to determine whether it might be string-cut. We did not identify bead drill cores, but those could have slipped through our screens. One notable contrast with Rochette's material is that we found far fewer jadeite percussion flakes in relation to other sorts of debris: we found three flakes and five bead preforms; he found 5,585 flakes and 12 bead preforms. The implication is that lapidary workers of Paso de la Amada were not beginning with raw jadeite cobbles but instead material that had already been partially worked.

SOUCES OF THE MATERIALS

Sources for iron ore were probably in northwestern Chiapas (Agrinier 1984) or Oaxaca (Pires-Ferreira 1975). Jadeite probably came from the Motagua Valley in Guatemala (Rochette 2009; Tremain 2014).

MANNER OF USE

Based on depictions of ornaments on figurines, people of Paso de la Amada wore beads, pendants, and mirrors in small numbers, strung around the neck, at the ear, at the end of the nose, or as part of a headdress. Evidence from burials is consistent with that from the figurines. At least four Initial or Early Formative burials from the Mazatán region have been recovered with ornaments. A Locona-phase youth at Vivero I had, on the forehead, a mica mirror affixed to a rounded sherd. The mirror was probably once part of a headdress (Clark 1991:20, Clark 1994a:406). An adult female buried in an Ocós-phase trash pit behind Mound 6 at Paso de la Amada was wearing a single greenstone bead around her neck. Likewise, an adult in Burial 5 (Locona or Ocós) in the Pit 32 excavations had two small greenstone beads in the facial region. Root disturbance precluded any attempt to determine exactly how these beads had been worn. Finally, an adult female buried during the Cherla phase, excavated by Clark in Trench 1, was interred wearing two greenstone beads around the neck and an ornament of iron ore at each ear (Clark and Colman 2014:149). In other words, the most direct evidence on the manner of use suggests that all the items considered here were worn in small numbers.

The relative frequencies of greenstone beads and pendants recovered from secondary and tertiary contexts provides further supporting evidence. These represent items lost or discarded. If we assume similar frequencies of loss/discard for beads and pendants, then their relative frequencies in midden, floor, and fill contexts should approximate their frequencies in use contexts. Pendants and beads occur in similar numbers (21 and 20, respectively, in non-burial contexts). That observation is consistent with the suggestion, based on figurines and burials, that beads were worn singly or in short strings, since otherwise we would have expected to find many more beads than pendants.

RECOVERY CONTEXTS AND THEIR IMPLICATIONS FOR HOW ORNAMENTS ENTERED THE ARCHAEOLOGICAL RECORD

Only two of 110 finished ornaments or fragments thereof reported here are from a burial context (Burial 5 in the Pit 32 excavations). None are from caches. Ornaments appear in all sorts of secondary and tertiary contexts, including pits, middens, platform fill, and slope wash. Ornaments in such contexts include both broken and still-usable pieces. (The greenstone beads are mostly still usable; the pendants mostly broken; the disk beads, iron ore mirrors, and "other" ornaments a mix of broken and usable.) The strong likelihood is that these represent artifacts that were lost or discarded.

CHANGES OVER TIME

The most significant change over time is the appearance of iron ore mirrors in the Cherla phase. There are no mica fragments from definite Cherla deposits, and it seems likely that iron ore constituted a functional replacement for mica mirrors. Greenstone beads and pendants were used throughout the occupation (Locona-Cherla). Soapstone disk beads seem to have appeared in Locona, reached a peak of popularity in Ocós, and declined somewhat in the Cherla phase.

DISTRIBUTION AMONG RESIDENCES

The final issue is whether there was unequal access to ornaments of imported stone—or unequal participation in the production of such ornaments.

Table 11.4. Greenstone and soapstone ornaments from general excavations, with volumetric densities

Locale	All Screened Deposits						Deposits from Extended Study Sample Only					
	Volume Excavated (m^3)	Greenstone Beads	Greenstone Pendants	Soapstone Beads	Greenstone Ornaments per 100 m^3	Disk Beads per 100 m^3	Volume Excavated (m^3)	Greenstone Beads	Greenstone Pendants	Soapstone Beads	Greenstone Ornaments per 100 m^3	Disk Beads per 100 m^3
Md. 1	111.6	8	15	15	20.6	13.4	69.2	4	9	7	18.8	10.1
Md. 12	105.7	4	3	17	6.6	16.1	60.9	3	2	13	8.2	21.3
Md. 32	75.8		1	5	1.3	6.6	24.8		1	2	4.0	8.1
Mz-250	25.0				0.0	0.0	10.4				0	0
Pit 32	20.3	2		4	9.9	19.7	5.7	1			17.5	0
Md. 21	12.5	1	1		16.0	0.0	3.5		1		28.3	0
Md. 13	9.3	1			10.8	0.0	2.8	1			35.7	0
Total	360.3	16	20	41	10.0	11.4	177.3	9	13	22	11.8	12.4

Overall, the pattern of distribution of stone ornaments and debris from their production does not provide strong evidence of differentiation between residences, though there are several interesting patterns to be noted. The suggestion to be developed in Chapter 17 in consideration of clay ear ornaments is that, in the Cherla phase, there was differentiation between residences in the usage of ornaments of all kinds.

The occurrence of ornaments in burials is too rare to provide clear evidence of status differentiation or lack thereof. The known examples (mentioned above under "Manner of Use") are widely dispersed.

The rest of this section focuses on ornaments and production debris from non-burial contexts, interpreted as objects lost or discarded.

Table 11.4 provides a comparison by excavation locale, first of all screened deposits and then of deposits from the extended study sample only. To maximize the samples, phase differences are not considered. The samples are listed by descending volume of earth excavated. There are clearly more ornaments in the larger samples. The most interesting observation is the complete absence of stone ornaments in the midsize (Locona-phase) sample from Mz-250, the location farthest from the public center of Paso de la Amada. There also appears to be a lower density of both greenstone and soapstone ornaments at Mound 32 compared to Mounds 1 and 12.

In Table 11.5, the Extended Study Sample is broken down by phase and excavation locale. The sample sizes become small, and Late Locona is considered together with Locona. Two columns at the right show "expected" counts, based on the assumption that the observed frequencies would be distributed between excavation locales in a consistent relation to the weight of sherds recovered. These are heuristic measures. For all stone ornaments and production debris, the calculation of expected counts was done separately for the Cherla-phase samples. All other samples were considered together. For soapstone beads, the calculations were done on all samples considered together. That last column can be dealt with briefly here. The pattern of higher than expected occurrence characterizes Ocós layers generally. These particular ornaments probably reached their peak popularity at that time.

In the column of expected values for all stone ornaments, among Locona-Ocós samples, the Mound 12 Ocós layers yielded fewer ornaments than expected, but the underlying Locona layers and the overlying ground surface (Md.12-IV) at the same mound yielded more. We would have expected something in the Pit 32 middens, but it needs to be remembered that there is a burial from that area with two greenstone beads and there are four soapstone beads from screened layers not included among the refuse samples. The complete absence of stone ornaments at Mz-250 remains interesting, as noted above, but the expected count in the midden there was slightly less than one. Among the Cherla samples, the expected value for individual locations outside of Mounds 1 and 13 is in each case less than one, but if those cases are pooled, we would have expected two stone ornaments in locations other than Mounds 1 and 13, whereas we found none. The issue of Cherla-phase social differentiation is discussed further in Chapters 17, 19, and 25.

Table 11.5. Stone ornaments from screened deposits by phase and excavation locale

Phase and Locale	Weight of Sherds (kg)	Volume Excavated (m³)	Mica	Iron Ore Mirror	Greenstone Beads	Greenstone Pendants	Soapstone Beads	Other Stone Ornaments	Greenstone Production Debris	Total Ornaments plus Production Debris	Expected Total, All Stone Ornaments and Production Debris[a]	Expected Soapstone Beads[a]
Locona												
Md. 12	267.7	21.1	2		2		2		3	9	5.9	1.6
Pit 32	92.0	2.8								0	2.0	0.5
Md. 1	46.2	3.3							1	1	1.0	0.3
Mz-250	43.2	10.4								0	0.9	0.2
Md. 14	35.1	1.3								0	0.8	0.2
Md. 32	24.6	2.5				1				1	0.5	0.1
Md. 13	13.5	3.5								0	0.3	0.1
Md. 21	11.7	3.5				1				1	0.3	0.1
Md32 surface	3.5	7.7	2							2		
Md32 platform	14.7	7.9								0		
Ocós												
Md. 12	516.9	24.2			1	1	5			7	11.3	3.0
Md. 32	137.6	6.2					2			2	3.0	0.8
Md12-IV	236.0	15.6				1	6		1	8	5.2	1.4
Md1-IV	111.3	17.2				1	1	1	1	5	2.4	0.6
Md1-IV (Str.1-2)	47.4	3.2							1			
Cherla												
Md. 1	2053.8	45.5		9	5	8	6	3	2	33	32.3	12.0
Md. 13	43.2	2.2		1	1					2	0.7	0.3
Tr.1B	41.3	0.3								0	0.6	0.2
Tr. 1T	37.6	2.0								0	0.6	0.2
Md. 11	29.1	0.8								0	0.5	0.2
Md. 32	11.0	0.4								0	0.2	0.1
Pit 29	8.8	0.5								0	0.1	0.1

Phase and Locale	Weight of Sherds (kg)	Volume Excavated (m³)	Mica	Iron Ore Mirror	Greenstone Beads	Greenstone Pendants	Soapstone Beads	Other Stone Ornaments	Greenstone Production Debris	Total Ornaments plus Production Debris	Expected Total, All Stone Ornaments and Production Debris[a]	Expected Soapstone Beads[a]
Other												
Md. 1	1065.9	42.5		6	4	6	8	2				
Md. 12	412.7	44.8	1	1	1	1	4		1			
Md. 32	186.0	51.0					3	1				
Pit 32	153.9	17.5			4		4					
Md. 21	65.2	9.0			1							
Md. 14	48.8	5.3										
Md. 13	20.8	3.6										
Md. 11	20.2	2.8										
Mz-250	9.4	14.6										
Md. 15	6.3	3.4										
Pit 29		3.5										
Md. 10			1									
Totals	**5815.5**	**380.1**	**6**	**17**	**19**	**20**	**41**	**7**	**10**			

[a] Expected counts are based on the overall frequency of the corresponding class of ornament (soapstone beads or all ornaments) in relation to the weight of sherds recovered. For example, the total of soapstone beads in dated deposits (minus Md. 32 surface, Md. 32 platform, and Md1-IV-Str.1-2) is 22 and the total weight of sherds is 3778.8 kg, so the resulting factor is 59/3566.4 or 0.005822. For Locona deposits in Mound 12, where 267.7 kg of sherds were recovered, the expected frequency of soapstone beads is 267.7 * 0.005822, or 1.6. Note that for "Total Ornaments plus Production Debris," the calculations were done separately for the Cherla samples.

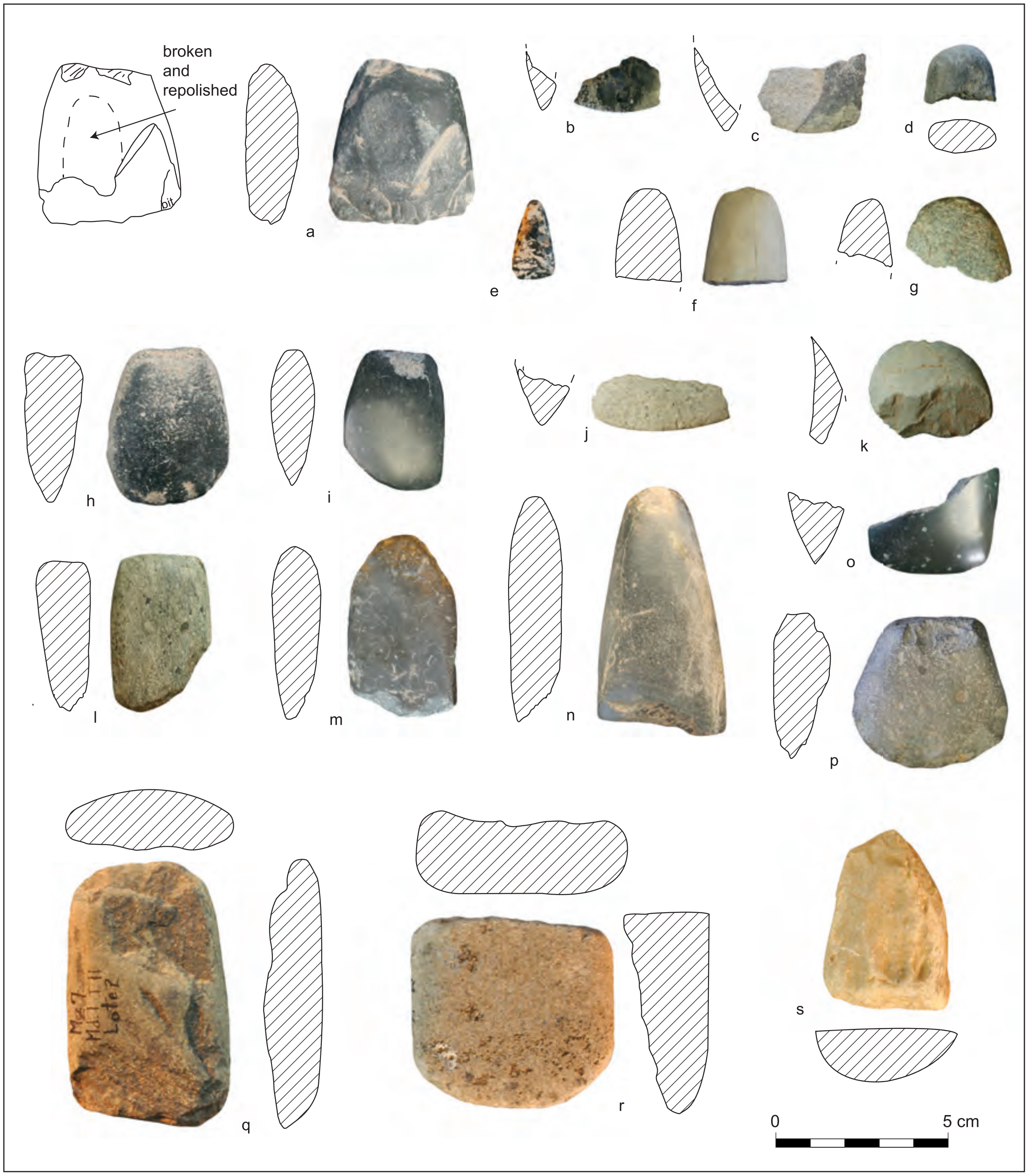


Figure 12.1. Polished stone axes and axe-like tools: (a–p) axes; (q–s) celtiform tools. Proveniences: (a) Md. 12 T1D F. 4; (b) Md. 1 F9/5; (c) Md. 1 E10/10; (d) Md. 32 T3F/138; (e) Md. 1 K9/2; (f) Md. 12 I5/25; (g) Md. 12 G6/28; (h) Md. 1 K10/10; (i) Md. 1 G9/11; (j) Md. 32 Unit 1/202; (k) Md. 14 TP1/3; (l) Md. 12 K4/29A; (m) Md. 12 P5/4; (n) Md. 1 H12/8; (o) Md. 1 I6/9; (p) Md. 12 G5–H5/32; (q) Md. 1 I11/2; (r) Md. 12 F1/6; (s) Md. 12 T1B/1. *Illustrations in this chapter by R. Lesure, Anna Bishop, Katelyn Jo Bishop, Barry Brillantes, and project staff, with other contributions as noted.*

CHAPTER 12

Miscellaneous Stone Artifacts

Richard G. Lesure

THIS CHAPTER COVERS ground, polished, and abraded stone artifacts not already considered in Chapters 9 through 11, as well as unmodified stones and minerals transported to Paso de la Amada by human inhabitants. The polished stone artifacts include axes, bark beaters, and several fragmentary artifacts whose original purposes are not always clear. Other categories include hammerstones, pecking stones, anvils, and polishing and abrading stones; in that last category are sandstone abrading tools that may have been used for lapidary work. The "miscellaneous shaped ground stone" category includes unusual artifacts made of the same kind of rock used for making grinding stones (Chapter 9), including spheres, rings, and minor sculpture. Flaked stone other than obsidian is rare at Paso de la Amada; the minimal evidence for industries in chert and basalt is considered here. Manuports and minimally modified stones are considered in two sections of this chapter: "Crystals and Minerals" and "Minimally Modified Rock and Miscellaneous Tools"; the latter section includes consideration of fire-cracked rock. In all, 634 cataloged artifacts are described; there is also consideration of 180 fragments of unworked pumice and 5,506 fragments of fire-cracked rock.

Many of the rock identifications provided here were made by Jessica Jones in the summer of 2012. She and Martin Biskowski calculated densities mentioned here for artifacts other than axes. The catalog of stone artifacts compiled by Henry Flores in 1996, during work for his UCLA undergraduate honors thesis, has proven quite valuable. Finally, I am indebted to John Clark for comments and suggestions over many years, including a brief review of the entire collection and an initial draft of this chapter in 2016.

POLISHED STONE ARTIFACTS

Axes

The excavations yielded 21 polished stones axes or fragments thereof, including seven complete or nearly complete specimens, nine substantial bit or poll pieces, and five small fragments (Figure 12.1a–p). Table 12.1 provides catalog numbers, proveniences, and other descriptive information.

General Characteristics of the Collection

The axes are mostly of hard, metamorphic greenstone, dark green to black in color. The source rock clearly varies, and at least some specimens were likely made from local river cobbles. A complete miniature axe is of diorite (303222), and there is a bit spall of fine-grained granite (303225). When I originally studied these artifacts in 1994, Ronald Lowe devised a method for calculating the volume of the artifacts based on a comparison of their weight in air to their weight in water. To check the accuracy of the method, we calculated density of a piece of pure iron. It came out as 7.8 g/cm^3; the actual value should be 7.874. We calculated densities of the larger axe fragments (Table 12.1). The method was inappropriate for pieces weighing less than about 10 g.

Table 12.1. Axes and axe fragments

Cat. No.	Provenience	Description	Material	Color	Density (g/cm3)	Size	Shape	Poll Form	Max. Length (cm)[a]	Max. Width (cm)[a]	Max. Thickness (cm)[a]
303207	Md. 1 H12/8	nearly complete	greenstone	dark grayish green (5GY4/1) to black	3.0	small	short	round	6.94	3.52	1.49
303208	Md. 1 I6/9	bit end	greenstone	greenish black (5BG2.5/1) with occasional speckles of greenish gray (5G5/1)	3.4					3.82	(1.72)
303209	Md. 1 G9/11	complete	greenstone	bluish black (5B2.5/1)	3.5	very small	short	square	3.99	2.92	1.30
303210	Md. 12 T1D/F.4	nearly complete	greenstone	greenish black (10GY2.5/1)	2.9	very small	short		4.75	4.26	1.64
303211	Md. 1 K10/10	nearly complete	greenstone	black (N2.5/0)	2.9	very small	short	square	4.41	3.43	1.74
303212	Md. 12 P5/4	nearly complete	metamorphic pebble	dark gray (7.5YR3/1)	2.7	very small	short	round	5.15	3.02	1.43
303213	Md. 12 G6/28	poll end	greenstone	mottled light greenish gray (5GY7/1) and greenish gray (5G5/1)	3.1			round			(1.61)
303214	Md. 12 I5/25	poll end	greenstone	light olive gray (5Y6/2)	2.8			round		(2.38)	(1.98)
303215	Md. 12 K4/29A	poll end	greenstone	mottled light greenish gray (10Y8/1) and greenish gray (5GY5/1)	2.9	very small	short	square	(4.38)	2.81	1.60
303216	Md. 12 G5-H5/32	nearly complete	metamorphic pebble	gray (2.5Y4/1 to 2.5Y5/1)	2.7	very small	short	square	4.26	4.32	1.65
303217	Md. 1 F9/5	bit spall	greenstone	mottled greenish black (10GY2.5/1) and greenish gray (5GY6/1)						> 3.0	
303218	Md. 1 E10/10	bit spall	greenstone	greenish black (10Y3/1)							
303219	Md. 14 TP1/3	spall	greenstone	greenish gray (5GY6/1)	2.5						
303220	Md. 12 F3-4/22 F.2	spall	greenstone	greenish black							
303221	Md. 21 P3/4	spall	greenstone	greenish black							
303222	Md. 1 K9/2	complete	diorite	mottled 10Y8/1 and 10GY2.5/1		miniature	short	pointed	2.32	1.27	0.50
303223	Md. 1 K8/5	bit spall	greenstone	greenish gray (10GY5/1)						> 3.9	
303224	Md. 1 E10/12	heavily battered	greenstone	greenish black	2.9						
303225	Md. 32 1/202 F.6	bit end	fine-grained granite	white, finely mottled with light gray						4+	
303226	Md. 32 T3F/138	poll end	metamorphic stone	dark gray N4						2.01	
303460	Md. 1 L10/1	bit spall	metamorphic stone	dark gray N4					> 3.5		

[a] Dimensions are original maximum values. Parentheses indicate that the maximum was measured on a broken piece; the original maximum for that dimension could have been on the part that was broken away.

Densities of the greenstone axes from Paso de la Amada were mostly in the range of 2.7–3.0 g/cm^3, with the full range from 2.5 to 3.5. Similar values were obtained from pecking stones made of various hard metamorphic stones (2.9 in three cases). Metate fragments in white or gray andesite ranged from 1.9 to 2.5 g/cm^3.

The artifacts are classified in Table 12.1 according to three characteristics: size, shape, and poll form. Gordon Willey (1978:86) introduced the following size classification for Barton Ramie, Altar de Scarificios, and Ceibal: "large," over 15 cm; "medium," 8–15 cm; "small," 6–8 cm; "very small," less than 6 cm. Willey's (1978) categories were remembered differently by later investigators (Aoyama 2009:48; Clark 1988:139). I use Willey's original classification here, with "very small" amended to 3–6 cm to allow for a "miniature" category of less than 3 cm. Clark (1988:139) introduced a simple classification of shape. *Long* axes are at least twice as long as they are wide. Short axes have lengths less than twice the width. A third commonly used basis for classification is poll form when viewed from one of the flat faces of the axe: squared, rounded, or pointed (Coe and Diehl 1980:238–39; Flannery and Marcus 2005:73; MacNeish et al. 1967:128–30).

Except for the miniature axe (303222), the axes of Paso de la Amada were similar in size and shape. Although the poll form varied between rounded and squared, the axes were all short rather than long. At the time of discard, all except one were "very small," and the exception was "small." Most exhibit evidence of heavy use, and it appears that bit spalling and reworking were common. It is therefore likely that some "very small" axes began their use as "small" axes. However, it seems unlikely that any specimens in the collection were ever medium or large. The use of an axe of the same type as those reported here—greenstone, short, very small, rounded poll—as an offering at Mound 6 during the Locona phase (Blake 1991:40, Figure 11) suggests that these tools had symbolic value. That axe was of particularly good-quality stone—probably at the top end of the density range of those reported here (Clark personal communication, 2016). It was also in good condition, with a smooth, even bit. The only bits of that quality in this collection are the bit spalls: cases in which a well-polished, symmetrical, even bit broke off in its entirety as a result of use (303208, 303217, 303218, 303225). In one of those cases, *abuse* seems as good a term as *use*, since damage on one side suggests that the axe was used as an anvil and broke in half as a result of that usage (303208).

Individual Specimens by Phase

None of the axes recovered in the small-mound excavations are as old as the offering at Mound 6, which was emplaced either from Floor 6 or Floor 5 during the first part of the Locona phase (Blake 1991:40, Figure 11). Three pieces reported here are probably Locona in date; two of those were in securely late Locona deposits. From a buried Locona ground surface in Mound 21 (a level possibly with some Ocós admixture before platform construction during that phase), 303221 is a tiny spall from a well-polished greenstone axe. Another tiny spall, again from a well-polished axe, is from late Locona ditch fill in Mound 12 (303220). A brownish-gray pebble, roughly shaped into axe form but not well polished (303216), derives from a late Locona surface in Mound 12 (Floor 3) (Figure 12.1p). It is heavily battered on the bit end but also on the poll end, suggesting that it was used as a chisel, with the hammer likely being a rock. Clark (1988:139–48) suggested that small axes at La Libertad were used as chisels based on patterns of poll damage. The Paso de la Amada axes are of similar size and, it appears, were used in similar ways.

Six axes or fragments thereof probably date to the Ocós phase. From a midden in Mound 12, 303210 is a badly damaged specimen made of greenstone (Figure 12.1a). It is battered on both ends, and one of the polished sides has been entirely removed with a large flake. The remaining side has evidence of removal of a flake from the bit and subsequent repolishing. Clark (personal communication, 1994) wondered whether flakes might have been intentionally removed from the piece through bipolar percussion—probably for manufacture into other tools. From another Ocós deposit in Mound 12 is the nearly complete 303212, a brownish-gray metamorphic pebble roughly worked into an axe (Figure 12.1m). It is heavily battered at both bit and poll ends, probably through use as a chisel.

Artifacts 303213 and 303215 are poll ends, the former from the Ocós to Cherla ground surface beneath the platform in Mound 12, the latter from not far beneath that surface; sherds from those units are Ocós with some Cherla. Specimen 303213 appears to be another pebble worked into an axe (Figure 12.1g). Its surface is not particularly well polished. Specimen 303215 is well polished but more wedge- than lozenge-shaped in profile. It was abandoned as a tool after a large spall came off the bit end (Figure 12.1l). There is slight battering on the flat surface of the poll end, suggesting that the tool was used as a chisel, perhaps with a wooden hammer.

There are two small axe fragments from Mound 32. From an Ocós midden (Feature 6), 303225 is a spall from a well-polished and symmetrical axe of fine-grained white stone that had acquired only slight evidence of use before the catastrophic break that removed the entire bit (Figure 12.1j). The spall measures 4 cm, but the original width of the tool would have been greater than that. Indeed, this piece is probably from the largest axe represented in the collection. From a layer of slope wash containing mainly eroded Locona and Ocós sherds but also traces of Jocotal, 303226 is the poll end of a small axe (Figure 12.1d). The end is rounded but nevertheless exhibits slight battering, again suggesting use as a chisel.

Ten axes or axe fragments were found in Cherla-phase platform fill in Mounds 1, 12, and 14. Based on the sherd contents of the Mound 1 fill, the eight pieces from that platform are probably Cherla. Two nearly complete axes, 303207 and 303209, exhibit light battering on their poll ends, suggestive of use as chisels. Specimen 303207 exhibits a complex pattern of breakage on the bit end (Figure 12.1n). It appears to have been broken and partially reworked several times before discard. Specimen 303209 is quite small (Figure 12.1i). Multiple breaks and reworkings left the bit pointed and well polished but distinctly asymmetrical. The high density of the stone (3.5 g/cm^3) may have contributed to the decision to repeatedly rework this particular piece.

Specimen 303208 is the axe already mentioned that seems to have broken during use as an anvil. The bit is nicely pointed, polished, and symmetrical, with one tiny nick that appears to be use-related damage (Figure 12.1o). The polished surface on one face of the tool is battered, and the break runs through the damaged patch. The stone is of particularly high density (3.4 g/cm^3). Specimen 303211 is a well-used axe that appears to have been resharpened multiple times (Figure 12.1h). In profile, it is wedge- rather than lozenge-shaped, perhaps as a result of reworking. Along the edges, it is rough from pecking, suggesting significant reworking prior to discard. The poll end is battered, consistent with use as a chisel.

In the Mound 1 Cherla collection are four bit spalls from axes (303217, 303218, 303223, and 303460). The first of those spalled off a well-polished, symmetrical bit (Figure 12.1b), while the last came off an already badly battered tool. Specimen 303460 is an unusual spall in that the break was along the longitudinal axis of the axe and therefore included only a small portion of the original width of the bit. The other bit spalls involve transverse breaks that removed much or all of the bit.

Artifact 303224 is a greenstone axe that ended its use life as a hammerstone. Battering from hammering is evident on the former bit end but also on both faces and both sides. The poll end is broken off, and there is no evident battering along this break. Clark (personal communication, 2012) suggested that the extent of hammering damage was inconsistent with the flaking of obsidian and that this may therefore have been a lapidary tool.

The final axe from the Mound 1 platform is the miniature, 303222. It is not only much smaller than the other pieces but also different in form. It is fully lozenge-shaped in profile, with a pointed poll (Figure 12.1e). It may have been hafted, although there is what appears to be a flake off the poll end. The bit is not fully symmetrical and exhibits some use damage on one face, extending 4 mm in from the edge.

Beyond Mound 1, Cherla axes are few. There is a single fragment from the Cherla platform in Mound 12 (303214). It is the poll end of a relatively narrow axe that was nearly as thick as it was wide (Figure 12.1f). The poll end is battered, consistent with use as a chisel. From Unit 1 in Mound 14, in the same level as the large fragment of hollow figurine, is a spall from a greenstone axe (303219). However, this flake is purely from one side of the tool. Evidence of the bit does not appear on the fragment.

Discussion

Axes could have been used for a variety of purposes. Willey (1978:86) pointed out that ground stone axes at Maya sites were too small and too rare to plausibly have been basic instruments of forest clearance. He suggested that most were used for household woodworking or wood carving. Clark (1988:Figure 66) shows four uses of polished stone axes illustrated in Maya codices: chopping a tree or other plant, carving a wooden mask, hunting or butchering a large animal, and decapitating a person. He suggests that axes from Middle Formative La Libertad (Chiapas) were used in a variety of ways, probably mostly for woodworking (Clark 1988:139–48). The smaller axes were chisels, the larger ones axes or adzes. At San José Mogote (Oaxaca), Flannery and Marcus (2005:73) envision a similar range of uses on wood, from felling trees to shaping of artifacts. They also suggest that some axes were used to dig pits in the soft volcanic tuff bedrock at the site. Although woodworking is the most common suggestion for use of axes (e.g., Coe and Diehl 1980:238–39; McAnany and Ebersole 2004:318), Aoyama (2009:130, 151–52) found that greenstone axes at Classic-period Aguateca were used on stone, probably for carving stelae.

In Table 12.2, the axe assemblage from Paso de la Amada is compared to that of several other Mesoamerican assemblages, based on the combined classifications of Willey (1978) and Clark (1988), as modified here by the addition of the category "miniature." Application to these diverse cases quickly reveals that the classification is not perfect. (For example, both miniature axes listed in the table are "short" but within a couple of millimeters of being "long"; a break between "miniature" and "very small" at 3 cm seems reasonable for Paso de la Amada, but at Chalcatzingo there appears to have been a significant size boundary at a somewhat greater length, perhaps 4 cm.) The advantage of applying a single classification is that it facilitates comparison. Axes of different sizes and shapes likely had different functions (Willey 1978:86).

Axes in the size range encountered at Paso de la Amada (small to very small) are typically the most common at other Formative sites as well. Still, the long and/or medium–large axes occasionally observed at the other sites are absent at Paso de la Amada. The issue does not appear to be sample size. (See last row in Table 12.2.) Larger axes of the Early and Middle Formative may often have been ceremonial objects rather than utilitarian tools. That is how Coe and Diehl (1980:238) interpret the large/long axe from San Lorenzo. The assemblage from San José Mogote, mainly of a local chlorite schist, is helpful here. It is different from that of Paso de la Amada, with several long and medium–large specimens; the very small/short axe appears to have

Table 12.2. Axe assemblage from Paso de la Amada compared to other Formative-period assemblages[a]

Size/Shape	Paso de la Amada[b]	San José Mogote	San Lorenzo	Chalcatzingo	Ceibal	La Libertad
large, long		1	1			
medium, long		3	1	1	1	1
medium, short		1				2
small, long					1	
small, short	1		1			
very small, long						1
very small, short	7	1	2	4	5	2
miniature	1			1		
Total	9	6	5	6	7	6

[a] Sources: San José Mogote: Flannery and Marcus (2005). San Lorenzo: Coe and Diehl (1980:238), Chicharras through Nacaste only. Chalcatzingo: Thomson (1987:301–2); six other celts/adzes are mentioned but not illustrated. Ceibal: Willey (1978:86–89); note that six are from a single cache. La Libertad: Clark (1988:139–45); size classification adjusted to follow that of Willey (1978).

[b] Includes those reported in Table 12.1 plus the axe offering from Mound 6.

been reworked from a larger, broken original (Flannery and Marcus 2005:72). The availability of material may be a factor in the size spectrum observed at San José Mogote, but a distinctive set of local uses was likely a factor as well. Flannery and Marcus's (2005:73, 365, 369) suggestion that axes were used in the modification of the volcanic tuff bedrock would make sense of the peculiarities of that assemblage in relation to those of other Formative-period sites.

Overall, the data in Table 12.1 suggest a limited range of functions for polished stone axes at Paso de la Amada. These were not basic instruments of forest clearance. Most likely they were used for woodworking. Many were probably used as chisels and therefore not hafted. They could have been used for preparing posts for buildings and for making other household objects of wood that have not survived in the archaeological record. The miniature axe served for particularly fine work.

Celtiform Tools

Three artifacts have a general form consistent with that of the axes, but they differ in a variety of ways from the specimens just described. Specimen 303430 is from platform fill in Mound 12 (Figure 12.1r). It is made of a hard, heavy, crystalline stone, perhaps granite. The fragment includes the bit end of a rectangular tool. One face and the two lateral edges are well polished. The other face is rough and broken across its entire expanse, exhibiting no evidence of polishing. The poll end of the tool has been broken away by a transverse fracture. The bit exhibits crushing damage from use, including possible use after the break that removed the entirety of one face of the tool. The remaining piece is 6 cm wide (an original dimension), 2.3 cm thick, and 5.6 cm long. Based on the profiles of the lateral edges, the original thickness of the tool was probably no more than 2.5 cm.

Specimen 303427, from mixed platform fill at Mound 1 (Figure 12.1q), is made of metamorphic greenstone with a density of 2.8 g/cm^3. It is a complete, flat, approximately rectangular tool (7.9 x 4.8 x 1.5 cm, 112 g). The two faces are roughly finished. The work in shaping the tool seems to have concentrated on the two lateral sides, which are shaped and polished. The bit end exhibits considerable shatter and flaking damage. The shape of the bit contrasts with those of the more elaborately worked axes. If one looks at one of the axes from the front, directly into the leading edge, the bit appears as a straight line. From that perspective, the bit of 303427 is curved rather than straight. In addition to the use damage evident on the bit, the tool appears to have damage on the poll end from having been struck with a hammerstone, suggesting use as a chisel. Use as a gouge in woodworking seems likely for this tool.

A third celtiform tool, 303376, is from platform fill at Mound 12 (Figure 12.1s). This piece exhibits no evidence of polishing. It was at first classified with the hammerstones. However, although more crudely fashioned, it has the same curved bit as the tool just described (303427) and was likely used in a similar way. The tool is a flake from a metamorphic greenstone cobble with a density of 3.2 g/cm^3. Light abrasion damage on some of the projecting edges on the face that retains cortex suggests that the cobble was in use as a pecking stone when the flake came off. The face of the flake is very flat, the other face rounded. Overall, the tool is triangular in shape (6.0 x 4.5 x 1.5 cm, 63 g), with the greatest width at the bit and a tapering toward the poll. The bit appears as a curved line when viewed directly from the front and exhibits considerable flaking and shatter damage. There may be some percussion damage also on the poll end from use of the tool is a chisel.

Bark Beaters

Three fragments of what appear to be stone bark beaters were recovered (Figure 12.2a–c). A formally similar artifact of poorly fired or unfired clay is also described in this section (Figure 12.2d). Interestingly, two of the stone bark beaters as well as the similar clay artifact came from Mound 32. A surface find from that mound (303235) is made of fine-grained basalt (Figure 12.2a). It was striated longitudinally on both faces. It is broken at one end as well as along its length. The cross section was roughly rectangular (with rounded edges). Of the original dimensions, only the thickness (3.2 cm) is preserved. The original length was greater than 5.9 cm. There are no hafting grooves on the sides, and it is possible that this was a club bark beater such as the surface find illustrated by MacNeish et al. (1967:Figure 111).

A smaller piece from Cherla platform fill in Mound 1 (Md. 1 F11/7) is also of fine-grained basalt and appears to have been very similar in form (303236) (Figure 12.2b). In this case, the maximum width is preserved (3.0 cm) but some of the surface has flaked off. It is likely that there were a few more grooves beyond the seven that remain.

A tiny fragment of what appears to be another bark beater (303237; Figure 12.2c), in this case of rhyolite, comes from the Ocós midden to the back of the platform at Mound 32 (Md. 32 T4F/201).

The unfired or poorly fired clay artifact, which is very similar in all respects to the bark beaters except for the material, comes from an unscreened layer, Mound 32 T1G/41. This lot was at the edge of the Locona platform and therefore included both Locona-era fill and subsequent slope wash. The full width of this piece is preserved (3.3 cm). There were nine grooves (Figure 12.2d). The artifact is broken at one end; originally, it was more than 6 cm long. The second face has crumbled away, but the original thickness was at least 3 cm. This artifact was one of a number of fragile, molded objects that appear to be in unfired or very lightly fired clay (see Chapter 18 for discussion). There do not appear to be other bark beaters of clay reported in the literature on ancient Mesoamerica. It is possible that this was simply an unpromising experiment. However, the suggestion for this particular piece goes further. I am arguing that this artifact was never actually used because it was so poorly fired.

Even if one discounts the clay specimen, we have a formally consistent set of three bark beaters, two of which are from definitively Initial and Early Formative deposits (prior to 1400 BC in the case of the fragment from the Ocós midden and prior to 1300 BC for the fragment from the Mound 1 platform). These may be the earliest known bark beaters from Mesoamerica; they are certainly *among* the earliest known. Bark beaters became more widespread in the first millennium BC, particularly along the Pacific Coast and in the Maya lowlands (Tolstoy 1991). Although unifacial bark beaters are most common, bifacial specimens such as 303235 from Paso have previously been reported, including from Middle Formative contexts at Chalchuapa (Sheets 1978:40) and Ceibal (Willey 1978:79–80). Hafting grooves around the sides are common, particularly in the Classic and Postclassic—see MacNeish et al. (1967:Figure 135) for a Postclassic specimen with a preserved haft—but also in Middle Formative cases such as K'axob and Ceibal (McAnany and Ebersole 2004:318; Willey 1978:79–80). Middle Formative specimens from Chalcatzingo and La Libertad lack hafting grooves (Clark 1988:138; Grove 1987a:333–34). The Paso de la Amada bark beaters were somewhat narrower than the norm in later Mesoamerica, but it is important to remember that they may have been club beaters (with an unstriated handle), in which case a narrower face may not be surprising.

Cloth and/or paper made from the bark of wild fig trees may have been used for a variety of purposes at Paso de la Amada, but clothing or ritual costume is most likely. In later eras, bark paper was used to absorb blood from autosacrifice and to make banners or crowns (Clark 1988:137). Citing Middle Formative cases, McAnany (2010:238–39) notes that bark beaters tend to be more common that spindle whorls and suggests that commoners may have worn bark cloth while elites may have been more likely to weave and wear cotton. That generalization does not seem to hold for Paso de la Amada.

The distribution of bark beaters at Paso de la Amada is quite different from that of any other artifact class at the site, especially if one includes the clay specimen. The presence of a bark beater in the redeposited high-status midden in the Cherla platform at Mound 1 is not surprising, since most artifact classes are represented in that large sample. The surprise is instead the concentration of these artifacts at Mound 32. It is possible that cloth/papermaking was a specialized but not necessarily elite activity at the site.

Highly Polished Worked Stone

From the redeposited Cherla midden of the Mound 1

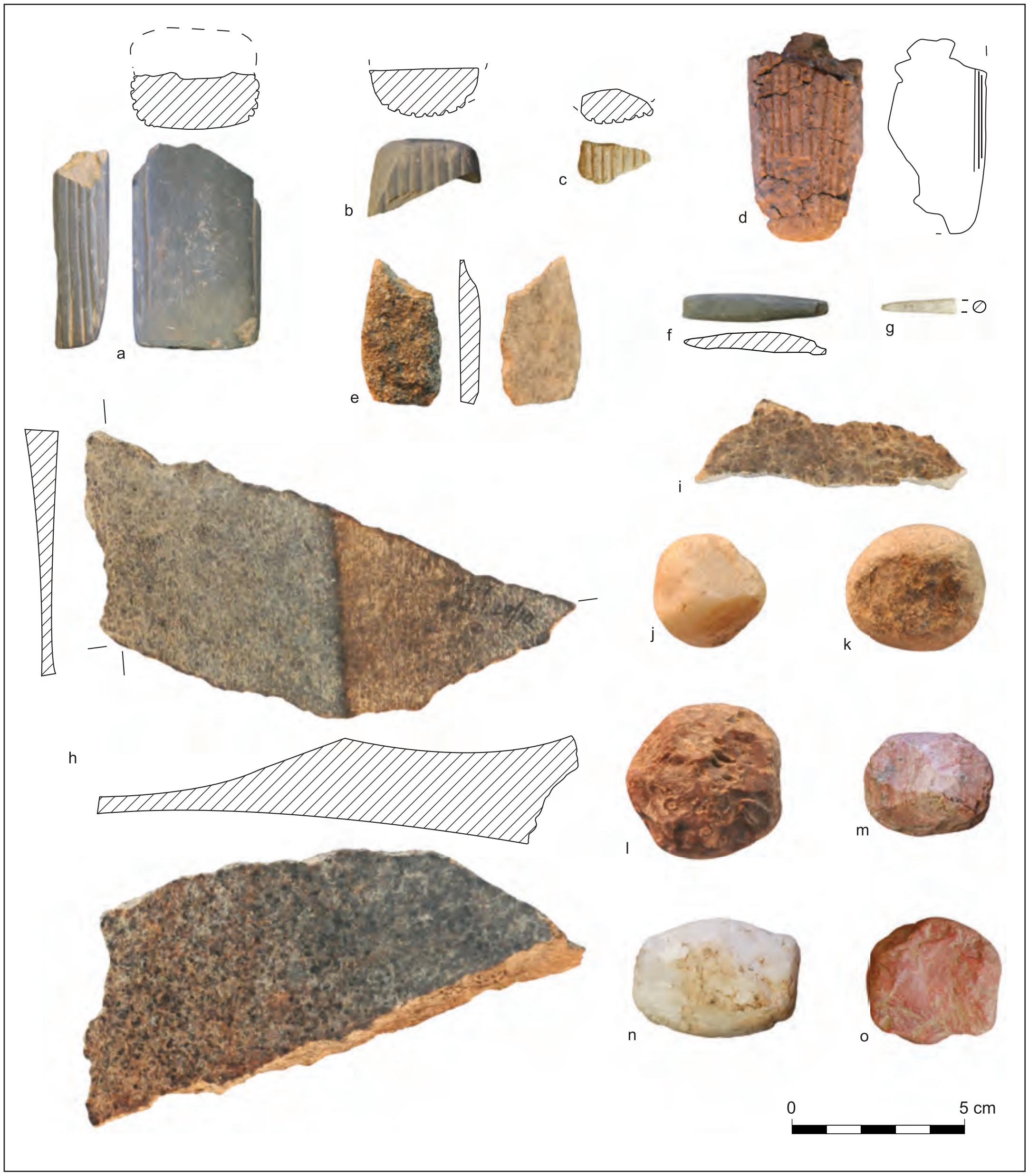


Figure 12.2. Various stone artifacts: (a–c) bark beater fragments; (d) fragment of poorly fired clay object in form of bark beater; (e) polished stone plaque; (f) small chisel; (g) perforator; (h–i) highly polished worked stone; (j–o) small hammerstones. Proveniences: (a) Md. 32 surface; (b) Md. 1 F11 Lot 7; (c) Md. 32 T4F/201; (d) Md. 32 T1G/41; (e) Md. 12 E3–4/19 Feature 2; (f) P32E3/4; (g) Md. 12 E3/20 Elem. 10; (h) Md. 12 L9/10; (i) Md. 1 K10/10; (j) Md. 1 K10/2; (k) Md. 1 F9/11; (l), P32A/2; (m) Md. 1 F10/1; (n) Md. 1 K13 Floor B, Section 10; (o) Md. 1 surface.

platform, two fragments of a highly polished stone artifact were recovered. We tried to envision it as a fragment of a stone vessel, but its diameter would have been surprisingly large (greater than 60 cm), and the symmetries seem somewhat distorted (Figure 12.2h–i). Clark (personal communication, 2016) suggested that it might have been a tool for polishing stone or bone artifacts. Jessica Jones described the material as "metamorphosed black stone" and measured the density as 2.2 g/cm^3. The large fragment is from Mound 1 L9/10 (303491), and a small, non-conjoining sliver of the same artifact is from Mound 1 K10/10 (303492).

One surface is slightly concave and is polished to a glossy sheen. That would presumably be the interior if the object had been a vessel. The other side is also well worked and smooth, but the finish is matte rather than glossy and still retains very fine striations from the working of the surface; this would presumably be the exterior. The preserved "interior" is a smooth, even surface, very slightly concave. The "exterior" is more complex in form in that it includes a distinct ridge that would have formed a break in the profile if the object had been a vessel. From that point, the thickness of the piece expands in one direction and contracts in the other direction. One puzzle is that the line of the ridge on the "exterior" is also gently concave, whereas if this had been a vessel, one would expect it to be convex.

Small Chisel

A small, intact tool, 4.2 cm long and made of fine-grained basalt, was probably used as a chisel (303245; Figure 12.2f). Maximum width is 0.8 cm; maximum thickness 0.6 cm. It is from P32E3/4 in the Pit 32 excavations, at a depth more likely to be Locona than Ocós and possibly originally part of the late Locona Feature 3, though not definitively assigned to that feature. The tool is widest toward the bit and tapers toward the poll end. The bit is wedge-shaped in profile and has some use damage. (Tiny flakes have spalled off.) There is also some damage at the poll end.

Polished-Stone Perforators

Two fragments of polished stone perforators or blood letters were recovered, both from Mound 12. From an Ocós midden (Md. 12 E3/20 F.10, 303088) is the working end of a perforator made of fine-grained granite (Figure 12.2g). It is broken; the surviving piece is 2.15 cm long (maximum preserved diameter 4.5 mm). From the Cherla platform (Md. 12 T1D/4, 303089), in a level with Ocós and some Cherla sherds, is the poll end of what appears to have been another perforator made of greenstone or fine-grained basalt. The surviving piece is 1.7 cm long (diameter 4.4 mm). Both tools were carefully manufactured and appropriate for only delicate work. (A jadeite perforator fragment was recovered from an Ocós pit at Mound 6.)

Although these stone perforators from Paso de la Amada differ from the large-handled "ice pick" blood letter from Ceibal (Willey 1978:97) and seem less effective than the stingray spine and imitations thereof in obsidian recovered at San José Mogote (Flannery and Marcus 2005:95–96), use as blood letters seems possible. Several similar objects, interpreted as probable blood letters, were found at Chalcatzingo (Thomson 1987:302). Two of those accompanied Cantera-phase burials (32 and 33), attesting to their symbolic importance. An imported stingray spine, also probably a blood letter, appeared in a Late Barranca burial (107) (Fash 1987:86–87). Another possible use is the working of hides, but the bone tools described in Chapter 15 see more likely in that case.

At Paso de la Amada, the polished stone perforators were deposited in domestic refuse, in each case after having broken.

Polished Stone Plaque?

A thin fragment of unidentified stone from a late Locona context at Mound 12 (E3–4/19, 303461) is smoothed flat and highly polished on one face (Figure 12.2e). The worked face has something of the appearance of marble (white with fine gray streaks). In profile, the stone appears finally bedded and therefore sedimentary. The bottom surface is a bedding plane of fused sand. The rock above that appears to be siliceous; it scratches glass. The original object is unidentified; it may have been a small plaque.

Polished Stone Sphere

From Locona refuse there is a fragment of a polished sphere in banded greenish-gray metamorphic stone (Mz-250 4/24, 303592). It was approximately 6.5 cm diameter. The fragment weighs 52.5 g.

HAMMERSTONES, PECKING STONES, AND ANVILS

Hammerstones and pecking stones are summarized by phase and excavation locale in Tables 12.3 and 12.4. In each table, expected values are calculated based on the assumption that the observed total count would be distributed among excavation locales in a consistent relation to the weight of sherds recovered. (See the note in Table 12.3 for further discussion of how expected counts were calculated.) The Cherla deposit in Mound 1 yielded fewer pecking stones and hammerstones than one would expect based on the weight of sherds recovered.

Small Hammerstones of Miscellaneous Dense Rock

There are 14 small hammerstones, mostly of quartzite, jasper, or other siliceous rock (Figure 12.2j–o). Some are irregularly shaped but approximately spherical; others are flatter. All appear to have originated as pebbles; most have been heavily used on multiple surfaces. Use wear takes the form of rough abrasion, spalling, and flaking. The longest dimensions vary from 2.8 to 4.2 cm, the smallest dimensions from 1.2 to 2.7 cm; weight ranges from 17.4 to 62.2 g. These may have been general purpose hammerstones used on a variety of small objects, including potentially as percussors for chisels. They do not exhibit the characteristic wear pattern noted on andesite hammerstones used for the production of obsidian flakes through bipolar percussion. However, the material in this case is harder, and that may be why wear patterns are distinctive.

There are two from the same provenience of the late Locona Feature 1 pit in the Pit 32 excavations (P32A/5b, 303499, 303500) and another two from a late Locona midden (F4/15, 303576). There is one from an unscreened Ocós context at Mound 12 (J5/29, 303503) and

Table 12.3. Distribution of hammerstones in dated refuse deposits, split by excavation locale

Context	Hammerstone-Anvil	Hammerstone-Pestle	Pestle-Hammerstone[a]	Small Hammerstone	Total Hammerstones	Expected Hammerstone Frequency[b]	Weight of Sherds
Early Locona							
Md. 1					0	< 1	11.09
Md. 12					0	< 1	1.57
Locona							
Md. 1					0	< 1	8.472
Md. 12					0	< 1	26.119
Md. 21					0	< 1	11.715
Md. 32					0	< 1	24.58
Pit 32			1		1	< 1	22.483
Mz-250	2				2	< 1	43.232
Md. 32 platform							
Late Locona							
Md. 1					0	< 1	26.675
Md. 12		1		1	2	2.2	240.045
Md. 13					0	< 1	6.47
Pit 32	2			2	4	< 1	69.566
Ocós							
Md. 12	4	1	3		8	4.8	516.885
Md. 32	1				1	1.3	137.635
Ocós-Cherla							
Md12-IV	3				3	2.1	228.575
Md1-V	3	1			4	1.0	111.307
Cherla							
Md. 1	2		2	3	7	19	2053.82
Md. 13					0	< 1	15.212
Md. 32	1				1	< 1	10.965
Other Contexts[c]							
Md. 1	1	1	1	6	9		
Md. 12	7	1	1	2	11		
Md. 13	1				1		
Md. 15	1	1			2		
Md. 21	1	1			2		
Md. 32			1		1		
Pit 32					0		
Mz-250					0		
Totals	**29**	**7**	**9**	**14**	**59**		**3566.4**

[a] These are the pestles that were also used as hammerstones described in Chapter 9.

[b] Expected counts are based on comparison to the overall frequency of the corresponding artifact (pecking stones or total hammerstones) per kilogram of sherds. For example, the total pecking stones in dated deposits is 59, the total weight of sherds is 3566.4 kg, and the resulting factor is 59/3566.4, or 0.016543. For Late Locona deposits in Mound 12, the expected frequency of pecking stones is 240.045 * 0.016543, or 2.2.

[c] Contexts not included in the Extended Refuse Study Sample or with stone artifacts unavailable for study in 2015–2016.

Table 12.4. Distribution of pecking stones (mainly of metamorphic greenstone) in dated refuse deposits, split by excavation locale

Context	Pecking Stone (early stage of use)	Pecking Stone (late stage of use)	Pecking-Polishing Stone	Flake of Metamorphic Stone	Total Pecking Stones[a]	Expected Pecking Stone Frequency[b]
Early Locona						
Md. 1	0	1	0	0	1	< 1
Md. 12	1	0	0	0	1	< 1
Locona						
Md. 1	1	0	0	0	1	< 1
Md. 12	1	1	0	1	2	< 1
Md. 14	0	1	0	7	1	n/a
Md. 21	0	0	0	3	0	< 1
Md. 32	0	2	0	0	2	< 1
Pit 32	0	0	0	0	0	< 1
Mz-250	1	1	0	7	2	< 1
Md32 surface and platform	0	1	0	6	1	
Late Locona						
Md. 1	0	0	0	0	0	< 1
Md. 12	4	5	0	3	9	4.5
Md. 13	0	0	0	0	0	< 1
Pit 32	2 + 1 unused[c]	1	0	0	3	1.3
Ocós						
Md. 12	4	3 + 1 offering[d]	0	1	7	9.7
Md. 32	2	2	0	0	4	2.6
Ocós-Cherla						
Md12-IV	3	2	0	4	5	4.3
Md1-IV	1	3	0	2	4	2.1
Cherla						
Md. 1	8	14	1	6	23	38.6
Md. 13	0	1	0	0	1	< 1
Md. 32	0	0	0	0		< 1
Other Contexts						
Md. 1	4	15	2	8	21	
Md. 12	4	8	0	6	12	
Md. 13	0	1	0	0	1	
Md. 15	1	0	0	0	1	
Md. 21	1	2	0	0	3	
Md. 32	1	4	0	9	4	
Pit 32	0	1	1	0	2	
Mz-250	0	1	0	0	1	
Totals	**40**	**71**	**4**	**63**	**114**	

[a] Does not include flakes.

[b] Expected counts are calculated in the same way as described for Table 12.3, with the same sherd weight data.

[c] Not included among the total pecking stones is a large, surprisingly heavy metamorphic greenstone cobble (8.7 x 6.2 x 3.4 cm; 559.5 g). It is of the same sort of metamorphic stone used for pecking stones, but it appears to be unused.

[d] The offering was a late-stage pecking stone that accompanied the Ocós-phase Burial 12.

another from the surface associated with the pre-platform Cherla Structure 1-2 at Mound 1 (K13 Floor B Sec. 10, 303502). That last is an elongate quartzite pebble that exhibits hammering damage particularly at one end and some also along the sides. There are three from the redeposited Cherla midden at Mound 1 (I9/9–10, 303579; F9/11, 303439; I8/11, 303504), three from the mixed upper layers of the platform (Md. 1 F10/1, 303501; K10/2, 303338; L11/6, 303578), one from an unscreened unit in the platform (303577), and one from the surface of Mound 1 (303505).

Hammerstone-Anvils

Twenty-nine pebble tools are classified as hammerstone-anvils because of the nature of the use damage they exhibit (Figures 12.3a, 12.3l, 12.3m). The material in this case is generally volcanic rock, usually andesite. The hammerstones are sub-spherical, with longest dimensions of 3.9–10.4 cm and smallest dimensions of 2.1–5.2 cm; weights range from 51.0 g to 406.8 g.

These tools have wear along prominent edges from use as hammerstones. They also have pitting on at least one face that matches damage on tools of similar material used for the production of obsidian flakes by bipolar percussion by John Clark in the summer of 2016. As demonstrated by Clark, bipolar percussion produces similar patterns of damage on both hammerstone and anvil. Damage consists of the spalling of tiny flakes; repeated use creates a distinct, irregular pit in the stone.

Hammerstone-Pestles

Hammerstone-pestles are elongate pebbles of andesite or other volcanic rock (Figure 12.3b–e). They exhibit grinding or percussion damage at the ends and percussion damage along the lateral faces. Damage on the lateral faces is of the form caused by use for production of obsidian flakes by bipolar percussion. The same traces of wear are relatively common on objects manufactured as pestles such as those described in Chapter 9. Those with hammerstone wear are included in Table 12.3 as pestle-hammerstones.

The seven artifacts classified instead as hammerstone-pestles are all expedient rather than formally manufactured tools. Traces of use as hammerstones are extensive, and that is postulated to be their primary use. They are generally 6–8 cm long with width and thickness in the range of 2–4 cm. Weight varies from 40 to 160 g.

Pecking Stones

Pebbles or cobbles of serpentine or other dense metamorphic greenstone were used in their natural state as pecking stones; 111 were recovered in the excavations (Table 12.4). They were probably used mainly for the production and maintenance of grinding tools such as metates, mortars, manos, and pestles (Figures12.3f–k, 12.3o–p, 12.3r–s). Density is 2.7–2.9 g/cm^3; hardness varies, but 6–7 appears typical.

The stones are usually irregular in shape, and it is the projecting edges and peaks that have been worn away through use. Use wear in two forms is observed, occasionally but not usually on the same tool. The first consists of pounding damage in the form of spalling, flaking, and crushing along a natural projection in the rock, either a peak or a continuous edge that sometimes curves around as much as half the circumference of the tool. The second form of use wear consists of wasting or ablation along a projecting edge. The affected area may be quite smooth or somewhat rough, but signs of crushing, spalling, or flaking are absent.

Clark (personal communication, 2016) suggested that the different forms of wear were related to the use life of the tool, the first representing early stage use and the second late-stage use, the crushing, spalling, and flaking having been wasted away through long-term use. He also suggested that tools in these different states were used for different stages in the production of ground stone artifacts. Those with crushing damage were used in the basic shaping of the object, whereas pecking tools with smooth and stable projections were used late in production to finish the stone surface. It appears that, at Paso de la Amada, not all pecking stones went through both stages of use. Pecking tools abandoned in the first stage of use tend to be lighter in color and somewhat less dense. They also tend to have fairly long use edges. Among pecking tools that went through longer use lives, a dense, black, metamorphic stone seems to have been particularly prized, and use surfaces are in the form of pointed projections (peaks) rather than continuous edges. (See caption of Figure 12.3 for stage identifications of the artifacts illustrated.)

Size and shape of the stones vary, with long dimensions 4.4 to 10.5 cm and short dimensions 3.1 to 6.3 cm. Weight ranges from 82.4 g to 491.0 g for specimens that are complete or nearly so.

Pecking-Polishing Stones

Four pecking stones similar to those just described were also used for polishing (Figures 12.3q, 12.3t–u). In addition to abrasion from pecking, each has a flat facet that has been polished from use. One is from P32E4/5. The others are from the Mound 1 platform fill (H9/11 and unscreened units). Weights range from 94.4 g to 322.4 g. The flakes of metamorphic greenstone (Table 12.4) appear to include spalls generated during the use of these tools.

Slate Chisels or Hammerstones

Four long, thin pieces of slate were used as chisels and/or hammerstones. From Mound 1 G11/1, 303240 is a complete, heavily used tool that may have been at the end of

Figure 12.3. Hammerstones, pecking stones, and anvils: (a, l–m) hammerstone-anvils; (b–e) hammerstone-pestles; (f–j, o–p) pecking stones, late stage; (k, n, r–s) pecking stone, early stage; (q, t, u) pecking-polishing stones. Proveniences: (a) Md. 12 T1A/5; (b) Md. 12 G5–H5/32; (c) P32B1/6; (d) Md. 12 T1A/2; (e) Md. 12 K4/F. 23; (f) Md. 1 I9/1; (g) Md. 1 E10/12; (h) Md. 12/35; (i) Md. 1 M10/12; (j) Md. 12 Burial 11 artifact a; (k) Md. 1/R; (l) Md. 12/24 F.10; (m) Md. 12 E4/7; (n) Md. 12 E3–4/19 F.2; (o) Md. 1 T3/7; (p) Md. 12 E2/8; (q) P32 E4/5; (r) Md. 12 J6/28; (s) Md. 1 I9/9–10; (t–u) Md. 1 Structure 1 fill.

its use life in its current form (Figure 12.4a). It is heavily scored longitudinally on one face, suggesting an abandoned attempt to divide the tool into two pieces that could then have continued in use. The tool is 8.8 cm long, 2.8 cm wide, and 0.9 cm thick. Both faces are fairly flat, a feature that contrasts with the other three specimens. However, a point consistent with the other pieces is that one of the faces was polished smooth while the other face is a rough, unpolished breakage plane. The poll is heavily battered from hammerstone blows. The bit end is heavily pitted and there is also pitting damage along the sides of the tool. The face that was originally polished smooth exhib-

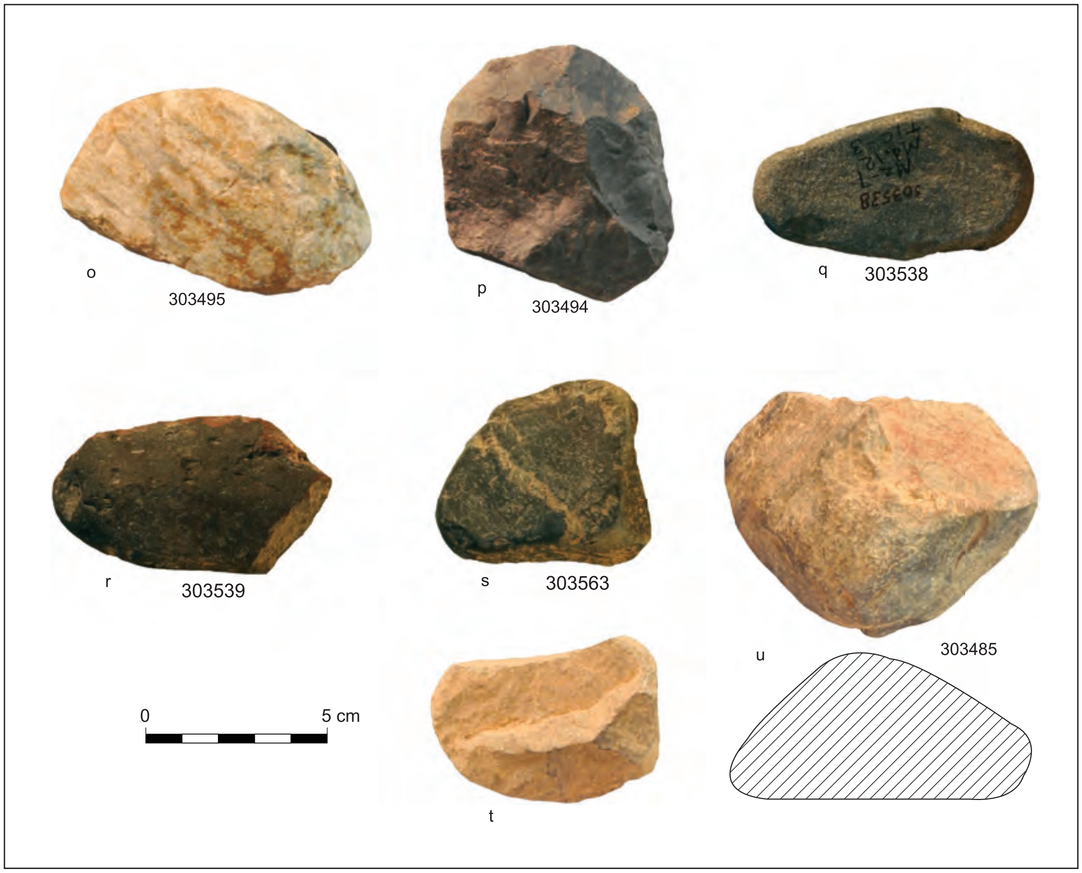


Figure 12.3. *continued*

its greater pitting than the opposite side (the one that was originally an unpolished breakage plane).

Specimen 303239, also from the surface layer of the Mound 1 platform (I8/1), is another slate tool preserved in its full original length (7.2 cm long, 2.6 cm wide, 0.9 cm thick) (Figure 12.4b). The poll end was originally polished flat, the bit end rounded. Like 303240, one face exhibits a flat breakage plane while the other is well polished. In this case, however, the polished face is an even, gentle, convex curve, as if the specimen were a longitudinal fragment of a polished cylinder. There is hammerstone battering at the poll end and pitting on the bit and along the polished face. The other face appears freshly broken. It exhibits no pitting or other traces of use damage. Therefore, an initial understanding of the piece was that it represented a tool broken during use and then abandoned. However, careful comparison to the first specimen raises the possibility that this was still a functional tool. The thickness from face to face is the same. The first tool also has one polished and one broken face. Although that complete tool has some use damage on both faces, spalling is significantly more frequent on the polished face. Thus the second specimen (303239) might have still been in use as a tool if it were always oriented with the polished face toward the object being struck.

The third specimen (303402) is again from the surface layer of the Mound 1 platform (G10/1) (Figure 12.4c). The remaining length after a transverse break is 5.3 cm; width and thickness are 2.5 and 1.0 cm, respectively. We have the poll end of the tool, polished flat (like that of 303239) and without evident traces of damage. In form, the tool seems to have been very similar to 303239, with one polished, rounded (convex) face that exhibits pitting from use and the other face an unpolished breakage plane without any traces of pitting.

The fourth specimen, 303403, is from mixed platform fill at Mound 12 (G6/25) (Figure 12.4d). The remaining length is 4.9 cm; maximum width and thickness are 2.3 and 0.7 cm, respectively. We appear to have the rounded bit end of the broken tool, though in this case there is no trace of use wear, raising the possibility that the breakage occurred during manufacture. Like 303239 and 303402, one face of this specimen is a flat breakage plane and the other face is rounded (convex) and well polished.

The similarities in form between these pieces suggest that slate chisel/hammerstones may have been manufactured in two steps. First, a piece of raw material was shaped into a well-polished cylinder with one rounded and one flat end. Then that object was fractured longitudinally to produce (if the operation was successful) two or more tools.

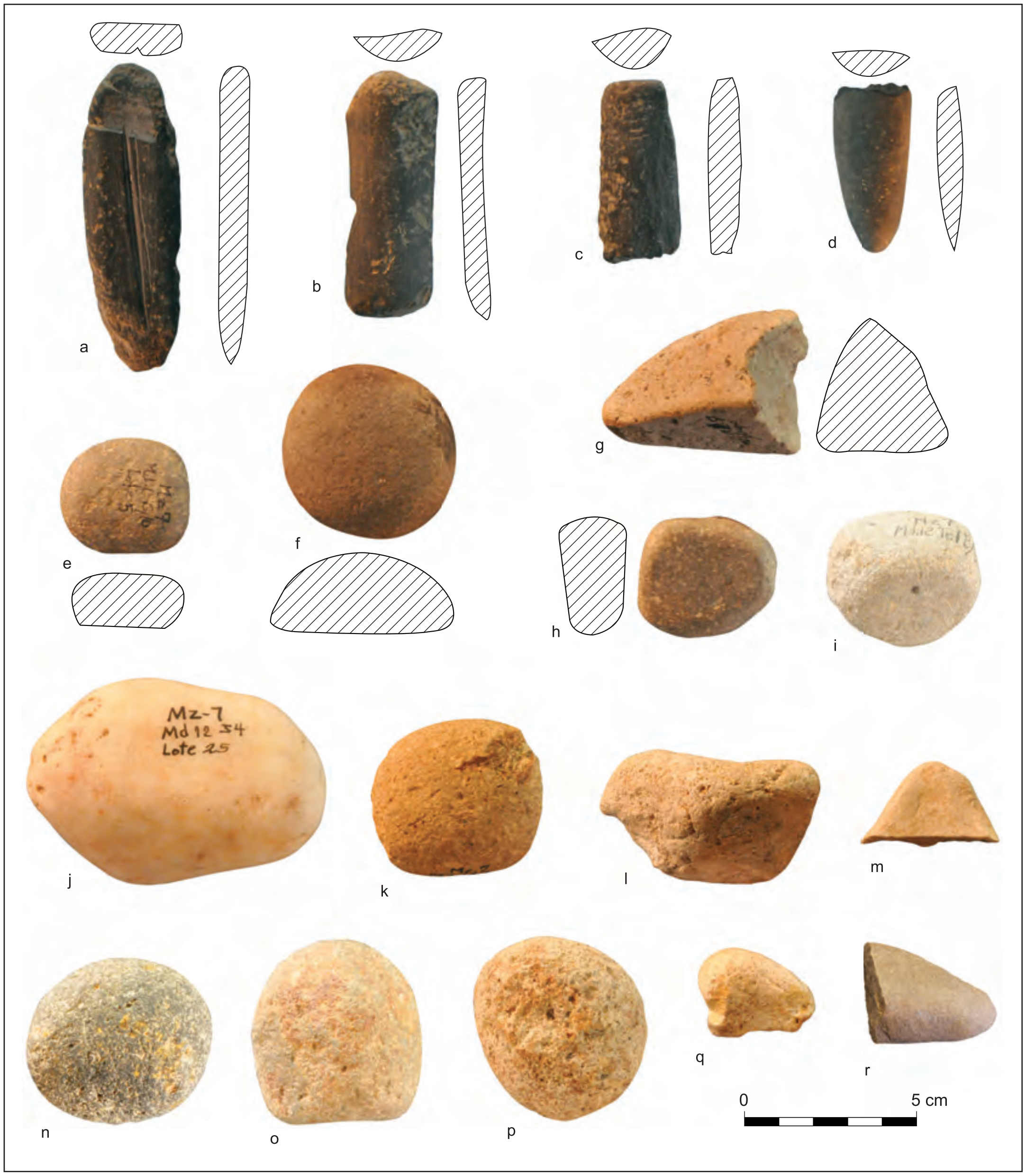


Figure 12.4. Pebble polishers: (a–d) slate chisels or hammerstones; (e–f, h, j–k) faceted pebble polishers; (g) pebble polisher, triangular cross section; (I, n–o, r) pebble polisher, light wear; (l–m, q) pebble polisher, light-colored stone; (p) hammerstone-anvil. Proveniences: (a) Md. 1 G11/1; (b) Md. 1 I8/1; (c) Md. 1 G10/1; (d) Md. 12 G6/25; (e) Md. 1 G10/5; (f) P32A/4B F.1; (g) Md. 1 surface; (h) P32A/5A1 F.1; (i) Md. 12 T1B/3; (j) Md. 12 J4/25; (k) P32B 2/5; (l) Md. 12 T1E/13; (m) Md. 1 I11/2; (n) Md. 12 H7/28; (o) Md. 13 P2/2; (p) Md. 12 I7/29; (q) Md. 1 I10/1; (r) Md. 1 J12/1.

All these slate tools are from chronologically mixed contexts containing Locona, Ocós, and Cherla sherds. If one had to guess, a Cherla date would seem most likely. Three of the artifacts come from Lot 1 at Mound 1, the surface layer of the mound. Two are from adjacent units and the third from 3–4 m away. It is possible that they were originally in a cache that was disturbed either by the ancient inhabitants who built the platform or in recent times by the plow. (Lot 1 included both disturbed plow zone and intact platform fill beneath.)

POLISHING AND ABRADING STONES

Small rocks were used for a variety of tasks involving abrading, smoothing, and polishing. Pebbles of metamorphic and volcanic rock were used for polishing. Pumice was relatively common in the deposits and was used for abrading and smoothing. Pebbles of abrasive volcanic rock other than pumice (such as pyroclastic) may have been used as smoothers rather than polishers. Of particular interest are the sandstone abraders, which likely include lapidary tools.

Pebble Polishers

Four types of pebble polishers, along with the more abrasive pebble smoothers, are reported in Data Record 12.1, split by phase and excavation locale. Expected values for total polishers are calculated based on corresponding weight of sherds, as in Table 12.3. Pebble polishers are less common than expected in the Cherla deposit at Mound 1 and consistently more common than expected in the Pit 32 Excavations (Locona and Late Locona). They are less common than expected in the Ocós deposits at Mound 12 but slightly more common in Late Locona and Ocós-Cherla deposits in that same mound. Overall, this variability is what one expects of small samples.

Note also that other pebbles in the deposits did not display convincing traces of use. Those are classified as possible slingshot ammunition and described below in the section on minimally modified rock.

Faceted Pebble Polishers

Thirteen polishing pebbles had distinct wear facets indicating long use life (Figures 12.4e–f, 12.4h, 12.4j–k). They are usually sub-spherical, with the longest dimensions between 3 and 8 cm. Material varies and includes quartzite, metamorphic greenstone, andesite, and vesicular basalt.

Pebble Polishers with Light Wear

Thirty-three pebbles exhibit light wear that did not reach the point of creating flattened facets (Figures 12.4i, 12.4n–o, 12.4r). The stone used varies but is often volcanic.

Pebble Polishers with Triangular Cross Section

Two elongate pebbles with triangular cross sections were used as polishers on each of their three faces (Mz-250 6/34 and Md. 1 surface) (Figure 12.4g).

Pebble Polishers in Light-Colored Stone

There are three polishing pebbles made of various light-colored stones (Figures 12.4l–m, 12.4q). One from Mound 12 T1E/13 (303479; hardness 4–5) has a curved polishing surface for working a cylindrical form. Another, from Mound 1 I10/1 (303308; hardness 3), is a small cream-colored pebble with multiple surfaces used for polishing. Finally, one from Mound 1 I11/2 (303480; hardness 4–5) is a cream-colored to green pebble. The polishing surface has a concave profile.

Pebble Smoothers

There are 10 pebbles of a fairly abrasive volcanic stone heavier than pumice. They may have been used for smoothing rather than polishing.

Sandstone Abrading Tools

Forty-two abrading tools of fine-grained sandstone and six unworked fragments of the same material were recovered (Figure 12.5). The artifacts are possible lapidary tools. Most of the tools exhibit use surfaces of several sorts, numbered 1 through 8 in Table 12.5. Use surfaces were classified as follows: (1) sawing, (2) drilling or reaming, (3) polishing on an edge with the tool at an angle, (4) polishing on an edge with the tool perpendicular to the surface being worked, (5) polishing or grinding with a flat surface, (6) polishing or grinding on a concave surface, (7) polishing or grinding in a groove, and (8) polishing or grinding with a convex surface. Of those, polishing with a convex surface (8) was the rarest and polishing with a flat surface (5) the most common.

Although it is typical for more than one sort of use surface to be observed on an individual tool, three use surfaces are rarely associated: sawing (1), drilling (2), and polishing on a concave surface (6). The lack of association must, at least in part, be the result of formal constraints dictated by the nature of the use: saws need to have a long, thin edge; drills need to be small with a tapered point; and tools with concave grinding surfaces need to be relatively large and thick. Building from those observations, five basic tool types are identified.

There are four *sandstone drills*, one of which was also used as a saw. Drills have relatively few additional types of use surface (1, 5, and possibly 3 and 4 are represented). The average was two different use surfaces per tool. Most are broken; original lengths were probably 4–5 cm.

From the fill of the Cherla platform in Mound 1 (H14/9–10) there is an additional, tiny sandstone tool related to the drills. It appears to be for reaming or fine grinding. The piece is intact and 4.3 cm long (maximum width 0.8 cm, maximum thickness 0.5 cm). It tapers to a delicate point at the working and. In cross section it is flat rather than round. There are indications of wear (abrasion marks) on the narrow edges but not on the flat upper and lower surfaces. The tool may have been inserted into holes (perhaps in greenstone or soapstone beads) and twisted, with the goal of enlarging the holes. Another possible use is for grinding the fine details on greenstone pendants.

There are 10 *sandstone saws* (one of which was also a drill and another also a grooved polisher). Saws are small, thin pieces of sandstone generally with one sawing edge and a variety of other uses represented (2, 3, 4, 5, 7). The average was 2.8 different uses per tool. Cutting edges were 2–5 cm long.

There are 10 *concave sandstone polishers*. These tend to

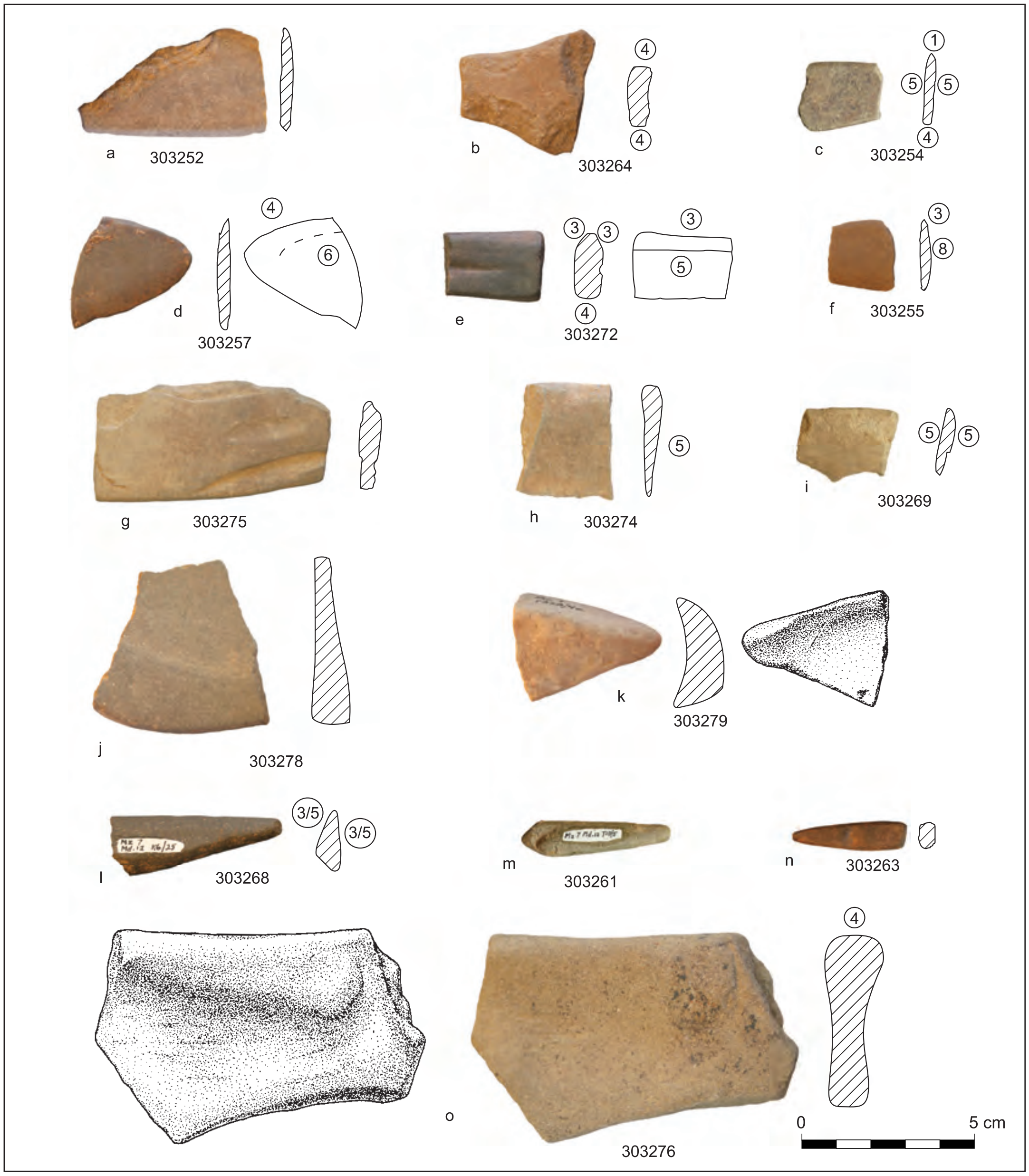


Figure 12.5. Sandstone abrading tools: (a, c, w, dd, ff, hh) saws; (b, d, f, h–i, l, u, z, ee, gg) miscellaneous polishers; (e, g, aa, cc) groove polishers; (j–k, o–r, v, x–y, bb) concave polishers; (m–n, s–t) drills. Proveniences: (a) Md. 1 Structure 1 fill; (b) Md. 1 T2/2; (c) Md. 12 T1E/1; (d) Md. 1 K12/3; (e) Md. 1 M10/11; (f) P32/2; (g) Md. 1 H10/7; (h) Md. 1 T2/2; (i) Md. 1 E10 F.4; (j) Md. 1 F12/25; (k) P32A/4a; (l) Md. 12 K6/25; (m) Md. 12 T1D/5; (n) Md. 1 G10/5; (o) Md. 13 P2/4A; (p) Md. 1 I6/10; (q) Md. 1 L10/10; (r) Md. 1 T2/4; (s) Md. 12 F2/23; (t) Md. 1 J9/1; (u) Md. 12 T1B/3; (v) Md. I6/10; (w) Md. 1 J12/7; (x) Md. 1/8; (y) Md. 12 F2/23; (z) Md. 12 T1F/4; (aa) Md. 1 G12/19; (bb) Md. 1 T2/5; (cc) Md. 1 G12/25; (dd) Md. 1 F10 E10 F.15; (ee) Md. 1 M10/25 or 26; (ff) Md. 12 P3/3; (gg) Md. 12 T1C F.2; (hh) Md. 12 T1C/7. *Drawings by Alana Purcell and R. Lesure.*

be the largest and heaviest of the sandstone abraders and may have been used often as stationary rather than hand tools: the object being polished was rubbed against the tool rather than the tool against the object. There are often other sorts of grinding facets present (use surfaces 3, 4, 5, and 7 are represented); some of the latter likely involved use as a hand tool. The average was 2.2 sorts of use surface per tool. Most are broken; maximum extant dimensions are not above 10 cm, though originally some could have been larger than that.

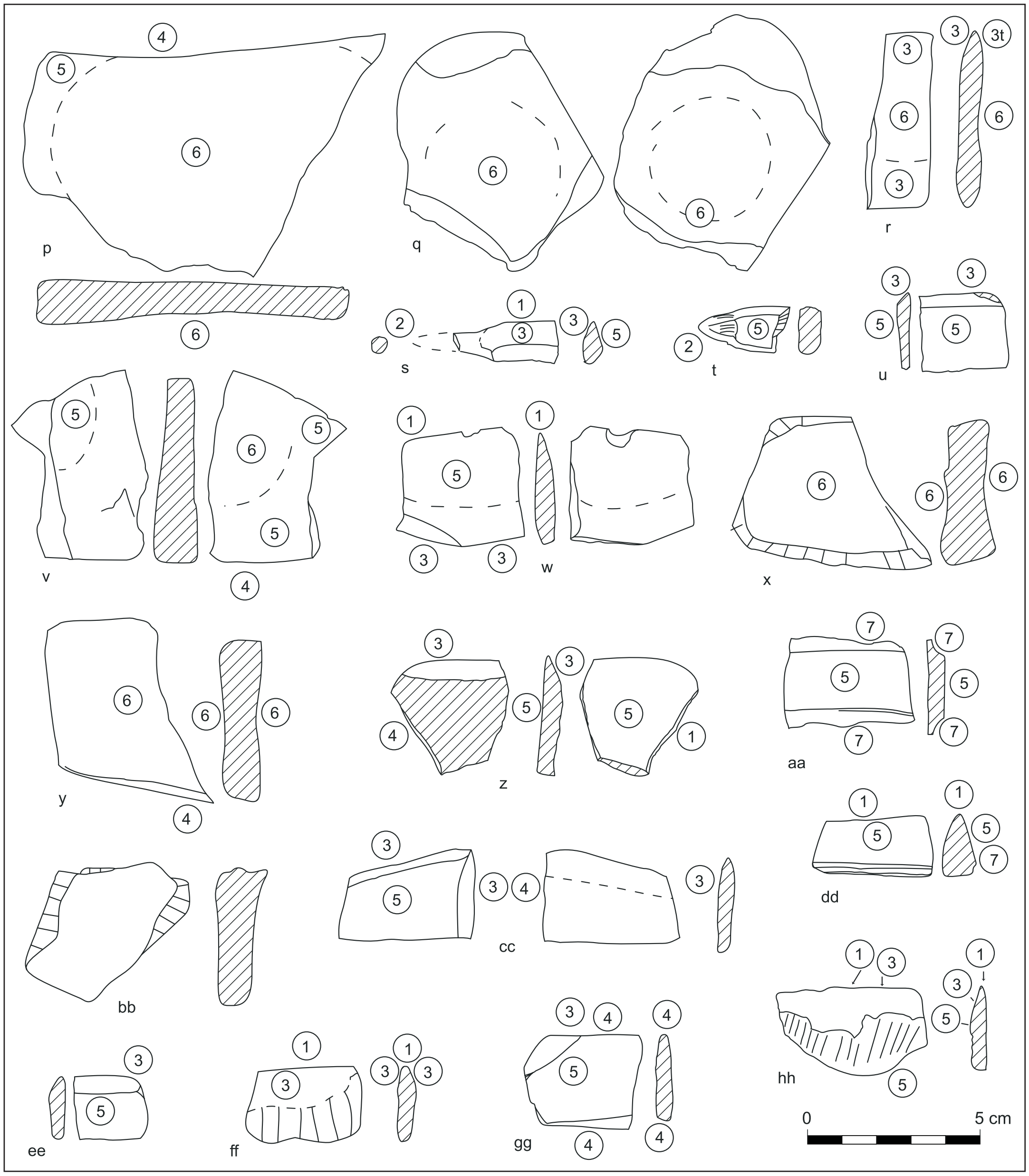


Figure 12.5. *continued*

Fifteen tools are *miscellaneous sandstone polishers*. All but one of these have one or more flat polishing surfaces (use category 5), and many also exhibit edge wear of different kinds (3 and 4). Rare are 8 and single possible instances of 1 and 6. The average number of different use surfaces is 2.3. The tools were small like the saws; maximum extent dimension is between 2 and 5 cm.

The final category is polishing in a groove. It is distinguished here because the use seems distinctive. However, the artifacts in this category are quite variable, exhibit other uses as well, and may not really form a functionally coherent set. Three tools are classified as *grooved sandstone polishers*. The clearest is 303275, which has one well-defined use-related groove and another that had just been started. Specimen 303271 has two deep, even, parallel grooves with rather light wear. The piece is broken down the middle of each groove. It may be that the grooves in this case are traces of manufacture rather than use: a thin piece of sandstone was grooved in at least two places and then broken along the grooves to form at least three separate miscellaneous sandstone polishers or saws. Specimen 303272 is broken but has a trace of a groove along a flat surface. Two other tools have observed grooves. Specimen 303287, classified as a concave polisher, also has a relatively large facet that appears to have been produced by abrasion against a cylindrical object. Specimen 303270 is similar to 303271 in having been snapped along a groove; it is uncertain whether the groove is a use surface or a trace of manufacture.

Table 12.5. Sandstone abraders, with notes on context and use traces[a]

Type	Cat. #	Provenience	Phase/Context	1	2	3	4	5	6	7	8	Comments
sandstone drill	303260	Md. 12 F2/23	Ocós	x	x	?						both saw and drill
sandstone drill	303261	Md. 12 T1D/5	platform fill		x							
sandstone drill	303262	Md. 1 J9/1	platform fill		x			x				
sandstone drill	303263	Md. 1 G10/5	platform fill		x		?					
sandstone saw	303252	Md. 1 fill	platform fill	x				x				
sandstone saw	303253	Md. 12 T1C/7	Ocós	x		x		x				
sandstone saw	303254	Md. 12 T1E/1	platform fill	x			x	x				
sandstone saw	303266	Md. 12 P3/3	platform fill	x		x						saw edge rounded from heavy use?
sandstone saw	303270	Md. 1 / F.15	Late Locona	x				?		x		
sandstone saw	303273	Md. 1 M10/12	Cherla	x		x	x	x				
sandstone saw	303282	Md. 1 J12/7	Cherla	x		x		x				
sandstone saw	303285	Md. 1 J12/9	Cherla	x				x				
misc. polisher	303251	Md. 1 / F.15	Late Locona				x	x				
misc. polisher	303255	P32/2	slope wash			x					x	
misc. polisher	303256	Md. 1 G12/25	Md1-V	?		x	x	x				
misc. polisher	303257	Md. 1 K12/3	platform fill			x	x	x	?			
misc. polisher	303258	Md. 12 T1B/3	platform fill			x		x				
misc. polisher	303259	Md. 1 M10/26	Md1-V			x	x	x				
misc. polisher	303264	Md. 1 T2/2	slope wash				x	x				
misc. polisher	303265	Md. 12 T1F/4	platform fill			x	x	x				
misc. polisher	303267	Md. 12 T1C/ F.2	Ocós			x	x	x				
misc. polisher	303268	Md. 12 K6/25	platform fill			x		?				unidentified stone
misc. polisher	303269	Md. 1 E10/ F.4	Cherla					x				
misc. polisher	303274	Md. 1 T2/2	slope wash					x				
misc. polisher	303288	Md. 1 Lot 8	platform fill					x				
misc. polisher	303295	Md. 21 P4/6										missing from collection?

The sandstone tools would have been appropriate for lapidary work (Clark 1988:161–62). For that reason, their distribution is of considerable interest in the search for evidence of social inequality at the site. Was lapidary work restricted to certain households? If so, was it organized as patronized craft specialization? Caution is in order because sandstone abraders were also probably used for the production of bone and shell artifacts (Clark 1988:162–66; Flannery and Marcus 2005:77, Figure 5.2d), so the presence of a sandstone grinding tool in a given context does not necessarily mean that lapidary work went on in that location. Still, unfinished greenstone ornaments are present at the site, and of all the tools discovered, these are the most appropriate for such work.

One initial question is whether the individual types of sandstone tools are differentially distributed. The sample is small, but the answer seems to be no. In a late Locona trash pit at Mound 1 (Feature 15), there was a saw and

Type	Cat. #	Provenience	Phase/Context	1	2	3	4	5	6	7	8	Comments
concave polisher	303276	Md. 13 P2/4A	platform fill				?		x			
concave polisher	303277	Md. 1 T2/5	fill/surface					x	x			
concave polisher	303278	Md. 1 F12/25	Md1-V				x	x	x			
concave polisher	303279	P32A/4a	Late Locona					x	x			
concave polisher	303280	Md. 12 F1/8	Md12-IV						x			
concave polisher	303281	Md. 12 F2/23	Ocós				x		x			
concave polisher	303283	Md. 1 T2/4	slope wash			x			x			
concave polisher	303284	Md. 1 I6/10	Cherla				x	x	x			
concave polisher	303286	Md. 1 I6/10	Cherla				x	?	x			
concave polisher	303287	Md. 1 L10/10	Cherla						x	x		
groove polisher	303271	Md. 1 G12/19	Md1-V					?		x		
groove polisher	303272	Md. 1 M10/11	Cherla			x	x	x		x		unidentified stone
groove polisher	303275	Md. 1 H10/7	Cherla				x	x		x		

[a] Codes for uses: (1) sawing, (2) drilling or reaming, (3) polishing on an edge with tool at an angle, (4) polishing on an edge with tool perpendicular to the surface being worked, (5) polishing or grinding with a flat surface, (6) polishing or grinding on a concave surface, (7) polishing or grinding in a groove, (8) polishing or grinding with a convex surface.

a miscellaneous sandstone polisher. From the same minimal provenience unit in the Feature 10 ditch at Mound 12 (F2/23), there was a drill and a concave polisher. More generally, in the late Locona/Ocós middens at Mound 12, there was a drill, a saw, a miscellaneous sandstone polisher, and two concave polishers. From the pre-platform ground surface at Mound 1, there are two miscellaneous polishers, one concave polisher, and one grooved polisher. Finally, from the redeposited Cherla midden of Zone IV, Mound 1, there are three saws, one miscellaneous polisher, three concave polishers, and two grooved polishers. A chi-square test on the assemblages from Mounds 1 and 12 (the two largest collections, consisting of 26 and 11 tools, respectively) found no significant difference in the distribution of types. In sum, there is no evidence for differential distribution of the individual types.

A young woman at the site of Tlatilco, in the Basin of Mexico, was buried with, among numerous other objects, a set of five polishers, some of which appear to be sandstone (Burial 53 in García Moll et al. 1991:40, 102, 199). The distributional data at Paso de la Amada is consistent with the idea that workers of polished stone or bone maintained tool kits consisting of several diverse types of sandstone abrading tools. The following distributional analysis therefore focuses on sandstone abraders as a category.

Table 12.6 examines spatial distribution among excavation locales. In this analysis, all deposits from each locale are considered. Frequencies of sandstone abraders (and unworked fragments of the same sort of sandstone) are standardized first by volume excavated (density per 10 m^3) and then by weight of associated sherds (frequency per 100 kg of sherds). Note that the rows are ordered in descending overall weight of sherds and that the resulting ordering corresponds perfectly to the descending raw frequencies of sandstone. That point is telling, because it suggests that there is no particular pattern to the distribution of these artifacts. The likelihood of finding a sandstone abrader in a given location is predictable based solely on the overall number of artifacts found there. The high volumetric density at Mound 1 is attributable to the overall high density of artifacts in those deposits. Mound 32 is low in volumetric density but similar to the other larger samples in frequency per 100 kg of sherds

Table 12.6 maximizes sample size at the expense of chronological resolution. Table 12.7, in contrast, examines the distribution of sandstone tools (and unworked fragments) by excavation locales within phases. (Locona and Late Locona are combined.) Sample size becomes quite small. To better assess the results, expected values for individual locations are computed based on the weight of sherds recovered. The Mound 1 Cherla deposit yielded a few less than expected, but there were more than expected in the Ocós-Cherla ground surface under the platform. The most interesting pattern is the presence of one or more

Table 12.6. Frequencies of sandstone abraders and unworked sandstone fragments by excavation locale[a]

Excavation Locale	Sandstone Tools or Unworked Sandstone Fragments	Volume Excavated (m^3)	Sandstone Fragments per 10 m^3	Weight of Sherds (kg)	Sandstone Fragments per 100 kg Sherds
Md. 1	27	111.65	2.42	3327.37	0.81
Md. 12	12	106.28	1.13	1438.56	0.83
Md. 32	3	90.59	0.33	388.92	0.77
Pit 32	2	20.30	0.99	247.30	0.81
Md. 13	1	9.29	1.08	77.45	1.29
Md. 21	1	12.49	0.80	76.91	1.30
Mz-250	0	31.89	0	59.84	0

[a] Standardized by volume excavated and by weight of associated sherds.

Table 12.7. Sandstone tool distribution by phase and excavation locale

Phase and Location	Volume Excavated (m^3)	Weight of Sherds (kg)	Sandstone Tool or Unworked Fragment	Expected Value[a]
Locona				
Md. 12	21.1	267.7	0	1.8
Pit 32	2.8	92.0	1	< 1
Md. 1	3.3	46.2	2	< 1
Mz-250	10.4	43.2	0	< 1
Md. 14	1.3	35.1	0	< 1
Md. 32	2.5	24.6	0	< 1
Md. 13	3.5	13.5	0	< 1
Md. 21	3.5	11.7	1	< 1
Ocós				
Md. 12	24.2	516.9	4	3.4
Md. 32	6.2	137.6	1	< 1
Ocós-Cherla				
Md. 1	17.2	111.3	4	< 1
Md. 12	15.6	236.0	1	1.6
Cherla				
Md. 1	45.5	2053.8	11	13.6
Md. 13	2.2	43.2	0	< 1
Trench 1B	0.3	41.3	0	< 1
Trench 1T	2.0	37.6	0	< 1
Md. 11	0.8	29.1	0	< 1
Md. 32	0.4	11.0	0	< 1
Pit 29	0.5	8.8	0	< 1

[a] Expected values calculated based on sherd weights in the same manner as for Table 12.3.

sandstone abraders in three Locona deposits for which the expected value was less than one. The evidence assembled in Tables 12.5 and 12.6 points toward generalized access to and use of tools appropriate for lapidary work.

Clark (1988:161–66) describes a collection of 48 fine-grained sandstone tools (and 44 fragments) from La Libertad, Chiapas (approximately 140 km from Paso de la Amada). The saws from La Libertad seem most directly similar to the corresponding objects at Paso de la Amada. Otherwise, the La Libertad tools tend to be larger than those of Paso de la Amada. Grooved tools form a larger proportion of the assemblage, and the collection seems less expedient in that distinct tool types are more readily distinguishable.

Ceja Tenorio (1985:108) previously reported five abrader saws from Paso de la Amada and noted similarities with those from San Lorenzo (Coe and Diehl 1980:236). In general though, it appears that, while similar tools are often reported from other Formative-period sites, materials used and specific forms vary considerably. Payson Sheets (1978:34–35) reports four whetstones (sandstone, andesite, schist) and four abrader saws (slate) from Chalchuapa. There apparently are no close equivalents at K'axob (McAnany and Ebersole 2004). The tool sharpeners (n = 2), abraders (n = 4), and knives or saws (n = 4) from Chiapa de Corzo (Lee 1969:123, 127, 131), though comparatively few in number, appear generally similar to the sandstone abraders from Paso de la Amada. MacNeish et al. (1967:125–26) report 25 abrader saws and two whetstones in slate, shale, sandstone, and jadeite from Tehuacán (all periods). Grove (1987a:333) describes "flat palettes" (material unidentified) from Chalcatzingo, which he compares to the whetstones of Tehuacán. He raises the possibility that they were used to polish iron ore mirrors; 26 of 33 specimens were from Plaza Central contexts. The *bruñidores* from Tlapacoya (Niederberger 1976:77–78, Lámina XXXI), n = 54, were very diverse; some of those artifacts seem to be similar to the sandstone abraders of Paso de la Amada.

Stone Saw

A stone saw of an unidentified heavy, reddish stone comes from Mound 12 F4/12. The length of the use edge is 6.5 cm.

Pumice Abraders

Pumice was used as an abrasive, usually expediently (as an unprepared chunk). There were also a couple of recurring types of more formally shaped abrading tools. Other pumice artifacts include eight floats (described below under "Minimally Modified Rock and Miscellaneous Tools") and three ornaments (described in Chapter 11).

Pumice fragments and artifacts are summarized in Table 12.8, split by phase and excavation locale. The collections from some analytical units, such as the 1990 test excavations, were not available for study when the artifacts were reviewed in 2016.

A total of 283 pumice fragments, collectively weighing approximately 1.7 kg, was registered. The main pattern to note in the table is the overrepresentation of pumice in the Cherla deposit at Mound 1, where there were 38 more pumice fragments than expected based on the corresponding weight of sherds recovered. In most other cases, the count of pumice was lower than expected, sometimes dramatically so, as in the Ocós deposits at Mound 12.

The average weight of pumice fragments from the Mound 1 Cherla deposit is the same as that from other dated contexts (6.2 g), but fewer pieces show clear signs of use as abraders compared to other contexts (33 percent and 53 percent, respectively). If one includes all worked pumice, including floats and ornaments, the comparison is 41 percent at Mound 1 to 57 percent in other contexts (with Md. 1-V excluded from these analyses). In sum, there seems to be evidence for differential intra-site distribution of pumice. I have no explanation to offer for that finding; I think pumice was readily available in streambeds and unlikely to have been a marker of high status.

Expedient Pumice Abraders

Expedient abraders were not systematically shaped prior to use (Figures 12.6h, 12.6k–n). Thirty-nine were identified. Specimens vary considerably in size and form. Use on a variety of different materials seems likely. Many have multiple abrasion facets, usually relatively flat but sometimes concave or slightly convex. Several of the concave abrasion surfaces are approximately cylindrical in form, suggesting use as shaft straighteners (indicated with arrows in Figure 12.6m and 12.6n). Maximum diameter of the corresponding shafts was 2.5, 4.0, 4.5, and approximately 8 cm.

Flat Pumice Abraders

The most common intentionally shaped pumice tool is the flat abrading stone (Figure 12.6d–f). The tools are round or oval, with two relatively flat abrasion surfaces (original dimensions: 3–6 cm long, 2–6 cm wide, 1–2 cm thick). Nineteen were identified.

Pumice Handstones

The other formal abrasion tool is the pumice handstone (Figure 12.6a–c). These are flat on the primary use surface. The rest of the tool is convex, such that it could be easily held in one hand. These were larger than the flat abraders, with original widths of 3.5 to 7.0 cm and lengths of 4.5 to perhaps 10 cm. Thickness ranged from 2.0 to more than 4 cm. Fragments of 16 such tools were identified.

Table 12.8. Pumice fragments and artifacts

Context	Count of Pumice Fragments	Expected Count[a]	Weight of Pumice Fragments (g)	Expedient Abrader	Flat Abrader	Hand Abrader	Misc. Rounded	Misc. Pumice Artifact	Ornament	Float	Total Artifacts
Early Locona											
Md. 1	0	< 1	0								0
Md. 12	3	< 1	27.9	1							1
Locona											
Pit 32	0	< 1	0								
Md. 1	1	< 1	6.1	1							1
Md. 12	3	1.1	35.1		1						1
Md. 21	1	< 1	3								0
Md. 32	0	1.0	0								0
Mz-250	0	1.8	0								0
Late Locona											
Pit 32	0	2.9	0								0
Md. 1	1	1.1	2.2								0
Md. 12	5	10.0	12.6	1	2		1	1			5
Md. 13	0	< 1	0								0
Ocós											
Md. 12	0	21.4	0								0
Md. 32	2	5.7	14	1		1					2
Md12-IV	3	9.5	16	1							1
Md1-V	5	4.6	15.1	1							1
Cherla											
Md. 1	123	85.2	751.5	21	9	5	4	4	3	4	50
Md. 13	1	< 1	1.8								0
Md. 32	0	< 1	0								0
Other											
Md. 1	103		605.6	10	7	9	2	2		5	35
Md. 11	3		missing data								
Md. 12	6		114.8			1	1	1			3
Md. 13	8		missing data								
Md. 21	6		21.7	2							2
Md. 32	3		16.2				1				1
Pit 32	6		4.4								
Totals				**39**	**19**	**16**	**9**	**8**	**3**	**9**	**103**

[a] Expected counts are calculated in the same way as described for Table 12.3.

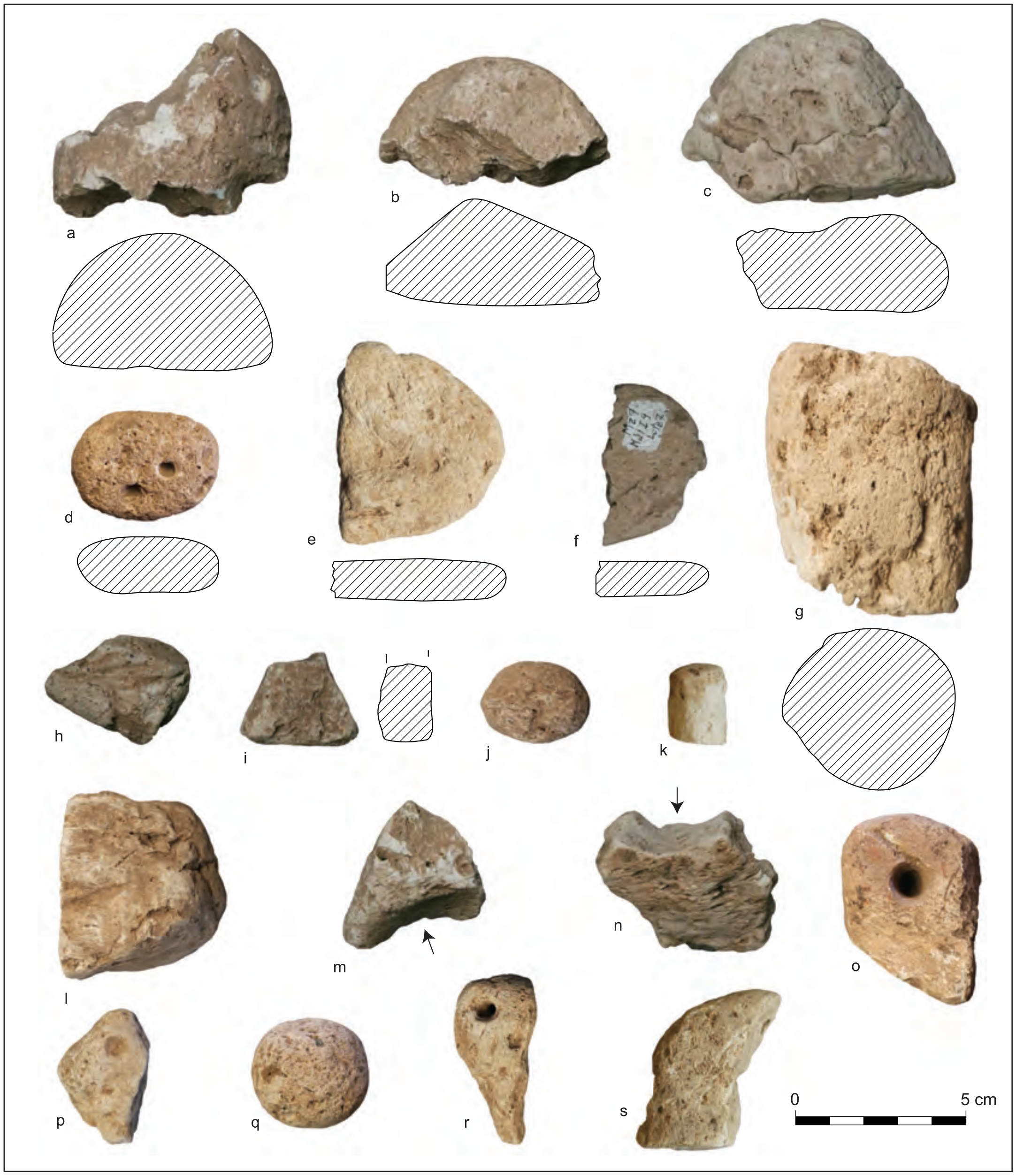


Figure 12.6. Pumice abraders: (a–c) pumice handstones; (d–f) flat pumice abraders; (g, i, k, p) miscellaneous pumice artifacts; (h, k–n) expedient pumice abraders; (o) large pumice fragment, incompletely drilled from two sides; (q) shaped stone sphere of pumice or rhyolite (303248); (r) drilled and shaped fragment of pumice; (s) rounded fragment of pumice. Proveniences: (a) Md. 1 Structure 1 fill; (b) Md. 1 K10/9; (c) Md. 12 K6/31; (d) Md. 1 J9/10; (e) Md. 12 F3–4/19; (f) Md. 1 I9/7; (g) Md. 12 G5/25; (h) Md. 1 I6/9; (i) Md. 1 K10/7; (j) Md. 1 H11/1; (k) Md. 1 H12/9–10; (l) Md. 1 I13/8; (m) Md. 1 H10/9–10; (n) Md. 12 P5/11; (o) Md. 1 G9/11; (p) Md. 1 T2/4; (q) Md. 1 I11/1; (r) Md. 1 J9/7; (s) Md. 1 H8/7.

Miscellaneous Rounded Abraders

An additional nine abrading tools were rounded in overall form but not so clearly shaped as formal tools.

Miscellaneous Pumice Artifacts

The nine miscellaneous pumice artifacts include a few pieces with drilled holes or attempts to drill holes and several specimens shaped in unusual forms (cylindrical, trianguloid). These artifacts have been worked in some way but were not necessarily used as abrading tools.

MISCELLANEOUS SHAPED GROUND STONE

Ground Stone Spheres and Spheroids

There were 14 small ground stone spheres. All of these seem to have been manufactured as spheres. They do not show evidence of wear from use as tools (Figures 12.6q, 12.7g–i, 12.7l–m, and 4.23). There appear to have been three sizes that correspond with raw material and context.

Most are of volcanic stone (andesite, rhyolite) and were recovered in middens and other deposits. They are 2.5 to 5.0 cm in diameter and weigh 12 to 150 g. There was one of andesite (4.4–4.7 cm "diameter," 107.5 g) from a late Locona context at Mound 12 (T1E/20) and another in this same material (3.5–3.8 cm "diameter," 76.4 g) from slope wash at Mound 32 (T3F/144). Nine are from Mound 1. From the deteriorated earthen wall associated with Structure 1-2 (Md. 1 G9 Floor A Sec. 16) there is a sphere of rhyolite. It is 2.8 cm in diameter and weighs 31 g. The rest are from the fill of the Cherla platform. From Md. 1 I11/1 is a lightweight sphere made of a rhyolite that tends toward pumice. It is 3.1 cm in diameter and weighs 19.1 g. Spheres of rhyolite or white andesite were recovered from the following proveniences in Mound 1: G11/9–10 (3.3 cm diameter, 36.9 g), L10/7 (3.3 cm diameter, 49 g), G9/5 (2.7 cm diameter, 16 g), G9/5 (3.5 cm diameter, 66 g), and unscreened fill (2.4 cm diameter, 12 g). In two final cases, the stone was not identified: F12/1 (5 cm diameter, 145 g) and I6/5 (2.5 cm diameter, 15 g).

Finally, three complete spheroids from immediately below the plow zone in Mound 12 (K4, F. 24) were apparently an offering, probably emplaced during the Cherla phase (see Figure 4.23). All three are sub-spherical. Specimen 303589 is of white andesite (7.9 x 7.3 x 6.5 cm, 183.6 g). Specimen 303590 is also of white andesite (12.9 x 10.4 x 9.9 cm, 233.3 g). Specimen 303591 is of heavier gray andesite (15.3 x 14.6 x 9.4 cm, 309.7 g). These objects are distinctly larger than the spheres found in other contexts.

Ground stone spheres that do not appear to have been used for rubbing or polishing are reported from various Formative sites. Sometimes they are rare, as at Ceibal (with a single sub-spherical specimen; 4.3 x 4.6 cm [Willey 1978:93]). In other cases, they are relatively common, as at Chalcatzingo (56 specimens ranging from 2.5 to 5 cm in diameter [Grove 1987a:340–41]). Those Middle Formative specimens are similar in size to those from Paso de la Amada. At San José Mogote, ground stone spheres are smaller (1.0–2.17 m in diameter with an outlier at 3.8 cm). The San José Mogote artifacts, of travertine, limestone, and chalcedony, probably required more effort to make than the rhyolite and andesite spheres from Paso de la Amada. The uses of ground stone spheres are uncertain.

Ground Stone Rings

There are two fragments of what appear to have been ground stone rings (Figures 12.7a, 12.7f). The largest, from an Ocós deposit in Mound 12 (provenience recorded as Md12 "T1B/C," which should be either "T1B/6" or "T1B/C F. 2"), had an outer diameter of 18 cm and an inner (hole) diameter of 10 cm. it weighs 219.5 g and constitutes 16 percent of a complete circular ring; if the original object was a full ring, it would have weighed 1.37 kg. The object is elliptical in cross section; the ellipse has a long axis of 4.7 cm and a short axis of 3.6 cm.

From the Locona-Cherla ground surface in Mound 1 (H9/25) there is a fragment of a ring 10 cm in diameter with a hole of 5 cm (101.3 g). It is elliptical in cross section; the ellipse has a long axis of 3.1 cm and a short axis of 2.6 cm. This second fragment constitutes 31 percent of a full ring; the original artifact would therefore have weighed 327 g.

Ground Stone Handle or Ring

A third ringlike form in volcanic rock is probably a fragment of a handle from some larger ground stone artifact rather than part of a complete ring (Figure 12.7c). The piece is from Mound 12 (F2/10, 303409). It is more highly polished than the two rings described above. The handle had an outer diameter of approximately 11 cm and an inner diameter of 6 cm, though it does not appear from the diameter chart to have been completely round. The key difference from the other two rings is a change in cross section between the two ends of the specimen: from basically circular at one end (3.2 x 2.9 cm) to oblong at the other (4.1 x 2.7 cm). The end with the oblong cross section may be from close to the join. The original object of which the handle was originally part remains unknown. Flannery and Marcus (2005:Figure 4.20a) illustrate a single-handled metate from San José Mogote.

Ground Stone Cylinders

There are two fragments of tiny ground stone cylinders or semi-cylindrical objects, both recovered in Cherla-phase platform fill. The fragment from Mound 1 J7/8 is made of pyroclastic (consolidated volcanic ash) and appears to be the end of a well-shaped cylinder (1.16 cm in diameter) that tapered somewhat toward the ends. The end itself is flat and 0.82 cm in diameter. The second piece, of andesitic basalt, is from Mound 12 T1E/3. It is 3.97 cm long, though one end is broken off. The form in this case is a more even cylinder (0.85 cm in diameter) and is only very slightly tapered at the ends; again, the end itself is flattened. Neither exhibits evidence of use wear.

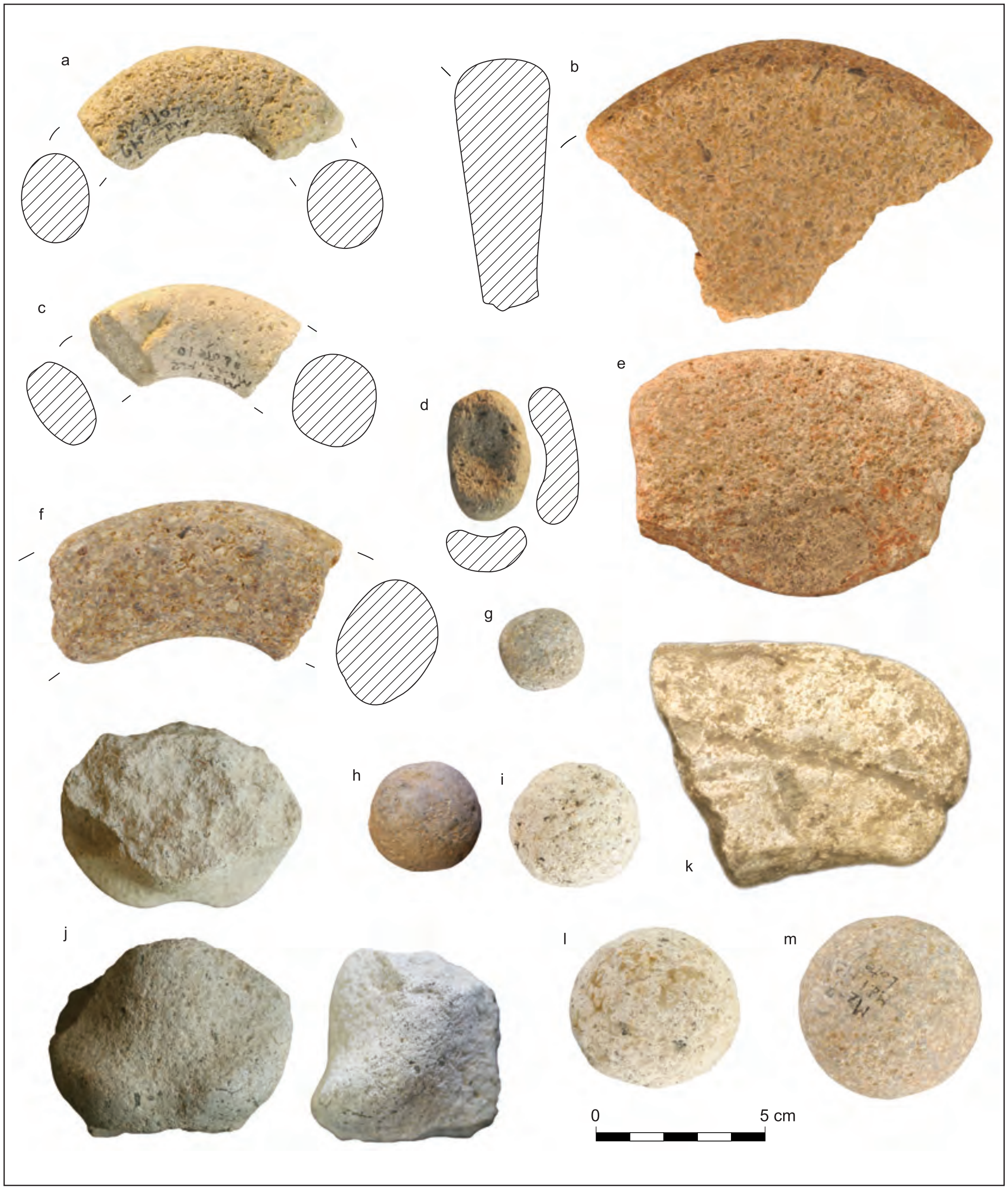


Figure 12.7. Miscellaneous ground stone artifacts: (a, f) stone ring; (b) highly polished slab metate (303467); (c) ground stone ring or handle; (e) metate-like stone with high polish in its center (303515); (g–i, l–m) ground stone spheres; (d) miniature ground stone receptacle; (j) small sculpture, probably anthropomorphic, shown in top, front, and side views; (k) sculpture fragment; a beak? Proveniences: (a) Md. 1 H9/25; (b) Md. 1 T1/1; (c) Md. 12 F2/10; (d) Md. 1 J13/9; (e) Md. 32 T1M/158; (f) Md. 12 T1B Ocós midden; (g) Md. 1 I6/5; (h) Md. 1 G9 Floor A Section 16; (i) Md. 1 L10/7; (j) Md. 12 T1A/4; (k) surface find; (l) Md. 12 T1E/20; (m) Md. 1 F12/1.

Minor Sculpture

Two fragments of small stone sculpture were recovered. (Note that there were also stone bowls, in one case with an effigy head; see Chapter 9.) A carved fragment of rhyolite (Figure 12.7j) is from the Ocós-Cherla ground surface underneath the Cherla platform in Mound 12 (Md. 12 T1A/4, 303234). It appears to be a torso fragment of an anthropomorphic sculpture that would originally have stood approximately 11 to 14 cm tall. The subject matter appears to be consistent with that of Xumay figurines (in ceramic) that depict seated, fat, masked individuals (Figure 16.2 l–n). The sculpture fragment is of the belly of a seated figure. The arms are schematically shaped (without any depiction of fingers or hands) and rest symmetrically on the belly.

A more enigmatic piece is a surface find from either Mound 40 or Mound 42, located to the west of Mound 7 (Lesure's fieldnotes, November 16, 1992). It is a broken fragment, 9.5 cm long and 8 x 6.5 cm in cross section, of what may be a beak or snout of a zoomorphic image (Figure 12.7k). The piece is probably Initial or Early Formative, but it is a surface find. Its actual date is unknown.

Perforated Ground Stone

A fragment of volcanic stone from Mound 1 (H11/1, 303401) is biconically perforated (Figure 12.8a). The surface of the artifact was also shaped, but the specimen is so badly broken that the original form remains unclear. The piece is fairly flat, with a maximum length of 6 cm and thickness of 1.7 cm.

Triangular-Shaped Stone

From the fill of the deep Locona pit at Mz-250 (5/48 F.1), there is a fragment of flat, soft, white stone shaped into an equilateral triangle with rounded points (Figure 12.8i). Looked at it from the edge, this piece has the appearance of a sandwich because a slot runs along much of the circumference of the piece. Close inspection suggests that the slot is not necessarily manufactured but instead corresponds to a thin bed or vein in the rock. This piece is unique in the collection, and its purpose is uncertain. One possibility is that it formed the backing for a costume component or mica mirror. One face bears blackened patches not present on the other face; they might be traces of adhesive. However, the surface itself is not particularly well smoothed.

Possible Foot of Ground Stone Mortar or Bowl

From Mound 12 E4/12 (303405) there is a small fragment of ground stone that may be the foot of a stone mortar or bowl (Figure 12.8b).

Highly Polished Ground Stone Artifacts

Specimen 303467 (GT-375), from Mound 1 T1/1, is a highly polished slab metate made of dense volcanic rock (density 3.1). It was circular and approximately 17 cm in diameter (Figure 12.7b). Maximum thickness toward the edges is 2.6 cm; minimum thickness toward the center is 2.0 cm. The polishing is very even and glossy across both faces. The edges are evenly pecked to form a well-shaped, circular artifact.

Two other pieces are not from such well-made tools, but they do have patches of glossy polish. Specimen 303515 (Figure 12.7e), from Mound 32 T1M/158, is a metate-like stone with high polish in its center, while 303429 (Mz-7-13), from Mound 1 K10/8, is another metate-like stone with high polish.

Miniature Ground Stone Receptacle

From Mound 1 J13/9 (303481) there is a complete miniature receptacle in lightweight, vesicular, volcanic rock (Figure 12.7d). It measures 4.0 x 2.4 x 1.7 cm and weighs 19.0 g. It is worked on all sides, with a flat base, rounded walls, and a shallow depression in its upper surface.

MISCELLANEOUS FLAKED STONE

Flaked stone other than obsidian was rare in the small-mound excavations. One biface and a tiny fragment of another were identified. An occasional flake and a few small cores attest to minor industries of chert, jasper, quartzite, and, basalt. There are also flakes of serpentine or metamorphic greenstone.

Obsidian Mirror Inlay

From a level of slope wash off the platform at Mound 32 (Md. 32 T1H/12), there is a small, round disk of obsidian (303115), 1.1 cm in diameter (shown in Figure 16.8e). The piece was first flaked to form the flat surfaces, then the edges were ground down to create an even, circular form. The use of this object, unique in the collection, is uncertain. My original idea was that it was part of a composite ornament, perhaps something like the greenstone turtle shown in Figure 11.2u. John Clark (personal communication), when shown this specimen for the first time, suggested that it looked like an inlay for the eye of a statue. We then tried it in the remaining eye of the Mound 32 statuette. It fits quite nicely. (See Figures 16.8c.) Although eyes inlaid with obsidian are generally understood as a later invention in Mesoamerica, Drucker (1952:159) describes a serpentine figurine from the 1943 excavations at La Venta (Figurine 12 from Tomb C) as originally having had obsidian inlays in the eyes: "Eyes are indicated by fairly deep elliptical pits; Wedel informs me that originally there was an obsidian (?) inset in one eye which was lost." No obsidian inlay is shown in the photo for the report of that season's work (Drucker 1952:Plate 52).

The obsidian mirror inlay from Paso de la Amada was recovered at Mound 32, but not from the same unit as the statuette. It was removed from the screen in Lot 12, the lowest of three arbitrary levels excavated through slope wash at the side of the platform. Sherds in Lot 12 were Locona and Barra. Those in lots above included Ocós and Jocotal. The underlying Lot 17 corresponds to the ancient ground surface beside the platform; sherds in that layer are mainly Locona with some Jocotal.

Figure 12.8. Miscellaneous stone artifacts: (a) biconically perforated ground stone; (b) foot of a stone mortar or bowl; (c) metallic crystal, likely arsenopyrite; (d–h) quartz crystals; (i) triangular shaped stone; (j) basalt biface; (k–l, s–t) pumice floats; (m–o) stone net weights; (p) hammerstone; (r) pebble paint palette; (u, w) pebble disks; (v) pyrite or iron ore chunk. Proveniences: (a) Md. 1 H11/1; (b) Md. 12 E4/12 F.2; (c) Md. 1 T1, above sand, 5/23/92; (d) Md. 12 I5/28; (e) Md. 1 J12/9; (f) Md. 1 H9/11; (g) Md. 1 H9/1; (h) Md. 12 T1E/11; (i) Mz 250 5/48; (j) Md. 1 I8/11; (k) Md. 1 I7; J7/5; (l) Md. 1 fill; (m) Md. 1 J9/18; (n) Md. 1 K10/7; (o) Md. 1 fill; (p) P32A/5b; (q) Md. 1 T3/1; (r) Md. 12 E3–4/19; (s) Md. 1 G10/1; (t) Md. 1 L9/6; (u) Md. 1 fill; (v) Md. 1 17/1; (w) P32B1/5.

Basalt Biface

A bifacially flaked scraping or chopping tool of basalt was recovered from Mound 1 I8/11 (303493). It may have been made from a mortar; there appears to be a small patch of the grinding surface preserved at one end (Figure 12.8j). The opposite end is one of the working edges. There is also a second working edge perpendicular to that.

Projectile Point Tang

Projectile points are basically absent from the stone artifact assemblage of Paso de la Amada. The one possible exception is a tiny fragment of a biface that Tom Wake pulled from the faunal remains. It appears to be the tang of a projectile point.

Chert, Quartzite, and Basalt Flakes

Seventy-four flakes or small chunks of chert, jasper, quartzite, basalt, or unidentified rock were registered. The chunks included three small cores, two of jasper and one of chert. Forty-eight specimens were from the Expanded Study Sample. From the Locona contexts at Mz-250 there was one basalt flake and eight unidentified flakes; the Locona midden at Mound 32 yielded one basalt flake. Late Locona specimens include one chert flake from the Pit 32 excavation and one basalt and two unidentified flakes from Mound 12. From an Ocós midden at Mound 32 there was one basalt flake and three flakes of unidentified stone. From the Ocós-Cherla ground surface under the Mound 12 platform there was one chert flake. In the Locona-Cherla ground surface under the Mound 1 platform, there were one basalt and three unidentified flakes in dispersed units. The redeposited midden in Zone IV of the overlying platform yielded nine basalt flakes, 10 chert flakes, and one quartzite flake, along with four flakes of unidentified stone.

Flakes of Serpentine or Other Metamorphic Stone

Sixty-three flakes of serpentine or other heavy metamorphic greenstone were recorded (see Table 12.4). They appear to include spalls generated during use of the metamorphic pecking stones described above. Others may have been intentionally produced. Either way, they could have served as tools with multiple potential functions.

CRYSTALS AND MINERALS

The inhabitants of Paso de la Amada occasionally transported minerals to the site. There are six quartz crystals, one crystal of a metallic mineral, and a piece of pyrite or iron ore.

Arsenopyrite

Jessica Jones tentatively identified the metallic crystal as arsenopyrite (Figure 12.8c). It is not magnetic. Its streak and hardness match that of arsenopyrite. This was an isolated find relatively deep in the Locona to Cherla ground surface in Trench 1 at Mound 1. It was at the bottom of Level 5, which mainly contained Locona sherds along with some Ocós and Cherla admixture. Deposition in the Locona phase is a distinct possibility. The arsenopyrite was near but not in the Locona pit Feature 8 in the same unit. However, if this piece was intentionally emplaced in a small hole, deposition in the Ocós phase (or even Cherla) is also a possibility.

Pyrite or Iron Ore

A fragment of pyrite or iron ore was identified among the pebbles studied in 2015 and was thus not available for examination by Jessica Jones (Figure 12.8v). It is from the surface layer at Mound 1 (I7/1, 303301). The piece was approximately in the form of a cube, but it is broken in half. It measures 2.7 x 2.4 x 1.5 cm and weighs 32.9 g.

Quartz Crystals

The quartz crystals are linear crystals with hexagonal cross sections (Figure 12.8d–h). They vary in length from 1.9 to 4.6 cm. Three of the six bear traces of red paint on three to four of six faces, giving them a pink glow in sunlight. From an Ocós level in the deep pit in Mound 12 (Md. 12 T1E/11 F.11), there is a crystal 3.5 cm long without any trace of red paint. From the Ocós-Cherla ground surface under the platform in Mound 12, there is a crystal 2.9 cm long with traces of paint on three of six faces. The other four crystals are from Cherla platform fill at Mound 1. A piece 1.9 cm long, partly shattered at one end, bears traces of red paint on three of six faces (Md. 1 J12/9). A piece 4.6 cm long has strong traces of red on one face, probable traces on two more, and possible traces on an additional face for a total of four of six faces painted. One end is broken, so the original piece was longer than 4.6 cm (Md. 1 H9/11). The final two crystals bear no traces of paint. One is a crystal 1.9 cm long from Md. 1 H9/1; the other is 2.9 cm long and from Md. 1 F11/1.

Clark (1988:188–89) noted the likely ritual use of quartz crystals at La Libertad. Brown (2000), in an interpretation of Structure 12 at Joya de Cerén (El Salvador), bolsters the case for considering such objects to be personal *sacra*, or divining tools. She reviews the ethnographic record from the Maya area and beyond and uses that evidence to interpret the enigmatic collection of found objects (including augite and biotite crystals) in Structure 12 at Cerén. It is likely that both the arsenopyrite and the quartz crystals from Paso de la Amada—neither of which occur naturally in the delta deposits in the vicinity of the site—were ritual objects and more particularly objects of personal ritual: divinatory devices, amulets, fetishes, or charms. It is interesting that two of the six objects were recovered from buried ground surfaces (in Mounds 1 and 12), contexts that, overall, contribute in a relatively minor way to the artifact collection under description here. It may be that the two pieces were intentionally buried by their owners as isolated objects. Although it is impossible to prove, that depositional pattern would be consistent with the identification of these as personal *sacra*.

MINIMALLY MODIFIED ROCK AND MISCELLANEOUS TOOLS

Pebble Net Weights

A relatively common find, particularly in Locona-phase deposits, are notched worked-sherd disks that we identify as net weights, following Coe (1961) and Ceja Tenorio (1985:105). Much rarer but very similar in form are stone examples manufactured from flat river pebbles (Figure 12.8n–o). There are four, all of andesite or basalt. They are similar in size to the ceramic net weights (3–4 cm long) but significantly heavier (21.5–43.8 g). One is from an Ocós midden at Mound 32 (Md. 32 3/242) and the others from the Cherla platform in Mound 1 (Md. 1 K10/7, Md. 1 J11/9, and Md. 1 unscreened fill).

Pebble Disks

Similar in form but without the notches are four pebble disks (Figures 12.8u, 12.8w). Four of the five are elliptical, almost round, measuring 3–3.5 cm across (10–20 g). They are flat, round pebbles, only slightly worked, if at all. One of andesite or basalt was among a few late Locona sherds that had worked their way into the pre-occupation substratum at the TP32 excavations (P32B1/5). Another, of rhyolite, is from the Locona-Ocós occupation layers off the platform at Mound 32 (T1M/162). A third, of andesite or basalt, is from the ground surface underlying the Cherla platform in Mound 1, in a unit with mainly Ocós sherds, along with some Cherla and Locona (Md. 1 F12/25). The fourth, of rhyolite, is from the fill of the Cherla platform (Md. 1 F12/5).

A fifth pebble disk of schist or soapstone (Mound 1 unscreened fill) is longer than the others (6.3 x 3.5 cm) (Figure 12.8u).

Notched Pebble

Another notched pebble, from Md. 1 J9/18 (303482), differs from those just identified as net weights in shape, weight, and workmanship (Figure 12.8m). It is heavier and less flat than the stone or ceramic net weights (71.5 g). It is also quite roughly finished. The notches seem intended to allow suspension of the rock by a string, but the purpose of the device is unknown.

Paint Palette

A pebble used as a miniature paint palette comes from a late Locona midden in Mound 12 (Md. 12 E3–4/19, 303242). The pebble, just 5 cm in diameter, is rounded on one side and flat on the other (Figure 12.8r). It is stained with dark red paint in the center of the flat surface (10R3/4, dusky red). Considering the small amount of paint that would have fit on this object, use in the painting of figurines seems most likely. Those artifacts often have touches of red paint, for instance on the shoulders and breasts of young female figures.

Pumice Floats

Eight pumice artifacts were probably floats (Figures 12.8k–l, 12.8s–t). They are grooved and perforated for attachment to a fishing line or net. Given their relatively small size (5–6 cm long and 1.3–2.5 cm thick), use as a bob on a fishing line seems likely. See Chapter 15 for fishhooks. All of the identified floats come from the platform in Mound 1 (see Table 12.8). Some have also been used as expedient abrading tools.

Small Pebbles: Slingshot Projectiles?

Given that rocks do not occur naturally in the river-laid silts and sands at Paso de la Amada, even pebbles must have been transported to the site by the ancient inhabitants. Some pebbles bear evidence of use for polishing, but others have no traces of such use. Thirty-seven pebbles from the small-mound excavations are proposed as slingshot projectiles. They range in diameter from 2.3 to 5.3 cm and in weight from 8 to 67 g. There are 22 from Mound 1 (mostly from Zones III and IV of the platform fill), 12 from Mound 12, and three from the Pit 32 excavations. Clark (1988:180–82) notes that Spanish conquistadors in Chiapas record the use of slingshots, and he identifies 15 pebbles from La Libertad as possible projectiles. Note also that stone projectile points are virtually absent from the artifact assemblage at Paso de la Amada, so use of the sling seems likely.

Fire-Cracked Rock

Fire-cracked rock, generally basalt, andesite, or granite, was relatively abundant at Paso de la Amada. All rocks must have been brought to the site by the human inhabitants, since rock does not occur there naturally. Many fragments of grinding stones, particularly small metate fragments, appear to also be fire-cracked, suggesting that they ended their use lives as cooking stones. In the excavations reported here, 5,506 fragments totaling 196 kg were registered. The overall average weight per fragment was 35.6 g. Data from several units are missing. Those units include several of the test pits excavated in 1990 and multiple units of Lots 9 and 10 at Mound 1.

These "thermolithics" were probably used to cook food either by roasting in pits or boiling in containers (Clark et al. 2007:29). Use as boiling rocks seems more likely given the absence of rock-filled roasting pits among the features recovered, an argument that Voorhies and Gose (2007:57) make for fire-cracked rock from the Middle Archaic site of Cerro de las Conchas. At one point during our fieldwork in Mazatán, Ronald Lowe tried boiling water with fire-heated cobbles from the Coatán River (likely the same source used by the inhabitants of the site). The water boiled readily enough but became quite dirty with soot and ash.

Clark and colleagues in the Mazatán zone and Rosenswig in the Cuauhtémoc zone have documented a decline in frequencies of grinding stones in refuse deposits over the course of the second millennium BC (Clark and Gosser 1995:215; Clark et al. 2007:28–31; Rosenswig 2006:340–41). That finding was based on the volumetric density of fire-cracked rock, which in those studies was contrasted with an increase in the proportion of plain tecomates (probable cooking pots) in the pottery assemblage (e.g., Clark et al. 2007:Figure 3.4). The implication drawn from those data was that Archaic cooking practices changed *gradually* over the course of the Initial and Early Formative as roasting and/or boiling by placement of heated rocks in containers gave way to direct heating of vessels placed over a fire.

The same basic pattern is observed in the refuse deposits reported here. Relevant data are presented in Table 12.9. When rock is standardized by weight of sherds, there is a general decline in rock over the sequence. The final column, the percentage of rock in the combined weight of fire-cracked rock and sherds, is an effort to get around some of the problems with standardization by weight of sherds and volume excavated. This statistic is an approximation of the importance of fire-cracked rock among all the artifacts recovered from a given set of strata.

Overall, the pattern in refuse samples from the small-mound excavations is for a falloff in discard of fire-cracked rock from Early Locona (1700–1650 BC) to Cherla (1400–1300 BC). This is consistent with patterns previously noted by Clark et al. and Rosenswig. In contrast to the data originally presented by Clark, those in Table 12.9 suggest a sharp decline in the Initial Formative (Early Locona to Locona) followed by more gradual, continued decline from Locona through Cherla. Note, however, that Rosenswig's (2006:Figure 4A) data suggest greater stability from Barra to Ocós and a more dramatic descent from Ocós to Cuadros. Further, Clark et al. (2007) note that fire-cracked rock was common at Cuadros-phase Cantón Corralito, a pattern they suggest may be related to the non-local ethnicity of the inhabitants of the site.

Table 12.9. Fire-cracked rock (FCR) through time

Phase	Count of FCR	Weight of FCR (kg)	Average Weight of Individual Specimens (g)	Weight (kg) of FCR Standardized by Weight of Sherds (kg)	Volumetric Density of FCR (kg/m3)	Volumetric Density of Sherds (kg/m3)	FCR as Percentage of Total Weight of FCR plus Sherds
Early Locona	139	6.57	47.3	0.52	3.02	5.82	34
Md32-surface	69	1.89	27.4	0.55	0.24	0.45	35
Md32-platform	114	4.04	35.5	0.25	0.46	1.83	20
Locona	528	21.20	40.1	0.12	0.74	6.23	11
Late Locona	473	24.71	52.2	0.07	1.35	19.21	7
Ocós	379	17.54	46.3	0.03	0.57	21.12	3
Md12-IV	188	5.70	30.3	0.03	0.44	15.52	3
Md1-IV	230	9.17	39.9	0.09	0.55	6.30	8
Cherla	846	25.22	29.8	0.02	0.75	39.27	2

Note: Refuse samples excluded due to missing FCR data: Locona: 0199B; Late Locona: 1260B, 1290C; 6Md12-IV: 1291C, 1293B; Cherla: 0004A, 0129B, 0131B, 0136N, 0139B, 0141N, 0143B, 0145B, 0148B, 0149C, 0150C, 0155N, 0157C, 0158C, 0159C, 0160C, 0162N, 0164N, 0166C, 0167N, 1302A.

CHAPTER 13

Carbonized Botanical Remains

Richard G. Lesure

THE PRESERVATION of carbonized botanical remains at Paso de la Amada is quite poor. The results of flotation from the 1997 excavations at Mound 32 and Mz-250 were analyzed by Virginia Popper and included in a previous report (Popper and Lesure 2009). Six samples from Mound 32 totaling 115 liters yielded one *Zea mays* cupule, 13.1 g of wood charcoal, and a parallel-sided but otherwise unidentifiable plant part. Six samples from Mz-250 totaling 92.25 liters yielded 0.24 g of nut fragments and 6.46 g of wood charcoal.

In 2010, an additional 10 samples of sediment that had been sitting in storage since the 1992–1997 excavations were processed. Those included eight samples from Mound 12 totaling 54.6 liters, a single sample from Mound 32 of 5 liters, and a small, 1-liter sample from Mz-250. The light and heavy fractions were reviewed at the New World Archaeological Foundation in San Cristóbal by Artemio Villatoro Alvarado. No additional charcoal was recovered from these samples.

Apparently, some characteristic of soils at the site has led to pervasively poor preservation of charcoal. Shell is likewise badly preserved, whereas bone is in many cases in much better shape.

CHAPTER 14

The Faunal Remains of Paso de la Amada

Thomas Wake, Katelyn J. Bishop, and Richard G. Lesure

GIVEN THE ABUNDANCE and diversity of faunal remains at sites such as Aquiles Serdán and Paso de la Amada, Blake et al. (1992a) suggested that consumption of wild animals—particularly fish—played a significant role in Early Formative subsistence and provided the economic basis for the emergence of hereditary inequality (see also Clark and Blake 1994). The primary goal of this chapter is to explore the role of animal resources in subsistence at Early Formative Paso de la Amada, with particular attention to any changes in adaptation or resource base from the Locona through Cherla phases. Topics considered include diet breadth, the range of habitats exploited, and whether human exploitation caused pressure on the wild resource base. We note the importance of domestic dog (*Canis lupus familiaris*) as a food source early in the occupation and consider the frequencies of animals that might have been preferentially hunted in agricultural fields. Beyond subsistence, we present the limited available evidence on the social and ritual use of animals.

A NOTE ON CONTEXTS AND PRESERVATION

Although the sample of identified vertebrate remains from Paso de la Amada is quite large, it is uneven in several senses. First, it is unevenly distributed through space and time due to excavation strategies focused on architecture, the complex histories of the excavated mounds, and varying conditions of preservation. Second, the samples from different phases are unevenly distributed among different sorts of deposits, including middens, trash-filled pits, buried occupation surfaces, and platform fill. Third, although mesh size was almost always 0.5 cm, one extraordinary deposit in Mound 6 (Unit E28, Levels 16–18) was screened through a fine mesh, leading to the recovery of thousands of tiny fish bones. That unit (referred to as the Ocós Oven) proves difficult to compare to the others and will be considered separately here. Fourth, in the case of the huge collection from the redeposited Cherla midden in the platform fill at Mound 1, only a portion of the available samples were fully identified in some units. (Mammals, reptiles, and amphibians were identified but fish were not.) Incompletely studied units are left out of most of the analyses in this chapter. One final thing to note about the Mound 1 fill deposits: it is clear that the faunal samples from this deposit have been homogenized by redeposition. There is less variation among individual proveniences than we find in the intact secondary refuse deposits at, for instance, Mound 12.

Table 14.1 gives an overview of the analyzed assemblage, split by excavation locale and phase. The unevenness in the sample sizes from different locales is evident. In most of the analyses for this chapter, Barra and Late Locona are included with Locona. The resulting Locona sample is dominated by materials from Mounds 6 and 12, a pattern that holds even more strongly for the Ocós sample. The Cherla sample is overwhelmingly from the redeposited, high-status midden in Mound 1. The Ocós-Cherla sample is mainly from the ground surface under the Mound 1 platform, a mixed deposit with Ocós, Cherla, and some Locona.

The column labeled “No Phase Designation” includes both incompletely studied units from Mound 1 (for which a phase is actually known) and mixed units that for a variety

Table 14.1. Identified bone specimens, split by excavation locale and phase

Excavation Locale	Analysis	Barra	Locona	Late Locona	Ocós	Ocós Oven (fine-screened)	Ocós- Cherla	Cherla	No Phase Designation	Total	Identified Specimens per Sherd[a]
Md. 1	full		144				2777	10,866	105	13,892	0.23
	incomplete								2729	2729	
Md. 5	full	184	345						187	716	
Md. 6	Fine screen					13,077				13,077	
	full		1488		2818				116	4422	
	dog burial[b]								727	727	
Md. 12	full		301	1105	4309		539		73	6327	0.07
Md. 14	full		82							82	0.04
Md. 21	full		36						99	135	0.02
Md. 32	full		75		221			54	23	373	0.02
	from burial[c]				52				38	90	
Mz-250	full		89							89	0.07
Trench 1B	full							356		356	0.10
Phase Total		**184**	**2560**	**1105**	**8127**	**13,077**	**3316**	**11,276**	**3370**	**43,015**	

[a] Calculated on Locona through Cherla columns only, and only on samples for which full analysis is available. Sherd counts were not available for Mounds 5 and 6.

[b] This dog burial, from Mound 6 Unit 48N74E, Level 5, was transported to Los Angeles with the rest of the fauna; it is not incorporated into the analyses in this chapter.

[c] Human bones from Mound 32 T4F/197 and Unit 2/231 appear to be from Mound 32 Burial 1. They were transported to Los Angeles with the fauna but were not studied by Kristin Hoffmeister for Chapters 23 and 24.

of reasons were deemed not appropriate for inclusion in the analyses of this chapter. The column "Identified Specimens per Sherd" gives a sense of the differential preservation of bone among the excavated locales. Higher values indicate better preservation of bone. Preservation was best at Mound 1 and comparatively poor at Mounds 21 and 32. The worst preservation conditions for bone were in the Pit 32 excavations (south of Mound 1). That excavation yielded no analyzable animal bones. Despite better preservation of bone in Mound 1, bones particularly of larger animals were more fragmentary in the tertiary context of the platform fill than in other contexts.

MATERIALS AND METHODS

Animal bones from the excavations reported in this volume have been under analysis at UCLA since 1997. Fifteen years later, bones from the 1985–1993 seasons at Mound 6 arrived as well. A substantial amount of bone from Mound 6 and from the platform fill in Mound 1 remains unanalyzed. Bone from the heavy fractions of flotation samples is still at the laboratory of the New World Archaeological Foundation in San Cristóbal de Las Casas, also unanalyzed. The Ocós Oven sample from Mound 6 (Unit E28, Levels 16–18) was screened by Blake through a fine mesh; the exact size of the mesh has not been reported to the authors of this chapter. That context is described by Blake (1991:38–40). Previous publications on Paso de la Amada fauna have considered subsets of the current sample (Lesure et al. 2009a; Lesure and Wake 2012; Steadman et al. 2003; Wake 2004a, 2004b), augmented here particularly by analysis of selected units from Mound 6.

Wake identified the fish, amphibians, reptiles, and mammals. Identifications were confirmed using comparative vertebrate osteological collections housed in the Cotsen Institute of Archaeology Zooarchaeology Laboratory at UCLA, the UCLA Department of Biology, and the Los Angeles County Museum of Natural History. David Steadman identified an initial set of bird bones at the Florida State Museum (Lesure et al. 2009a; Steadman et al. 2003). Katelyn Bishop identified more bird bones during her MA work, using the Donald R. Dickey Bird and Mammal Collection at UCLA as well as the comparative collections at the Cotsen Institute Zooarchaeology Laboratory (Bishop 2014; Bishop et al. 2018). Barry Brillantes measured fish vertebrae for his undergraduate honors thesis (Brillantes

2011). John Dietler analyzed a sample of crab for comparison with the nearby estuary site of El Varal (Dietler and Wake 2009); other crab remains have not been analyzed. Shellfish remains are present at Paso de la Amada but in terrible shape: they consist basically of shell crumbs. Bishop and Lesure have reviewed some of the bags of shell and identified the most common taxa with the aid of a comparative collection of archaeological specimens assembled by Alina Gagiu after her analysis of the El Varal shells (Lesure et al. 2009b). Overall, at Paso de la Amada, vertebrate remains far exceed invertebrate remains; in many samples, invertebrate remains were entirely absent.

During analysis, attempts were made to refit bones within a given minimal provenience; occasionally, for larger bones, refitting efforts extended to adjacent proveniences. Information recorded included taxonomy, skeletal element, portion of the bone present, side of body, alteration to the bone (burning, cut marks), and, where possible, age of the individual (juvenile versus adult). Most but not all of the fully analyzed collection was weighed (94 percent). Only fully analyzed, fully weighed samples were used in the calculation of estimated biomass (described below).

In the Excel file that forms the basic dataset, several variables were created to filter subsamples for detailed analysis. The variable "Analysis" distinguishes analyzed units ("full"), incompletely analyzed units for which identifications of fish are not available ("incomplete"), the fine-screened Ocós Oven deposit from Mound 6 ("fine screened"), and bone considered to come from a burial of either a person or a dog ("burial"). The variable "Bone Weight" designates whether bones in the sample to which a given row belongs were weighed (yes or no). Finally, the variable "Bone?" allows separation of bones and teeth from shells or scales of various kinds. The latter are present in the case of only a few species, and their inclusion or exclusion rather significantly affects NISP and, potentially, estimated biomass. In particular, there are 2,362 gar scutes in the fully analyzed sample but just 317 identified bones. Likewise, there are 1,240 fragments of armadillo osteoderms but just 27 identified bones. The issue was less dramatic for turtles (since their shells are composed of fewer constituent elements): 262 bones and 240 shell fragments.

Throughout this chapter, our analyses rely on two standard zooarchaeological measures: number of identified specimens (NISP) and minimum number of individuals (MNI). NISP is a simple count of specimens identified as belonging to the most discrete taxon possible. MNI is a derived measure that calculates the minimum number of individuals reflected in the skeletal elements identified to a given species. MNI was calculated as the greatest number of a left- or right-paired element or the greatest number of an unpaired element, whichever was greater. The assemblage was divided by mound, then further by phase within each mound, and MNI was calculated within these groups. MNI was calculated only for specimens identified to the taxonomic level of species and for specimens identified to the level of genus when those genera were unique and not represented by specimens identified to a species within the same time/mound context. Osteoderms representing crocodilians and armadillos (*Dasypus novemcinctus*) and ossified ganoid scales of gar (*Atractosteus tropicus*) were excluded from MNI calculations. When certain snake and fish taxa were represented by an abundance of vertebra, MNI was calculated by counting the total number of vertebra in a comparative specimen of the same species and dividing the specimen count by the expected count.

To assess the relative dietary contribution of different taxa, we use a method described by Reitz and Wing (2008:66–69, 237–39) to estimate original sample biomass from the weight of archaeological bone specimens. The allometric formulae take the form $Y = aX^b$, where X is the observed specimen weight, Y is the corresponding original biomass, and a and b are constants that need to be empirically determined by class (or lower-order taxon). Wake et al. (2004:181–96) have used this approach to estimate original biomass for vertebrate fauna from Archaic-period sites in the Soconusco, and Peres et al. (2010) use it in an analysis of Formative fauna from Tres Zapotes.

We derive appropriate values of a and b for mammals, birds, turtles, snakes, and various aquatic taxa (Chondrichtheyes, Siluriformes, Perciformes, Serranidae, Sciaenidae, Pleuronectiformes, and other bony fishes, the Actinopterygii) from Reitz and Wing (2008:Table 3.4; note that the values for a in that table are actually values of Log(a), something the authors fail to mention). Colaninnu (2010:Appendix E) provides values of b and Log(a) for Alligatoridae. Those are extremely close to the snake values from Reitz and Wing (2008), a point that has prompted us to extrapolate the Alligatoridae values to iguanas and other lizards. There remained only the toads and frogs, which, except for *Rhinella marina* (formerly *Bufo marinus*), compose a negligible part of the assemblage. Reitz and Wing (2008:238) note that no allometric formula is available. For *Rhinella* sp. in their hypothetical collection, they use the simple method of dividing a known body weight (20.5 g) by the associated skeletal weight (4.4 g) and using that as a factor to convert archaeological specimen weights to estimated biomass. We use that method in the case of *Rhinella marina*/*Rhinella* sp. and other amphibians (the latter representing a tiny fraction of the full bone assemblage).

Contrary to suggestions by Wing (1980:378) and Peres et al. (2013:117) for Gulf Coast assemblages, we think *Rhinella* sp. may have been a food source in the Locona and Ocós phases at Paso de la Amada due to the fact that their toxic secretions containing bufotenine occur only in the skin. Once skinned, rinsed, and cooked they can be eaten. Lever (2001:32) reports consumption of cane toads by the Campa, a native group in the Amazon region of Peru. The Australian Broadcasting Corporation recently touted the edibility of the species (https://www.abc.net.au/news/2014-11-11/academic-wants-us-to-eat-cane-toads/5882986).

The values of a and b for turtles appear to be determined assuming inclusion of shell fragments, and Tanya Peres (personal communication to Lesure, 2017) reports that she included those in the analysis of the Tres Zapotes fauna. However, in the case of gar and armadillo, we use generic formulae (for bony fish and mammals, respectively), both calculated overwhelmingly on the basis of animals that would not yield scale/shell fragments. In these cases, we have left the scale/shell fragments out of the calculation of estimated biomass.

Calculation of diversity and equitability measures (described below in the section on diet breadth) required considerable work on the taxa list presented in the next section. To produce the list for analysis, we followed three principles: (1) to use the most specific identifications possible, (2) to avoid artificial inflation of taxa that would result from including a given higher order identification (say, *Chelonia* sp.) as a separate taxon when the identified specimens could pertain from a more specific identification (*Chelonia agassizii*), and yet (3) to avoid as much as possible the discard of the data in those higher-order identifications. These were often competing principles, and it is possible that in some instances other investigators would have made different decisions. We first deleted all identifications higher than the family level (Mammalia, Teleostei, and so on) and then sorted by family and phase and consolidated or eliminated lines as necessary. In a given family, where there was just one species identified and also an identification at a higher level (to genus or family), we assumed that the latter was part of the former and merged the values rather than deleting the higher-order counts. Where, instead, there were at least two genera identified and also a more general identification to family, the basic rule was to eliminate the latter. However, particularly among the fish, that rule conflicted with our third principle, namely to avoid discarding large amounts of frequency data. We have considered several of the most common fish at the family level in the biomass calculations.

For the biomass estimates, unusually large, heavy bones that are outliers in terms of individual bone weight can greatly affect the calculations. Two such outliers in the assemblage have been removed from all biomass calculations unless otherwise indicated: most of a dog neurocranium from Locona-phase Mz-250 4/25 (184.17 g) and a caiman (*Caiman crocodilus*) cranium (posterior) from Ocós-phase Mound 12 T1E/9 (96.68 g).

To assess the quality and structure of the fishery by phase, we determined the mean trophic level (MTL) represented by the identified piscine specimens for each subassemblage. Following Wake et al. (2013:1025) and Wake and Voorhies (2015:153), we determined the mean trophic level of the fishery represented in the different occupational periods at Paso de la Amada by referring to FishBase (Froese and Pauly 2018) for trophic levels of each identified taxon, multiplied this value by the MNI per taxon, added up all TL(MNI) values per taxon, and divided the resulting total by the total number of individuals for all identified taxa per occupational period.

OVERVIEW OF THE ASSEMBLAGE

Among the 43,631 identified specimens from Paso de la Amada, there are 146 identified genera and 127 distinct species in 95 families of crustaceans, fish, amphibians, reptiles, birds, and mammals (Table 14.2). Four families, genera, and species of crustaceans, all crabs, are identified.

Fish are the most numerous and diverse class of vertebrates represented, with 44 genera and 42 species representing 28 families, including both cartilaginous (Elasmobranchiomorphii—two genera, species, and families) and ray-finned (Actinopterygii—42 genera, 40 species, 26 families) species. Identified mammals are the second most numerous class of vertebrates recovered from Paso de la Amada, including 26 genera and 21 species representing 17 families. Reptiles follow the mammals in terms of numerical representation, except in the Locona phase, and include 23 genera and 15 species representing 12 families. Amphibians are represented by six genera and three species in six families and are more common than reptiles only in the Locona phase. Birds are quite diverse, represented by 47 genera and 46 species in 27 families, but numerically they represent the rarest vertebrate class.

Fish Remains by Phase

Fish bone specimens constitute the greatest percentage of vertebrate bone in each phase. Sea catfish, gar, sleepers, and cichlids (Ariidae, Lepisostidae, Eleotridae, and Cichlidae, respectively) are the most common fish families in all phases in terms of percent NISP. With the exception of the Ariidae, the most common ray-finned fish families identified from Paso de la Amada prefer fresh- or low-salinity water. Ariid sea catfish are found in a much wider range of relative salinity waters from the sea, through estuaries and into rivers.

The relative frequencies of certain fish families vary over time. The Locona phase has a somewhat more even distribution of fish families, with five families constituting approximately 85 percent of the NISP (Ariidae, Lepisosteidae, Eleotridae, Cichlidae, and Centropomidae), compared to four families in Ocós, three in the Ocós-Cherla sample, and just two (Ariidae and Eleotridae) in Cherla. Representation of gar declines in Ocós-Cherla and plummets in Cherla.

Amphibians and Reptiles by Phase

Amphibians constitute 5.5 percent of the vertebrate assemblage in Locona and diminish to 1.4 percent and 0.3 percent in the Ocós-Cherla and Cherla samples, respectively. The most common amphibian species overall at Paso de la Amada is the marine toad. Marine toads are especially

Table 14.2. Identified fauna of Paso de la Amada. Note that the table continues for eight additional pages.

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*
Invertebrates																	
biting fiddler crab	*Uca mordax*					1	***1***									1	***1***
princely fiddler crab	*Uca princeps*									1	***1***	1	***1***			2	***2***
fiddler crabs	*Uca* sp.					2	***2***									2	***2***
warrior swimming crab	*Callinectes bellicosus*													1	***1***	1	***1***
swimming crab	*Callinectes* sp.			2	***1***	7	***4***			34	***3***	129	***14***	65	***15***	237	***37***
terrestrial crabs	*Sesarma* sp.					1	***1***									1	***1***
mangrove crab	*Ucides occidentalis*					2	***1***			5	***2***	5	***1***	62	***1***	74	***5***
decapods	Decapoda					3				8		25		137		173	
shell	shell													544		544	
Total Invertebrates		**0**	***0***	**2**	***1***	**16**	***9***	**0**	***0***	**48**	***6***	**160**	***16***	**809**	***17***	**1035**	***49***
Fish																	
bull shark	*Carcharhinus leucas*					1	***1***					2	***1***			3	***2***
sharks	*Carcharhinus* sp.			8	***2***	4	***2***					2	***2***	1	***1***	15	***7***
spotted eagle ray	*Aetobatus narinari*											2	***1***			2	***1***
cartilaginous fish	Elasmobranchii											2				2	
tropical gar	*Atractosteus tropicus*	5	***1***	412	***8***	1502	***4***	43	***1***	587	***2***	159	***4***	20	***8***	2728	***28***
machete	*Elops affinis*							2	***1***	1	***1***	5	***1***			8	***3***
sardines	Clupeidae			5		1										6	
anchovies	Engraulidae							2								2	
anchovies and sardines	Clupeiformes			9				23								32	
headstanders	*Roeboides* sp.							8	***2***							8	***2***
characins	Characidae							5								5	
blue sea catfish	*Ariopsis guatemalensis*	2	***1***	5	***4***	22	***5***			27	***4***	198	***18***	3	***2***	257	***34***
tete sea catfish	*Ariopsis seemanni*											1	***1***			1	***1***
sea catfish	*Ariopsis* sp.			21	***8***	50	***12***			11	***3***	1631	***142***	5	***4***	1718	***169***
congo sea catfish	*Cathorops fuerthii*			1	***1***							6	***3***			7	***4***
sea catfish	*Cathorops* sp.			2	***2***	9	***3***	1	***1***	4	***1***	24	***6***	3	***1***	43	***14***
chili sea catfish	*Notarius troschelii*					2	***2***					2	***2***	1	***1***	5	***5***
sea catfish	*Notarius* sp.											1	***1***			1	***1***
cominate sea catfish	*Occidentarius platypogon*					5	***1***			1	***1***	50	***9***			56	***11***
sea catfishes	Ariidae	4		204		433		24		428		1799		51		2943	
Guatemalan chulín	*Rhamdia guatemalensis*							31	***3***			1	***1***			32	***4***

Table 14.2. Identified fauna of Paso de la Amada *continued*

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*
catfish	Siluriformes							20								20	
Walter's toadfish	*Batrachoides waltersi*									1	1	1	1			2	2
striped mullet	*Mugil cephalus*	1	1													1	1
white mullet	*Mugil curema*	3	1	2	1							10	1			15	3
mullet	*Mugil* sp.	1	1	14	4	73	3	2	1	19	1	70	4			179	14
mullets	Mugilidae							90								90	
neotropical silversides	Atherinopsidae					6		47								53	
silversides	Atheriniformes							1								1	
livebearers	*Poeciliopsis* sp.			3	1	1	1	127	3							131	5
tooth-carps	Poeciliidae			9		14										23	
needlefish	*Strongylura* sp.					4	2			1	1	2	1			7	4
needlefishes	Belonidae							2								2	
marbled swamp eel	*Synbranchus marmoratus*			8	2	19	3			4	1	80	3	3	1	114	10
armed snook	*Centropomus armatus*							13	3							13	3
blackfin snook	*Centropomus medius*					1	1					1	1			2	2
black snook	*Centropomus nigrescens*			1	1	2	1					12	5			15	7
yellowfin snook	*Centropomus robalito*			2	1	1	1					2	1			5	3
union snook	*Centropomus unionensis*											3	3			3	3
white snook	*Centropomus viridis*					1	1					1	1			2	2
snook	*Centropomus* sp.	5	1	35	11	42	5	76	9	20	9	109	15	6	2	293	52
grouper	*Mycteroperca* sp.			1	1							3	1			4	2
green jack	*Caranx caballus*											1	1			1	1
Pacific crevalle jack	*Caranx caninus*											2	1			2	1
jacks and trevallies	*Caranx* sp.			3	2	3	1	1	1			20	1			27	5
Pacific bumper	*Chloroscombrus orqueta*			3	1	13	5	8	1	2	2	5	3			31	12
longjaw leatherjacket	*Oligoplites altus*					1	1					2	1			3	2
leatherjackets	*Oligoplites* sp.			1	1			3	1	3	1	6	1			13	4
pompano	*Trachinotus* sp.											4	1			4	1
jacks et alia	Carangidae											6				6	
yellow snapper	*Lutjanus argentiventris*											3	1			3	1
Jordan's snapper	Lutjanus jordani											6	3			6	3
Pacific dog snapper	*Lutjanus novemfasciatus*			9	1							2	1			11	2
blue and gold snapper	*Lutjanus viridis*					1	1									1	1
snappers	*Lutjanus* sp.	2	1	27	8	24	4	2	1	19	4	70	8	5	3	149	29

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***
sargo	*Anisotremus* sp.					5	***1***			1	***1***					6	***2***
scale-finned grunt	*Haemulon* sp.					1	***1***					1	***1***			2	***2***
raucous grunt	*Haemulopsis leuciscus*											1	***1***			1	***1***
longspine grunt	*Pomadasys macracanthus*			2	***2***	12	***2***			11	***1***	16	***2***	2	***1***	43	***8***
grunt	*Pomadasys* sp.	1	***1***	23	***6***	24	***2***			6	***1***	26	***5***			80	***15***
grunts	Haemulidae			2				15				11				28	
Peruvian mojarra	Diapterus peruvianus											6	***6***			6	***6***
mojarra	*Eucinostomus* sp.					41	***4***					1	***1***			42	***5***
black axillary mojarra	*Eugerres axillaris*			1	***1***	4	***2***									5	***3***
mojarra	*Eugerres* sp.											4				4	
yellow fin mojarra	*Gerres cinereus*	2	***1***	15	***4***	26	***3***	4	***1***	28	***6***	44	***10***	2	***2***	121	***27***
mojarras	Gerreidae					39		20				13				72	
yellow bobo	*Polydactylus opercularis*					6	***2***									6	***2***
threadfin	*Polydactylus* sp.											3	***1***			3	***1***
swordspine croaker	*Bairdiella ensifera*											1	***1***			1	***1***
weakfish	*Cynoscion* sp.			4	***1***	3	***2***			2	***1***	6	***1***			15	***5***
croaker	*Micropogonias* sp.											2	***1***			2	***1***
Goode croaker	*Paralonchurus goodei*			1	***1***											1	***1***
croaker	*Paralonchurus* sp.									1	***1***					1	***1***
croakers	Sciaenidae			1								1				2	
blackthroat cichlid	*Amphilophus macracanthus*	4	***2***	1	***1***	31	***7***	103	***7***	8	***3***	38	***5***	1	***1***	186	***26***
three spot cichlid	*Cichlasoma trimaculatum*					5	***2***	54	***6***	1	***1***	3	***2***			63	***11***
cichlids	*Amphilophus/ Cichlasoma* sp.	18	***3***	86	***11***	173	***16***	2	***2***	61	***5***	144	***12***	2	***2***	486	***51***
cichlids	Cichlidae							1472				5				1477	
Pacific fat sleeper	*Dormitator latifrons*	2	***1***	201	***15***	255	***12***	1491	***35***	110	***4***	1561	***60***	30	***3***	3650	***130***
spotted sleeper	*Eleotris picta*			5	***3***	1	***1***	8	***1***	2	***1***	7	***2***	2	***1***	25	***9***
sleepers	Eleotridae											487				487	
river goby	*Awaous* cf. *banana*									2	***2***	1	***1***			3	***3***
gobies	Gobiidae			2		6		3								11	
normal-looking fish	Perciformes			2												2	
large-toothed flounders	*Etropus* sp.											1	***1***			1	***1***
flatfish	Pleuronectiformes							4								4	

Table 14.2. Identified fauna of Paso de la Amada *continued*

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*
bullseye puffer	*Sphoeroides annulatus*			1	*1*	1	*1*			2	*2*	1	*1*			5	*5*
pufferfishes	*Sphoeroides* sp.					2	*2*					2	*2*			4	*4*
ray-finned fishes	Teleostei	116		1243		2274		7765		799		2615		250		15062	
Total Fish		**166**	***15***	**2375**	***106***	**5144**	***120***	**11472**	***80***	**2162**	***61***	**9307**	***367***	**387**	***33***	**31013**	***782***
Class Amphibia																	
Mexican burrowing caecilian	*Dermophis mexicanus*									1	*1*			2	*1*	3	*2*
Mexican burrowing toad	*Rhinophrynus dorsalis*			9	*4*	11	*5*	4	*1*	5	*2*			7	*3*	36	*15*
toads	*Rhinella* sp.			5	*1*			1	*1*	2	*1*	20	*4*			28	*7*
cane toad	*Rhinella marina*	5	*1*	174	*16*	164	*16*			25	*4*	7	*2*	47	*8*	422	*47*
tree frogs	Hylidae					4										4	
robber frogs	*Craugastor* sp.							6	*1*							6	*1*
sabinal frog	*Leptodactylus melanonotus*			1	*1*											1	*1*
leptodactylid frogs	*Leptodactylus* sp.													1	*1*	1	*1*
pond frogs	*Rana* sp.					1	*1*					1	*1*			2	*2*
frogs	Anura unid.			22		17		7		11		4		4		65	
Total Class Amphibia		**5**	***1***	**211**	***22***	**197**	***22***	**18**	***3***	**44**	***8***	**32**	***7***	**61**	***13***	**568**	***76***
Class Reptilia																	
green turtle	*Chelonia mydas*											2	*1*			2	*1*
scorpion mud turtle	*Kinosternon scorpioides*			17	*4*	26	*2*			140	*2*	16	*3*	118	*3*	317	*14*
mud turtles	*Kinosternon* sp.			3	*2*	8	*2*			4	*1*	110	*1*	19	*3*	144	*9*
giant musk turtle	*Staurotypus salvinii*											1	*1*			1	*1*
painted wood turtle	*Rhinoclemmys pulcherrima*			1	*1*											1	*1*
Central American slider	*Trachemys grayi*			17	*4*	45	*3*			23	*2*	47	*3*	31	*5*	163	*17*
pond turtles	Emydidae											6		1		7	
turtles and tortoises	Testudinata					3				2		12		17		34	
basilisks	*Basiliscus* sp.			1	*1*	2	*2*									3	*3*
helmeted iguanas	*Corytophanes* sp.											1	*1*			1	*1*
anoles	*Anolis* sp.			3	*1*	1	*1*	2	*2*							6	*4*
black spiny-tailed lizard	*Ctenosaura similis*			2	*1*	14	*2*			2	*2*	11	*3*	10	*2*	39	*10*
green iguana	*Iguana iguana*			4	*4*	14	*2*			2	*2*	2	*1*	20	*3*	42	*12*
Iguana/Ctenosaura	*Iguana/Ctenosaura*			28	*3*	35	*2*			15	*2*	64	*3*	57	*2*	199	*12*

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
iguanas	Iguanidae													1		1	
jungle-runners	*Ameiva* sp.			3	1	2	1	3	1							8	3
whiptail lizards	*Aspidoscelis* sp.					2	1									2	1
whiptail lizards	Teiidae							1								1	
small lizards	Lacertilia, small			1												1	
lizards	Lacertilia			2		3						10		3		18	
boa constrictor	*Boa constrictor*			6	2	2	1	1	1	3	1			22	1	34	6
boas	Boidae											1				1	
Middle American indigo snake	*Drymarchon melanurus*			4	1	3	1			3	1	7	1	14	1	31	5
neotropical racer	*Drymobius* sp.									2	1			4	1	6	2
Salmon-bellied racer	*Mastigodryas melanolomus*					10	1					2	1	14	2	26	4
cf. racer snake	cf. *Mastigodryas* sp.					1	1									1	1
puffing snake	*Pseustes poecilonotus*			44	1							6	1	5	1	55	3
green rat snake	*Senticolis triaspis*					22	1									22	1
chicken snake	*Spilotes pullatus*									1	1	1	1			2	2
colubrid snakes	Colubridae			2		5				6		110		44		167	
nauyaca	*Bothrops asper*			1	1											1	1
Central American rattlesnake	*Crotalus simus*									1	1			1	1	2	2
vipers	Viperidae											1		3		4	
snakes	Serpentes			4				2		6		7				19	
spectacled caiman	*Caiman crocodilus*			3	3	15	2			1	1			15	1	34	7
American crocodile	*Crocodylus acutus*									1	1	5	1	3	2	9	4
crocodilians	Crocodilia			4		2				1		12		8		27	
reptiles	Reptilia					2						3		14		19	
Total Class Reptilia		**0**	**0**	**150**	**30**	**217**	**25**	**9**	**4**	**213**	**18**	**437**	**22**	**424**	**28**	**1450**	**127**
Class Aves																	
black-bellied whistling duck	*Dendrocygna autumnalis*					1	1							5	3	6	4
Muscovy duck	*Cairina moschata*					1	1							1	1	2	2
dabbling duck	*Anas* sp.			1	1	1	1							2	1	4	3
lesser scaup	*Aythya affinis*													1	1	1	1
ducks, geese, swans	Anatidae											1				1	
white-bellied chachalaca	*Ortalis leucogastra*									1	1	3	1	4	1	8	3
plain chachalaca	*Ortalis vetula*									1	1	2	1			3	2

Table 14.2. Identified fauna of Paso de la Amada *continued*

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
chachalaca	*Ortalis* sp.											2	1			2	1
northern bobwhite	*Colinus virginianus*											7	2	10	2	17	4
ocellated quail	*Cyrtonyx ocellatus*											2	1	1	1	3	2
spotted wood quail	*Odontophorus guttatus*													1	1	1	1
least grebe	*Tachybaptus dominicus*											1	1			1	1
pied-billed grebe	*Podilymbus podiceps*													1	1	1	1
Inca dove	Columbina inca			26	1							1	1			27	2
blue ground dove	*Claravis pretiosa*											2	1			2	1
ruddy quail-dove	*Geotrygon montana*													1	1	1	1
white-tipped dove	*Leptotila verreauxi*													2	2	2	2
mourning dove	*Zenaida macroura*									1	1	3	1			4	2
pigeons and doves	Columbidae											4				4	
lesser ground cuckoo	*Morococcyx erythropygus*									1	1					1	1
groove-billed ani	*Crotophaga sulcirostris*													1	1	1	1
common moorhen	*Gallinula chloropus*			1	1											1	1
least sandpiper	*Calidris minutilla*					1	1									1	1
terns	*Sterna* sp.											1	1			1	1
neotropic cormorant	*Phalacrocorax brasilianus*													2	1	2	1
brown pelican	*Pelecanus occidentalis*													2	2	2	2
bare-throated tiger heron	*Tigrisoma mexicanum*					1	1									1	1
great egret	*Ardea alba*					1	1									1	1
great blue heron	*Ardea herodias*													1	1	1	1
green heron	*Butorides virescens*			104	1	1	1					4	1			109	3
herons	Ardeidae									2				1		3	
turkey vulture	*Cathartes aura*											2	1			2	1
black vulture	*Coragyps atratus*											1	1			1	1
osprey	*Pandion haliaetus*			1	1							10	1			11	2
sharp-shinned hawk	*Accipiter striatus*			4	1											4	1
roadside hawk	*Buteo magnirostris*											4	1			4	1
harpy eagle	*Harpia harpyja*													1	1	1	1
raptors	Accipitridae			1						1						2	
barn owl	Tyto alba			1	1							1	1			2	2

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*	NISP	*MNI*
Lesson's motmot	*Momotus lessonii*													2	***1***	2	***1***
motmots	Momotidae											1				1	
ringed kingfisher	*Megaceryle torquata*					1	***1***									1	***1***
emerald toucanet	*Aulacorhynchus prasinus*											2	***1***			2	***1***
northern crested caracara	*Caracara cheriway*			11	***1***							3	***1***			14	***2***
orange-fronted parakeet	*Eupsittula canicularis*													1	***1***	1	***1***
military macaw	*Ara militaris*									1	***1***					1	***1***
white-fronted amazon	*Amazona albifrons*			1	***1***											1	***1***
yellow-headed/ naped amazon	Amazona oratrix/auropalliata					32	***1***									32	***1***
sulfur-bellied flycatcher	*Myiodynastes luteiventris*													3	***2***	3	***2***
kingbirds	*Tyrannus* sp.													1	***1***	1	***1***
rose-throated becard	*Pachyramphus aglaiae*											2	***2***			2	***2***
rusty sparrow	*Aimophila rufescens*													1	***1***	1	***1***
American sparrows	Emberizidae			1												1	
red-winged blackbird	*Agelaius phoeniceus*											1	***1***			1	***1***
great-tailed grackle	*Quiscalus mexicanus*					1	***1***					2	***1***			3	***2***
grayish saltator	*Saltator coerulescens*													1	***1***	1	***1***
small passerines	Passeriformes, small			2												2	
passerines	Passeriformes			1												1	
small bird	Aves, small			1						3		10		18		32	
medium bird	Aves, medium	1		8		1				2		4		20		36	
large bird	Aves, large			1		5				3				2		11	
bird	Aves	5		15		20		2		6		8		15		71	
Total Class Aves		**6**	***0***	**180**	***9***	**67**	***10***	**2**	***0***	**22**	***5***	**84**	***23***	**101**	***28***	**462**	***75***
Class Mammalia																	
common opossum	*Didelphis marsupialis*					2	***1***					7	***1***	3	***1***	12	***3***
opossum	*Didelphis* sp.			6	***4***	14	***4***			1	***1***	2	***1***	2	***1***	25	***11***
gray four-eyed opossum	*Philander opossum*					1	***1***			1	***1***			1	***1***	3	***3***
least shrew	*Cryptotis* cf. *parva*					3	***1***									3	***1***
nine-banded armadillo	*Dasypus novemcinctus*			9	***3***	1100	***2***			11	***2***	100	***1***	47	***3***	1267	***11***

Table 14.2. Identified fauna of Paso de la Amada *continued*

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***
mantled howler monkey	*Alouatta palliata*													1	***1***	1	***1***
ocelot	*Leopardus pardalis*			2	***1***					2	***1***			1	***1***	5	***3***
mountain lion	*Puma concolor*											1	***1***			1	***1***
jaguarundi	*Puma yagouaroundi*													1	***1***	1	***1***
small cat	Felidae, small			1												1	
cats	Felidae											1				1	
dog	*Canis familiaris*			52	***7***	90	***5***	1	***1***	26	***3***	15	***4***	761	***5***	945	***25***
wolves, dogs, coyotes	*Canis* sp.					4	***1***			3	***1***	10	***1***	4	***1***	21	***4***
gray fox	*Urocyon cinereoargenteus*					5	***1***					2	***1***	2	***1***	9	***3***
canid	Canidae					3										3	
long-tailed weasel	*Mustela frenata*									11	***1***	1	***1***			12	***2***
white-nosed coati	*Nasua narica*											2	***1***	1	***1***	3	***2***
raccoon	*Procyon lotor*			1	***1***					1	***1***	1	***1***	1	***1***	4	***4***
carnivores	Carnivora			1		1				1		3		6		12	
red brocket deer	*Mazama americana*											1	***1***			1	***1***
white-tailed deer	Odocoileus virginianus	4	***1***	31	***8***	27	***3***			11	***2***	27	***4***	65	***5***	165	***23***
deer	Cervidae											1				1	
collared peccary	*Pecari tajacu*			2	***2***	16	***2***			1	***1***	6	***1***	3	***1***	28	***7***
artiodactyl	Artiodactyla			4				4		2		7		2		19	
whales, dolphins, porpoises	Cetacea			1												1	
lowland paca	*Cuniculus paca*											1	***1***			1	***1***
variegated squirrel	*Sciurus variegatoides*									1	***1***					1	***1***
spiny pocket mouse	*Heteromys* sp.			1	***1***											1	***1***
giant pocket gopher	*Orthogeomys grandis*	1	***1***	32	***8***	68	***6***			54	***4***	43	***4***	43	***4***	241	***27***
rice rat	*Oryzomys* sp.	1	***1***	23	***5***	40	***8***	21	***1***	5	***2***	3	***1***	18	***7***	111	***25***
deer mouse	*Peromyscus* sp.											1	***1***	2	***1***	3	***2***
harvest mouse	*Reithrodontomys* sp.					1	***1***									1	***1***
rodents	Cricetidae											4				4	
hispid cotton rat	*Sigmodon hispidus*			21	***10***	67	***13***			15	***4***	4	***3***	41	***11***	148	***41***
cotton rat	*Sigmodon* sp.							2	***1***							2	***1***
rodents	Rodentia			51		52		15		3		57		22		200	

		Barra		Locona		Ocós		Ocós Oven		Ocós- Cherla		Cherla		Unknown Phase		Total	
Common Name	Latin Name	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***	NISP	***MNI***
small rodent	Rodentia, small							37								37	
large rodent	Rodentia, large					1				1						2	
hares and jackrabbits	*Lepus* sp.											1	***1***			1	***1***
Brazilian cottontail	*Sylvilagus brasiliensis*			1	***1***	1	***1***							1	***1***	3	***3***
eastern cottontail	*Sylvilagus floridanus*					1	***1***					62	***5***	11	***2***	74	***8***
cottontail	*Sylvilagus* sp.	2	***1***	8	***2***	22	***4***	7	***1***	9	***2***	17	***1***	37	***6***	102	***17***
small mammal	mammal, small	1		35		2		7		13		21		17		96	
medium mammal	mammal, medium			15		36				5		83		36		175	
large mammal	mammal, large	2		192		225		2		277		724		889		2311	
mammal	mammal			357		521		33		359		84		238		1592	
Total Class Mammalia		**11**	***4***	**846**	***53***	**2303**	***55***	**129**	***4***	**813**	***27***	**1292**	***36***	**2256**	***56***	**7650**	***235***
Unidentified																	
	unidentified															4	
	vertebrata															1449	
All Total		*188*	*20*	*3764*	*221*	*7944*	*241*	*11630*	*91*	*3302*	*125*	*11312*	*471*	*4038*	*175*	*43631*	*1344*

well represented in the Locona and Ocós assemblages. Marine toads are the largest anurans in Mesoamerica and are edible, if properly peeled, rinsed, and cooked (Wing 1980:378).

Other identified amphibians include representatives of three other families of frogs (tree frogs: Hylidae; robber frogs: Craugastoridae; and white-lipped frogs: Leptodyctylidae) and the Mexican caecilian (*Dermophis mexicanus*), all present in low numbers.

Reptiles are present in each phase. Turtles constitute nearly half of the identified reptile specimens, and they increase in importance from Locona to Cherla. Freshwater scorpion mud turtles (*Kinosternon scorpioides*) and Central American sliders (*Trachemys grayi*) are most common. The green sea turtle is represented by two carapace fragments from Cherla-phase deposits. The other aquatic reptiles present at Paso de la Amada include crocodilians, both the spectacled caiman and the American crocodile, with caimans generally more common. Both caimans and crocodilians in general are somewhat less common in the Ocós-Cherla and Cherla samples than they are in Locona and Ocós.

Identified terrestrial reptiles at Paso de la Amada include both lizards and snakes. Black and green iguanas dominate the identified lizards, and their frequency fluctuates through time at the site, peaking in Ocós. Five other lizard genera are present, all represented by relatively few specimens.

Snakes are fairly well represented, with the greatest diversity and numbers seen in the Cherla phase. Nonvenomous colubrid snakes dominate the snakes numerically, in terms of diversity, and in frequency through time. All of the identified colubrid snake genera represent fast, active, diurnal predators. The ground snake vertebrae beads from Paso de la Amada discussed in Chapter 15 are all identified as large colubrid snakes, primarily the indigo snake (*Draymarchon melanurus*). Two relatively large-bodied genera dominate the more discretely identified snake assemblage: boa constrictors and indigo snakes. Both snakes are large enough to eat and are most common in the Cherla phase. Two venomous snake species are identified: the nauyaca (*Bothrops asper*) and the cascabel (*Crotalus simus*), both present in very low numbers.

Birds by Phase

Bird specimens constitute 1.1 percent of the overall faunal assemblage (n = 462). As a class, birds are the most diverse vertebrates in terms of number of unique taxa (species and/or genus, sometimes family) represented per NISP. Birds are best represented in the Locona phase (n = 180), due primarily to the discovery of a mostly complete articulated skeleton of a green heron (n = 104) associated with Structure 4 in Mound 6. Fewer bird specimens were recovered from Ocós (n = 67) and mixed Ocós and Cherla (n = 22) contexts, with slightly more in Cherla (n = 84) contexts. Undetermined phase contexts produced 101 bird specimens.

Bishop et al. (2018) divide the birds into two broad categories: aquatic and terrestrial. In general, aquatic bird taxa such as ducks, cormorants, and herons are more common in the earlier Locona and Ocós phases than they are in Cherla-phase contexts. Terrestrial birds, including quail, doves, and chachalacas, are more common in later Cherla-phase contexts in general. There are a few noteworthy exceptions in temporal representation of terrestrial bird taxa. Yellow-naped/headed amazon parrots, northern caracara, and Inca doves are all best represented in Locona-phase contexts, again due to the presence of at least partial skeletons.

Mammals by Phase

The frequency of mammal specimens fluctuates. Mammals constitute 22 percent of the vertebrate assemblage in the Locona phase, rise to 30 percent in the Ocós phase, and then diminish to 25 percent in Ocós-Cherla and 12 percent in Cherla.

In terms of percent NISP, rodent bones dominate the mammal sub-assemblage in the Locona, Ocós, and Ocós-Cherla samples, diminishing in the Cherla phase. The majority are rats (*Sigmodon*) and mice (*Oryzomys*). Both of these small rodents are relatively commensal, likely to take advantage of available trash or stored foodstuffs found within and around dwellings and may not represent animals consumed for food. Single identified paca (*Cuniculus paca*) and squirrel (*Sciurus variegatoides*) bones most likely do represent larger rodents that were consumed for food, as do most of the giant pocket gopher (*Orthogeomys grandis*) specimens. While it is conceivable that the gopher specimens could be intrusive, as the animals are vigorous burrowers, most of their identified bones are fragmented, many are burned, and several bear cut marks. In terms of percent NISP (identifications at least to the genus level), the giant pocket gopher constitutes 16.8 percent of all mammals during the Locona phase, 4.6 percent in Ocós, and 14.0 percent in Cherla. If the other rodents and *Orthogeomys* are removed from the discussion, then dog specimens represent the most commonly encountered mammal remains in each phase at Paso de la Amada until overtaken by rabbits during the Cherla phase.

Dogs (Canidae)

Three species of the Canidae are currently present in the Mazatán region of Chiapas: domestic dog (*Canis familiaris*), coyote (*Canis latrans*), and gray fox (*Urocyon cinereoargenteus*). Domestic dog and gray fox are both identified as present in the Paso de la Amada samples reported here. No coyote specimens are positively identified, although they probably were present during the Formative period (Hody and Kays 2018).

The frequency of domestic dog decreases steadily through time. Dogs are the most common mammal specimens in Locona-phase deposits. They remain common in Ocós deposits if one excludes shell fragments of armadillo, which otherwise overwhelm the Ocós sample. By the Cherla phase, dog representation is much lower than during the earliest occupation of the site, and dog specimens are less common than deer, giant pocket gophers, and rabbits. Gray fox specimens are present in the Mound 12 Ocós and the Mound 1 Cherla samples.

Other Carnivores

Several other carnivores are represented in relatively low numbers. These include cats (Felidae) such as ocelots (*Leopardus pardalis*), present in the Ocós, Ocós-Cherla, and Cherla assemblages, and pumas (*Puma concolor*) and jaguarundis (*Puma yagouarandi*), present only in the Cherla phase. Procyonid carnivores include coatimundis (*Nasua narica*), present only in Cherla-phase deposits, and raccoons (*Procyon lotor*), present in Locona, Ocós-Cherla, and Cherla. Long-tailed weasel (*Mustela frenata*) specimens are present in Ocós-Cherla and Cherla.

Miscellaneous Mammals

A howler monkey (*Alouatta palliata*) proximal femur is identified in the Mound 1 Cherla sample. A single distal humerus of a fruit bat (*Carollia* sp.) is present in the Mound 12 Ocós-phase collection, and a single bone fragment identified as whale (Cetacea) was recovered from Locona-phase deposits in Mound 6.

Artiodactyls (Artiodactyla)

Three species of even-toed ungulates are represented: white-tailed deer (*Odocoileus virginianus*), a single brocket deer (*Mazama temama*) molar, and collared peccary (*Pecari tajacu*). White-tailed deer represent the largest economically important wild mammal hunted at Paso de la Amada, as no Central American tapirs (*Tapirus bairdii*) have yet been identified. White-tailed deer constitutes more than 10 percent of the mammal specimens in the Locona sample. Collared peccaries are present in each phase as well, but in much lower numbers than deer. Brocket deer is represented by only a single specimen, in the Cherla-phase samples from Mound 1.

Rabbits (Lagomorpha)

Two genera of lagomorphs are present in the Paso de la Amada mammal sub-assemblage: *Lepus* (jackrabbits) and *Sylvilagus* (cottontails). Cottontails are by far the most

Table 14.3. The Paso de la Amada faunal assemblage: percentages of NISP and MNI by phase and class, with domestic dogs separated from wild mammals

Class	Barra		Locona		Ocós		Ocós-Cherla		Cherla	
	NISP	**MNI**	NISP	**MNI**	NISP	**MNI**	NISP	**MNI**	NISP	**MNI**
fish	88.3	**75.0**	63.1	**48.2**	64.9	**51.7**	66.4	**51.3**	83.5	**80.7**
mammals, wild	5.9	**20.0**	21.1	**21.0**	27.8	**21.1**	24.1	**19.3**	11.4	**6.8**
domestic dog	0	**0**	1.4	**3.1**	1.2	**2.6**	0.9	**3.4**	0.2	**1.1**
reptiles	0	**0**	4.0	**13.6**	2.7	**10.8**	6.5	**15.1**	3.9	**4.8**
amphibians	2.7	**5.0**	5.6	**10.0**	2.5	**9.5**	1.4	**6.7**	0.3	**1.5**
birds	3.2	**0**	4.8	**4.1**	0.8	**4.3**	0.7	**4.2**	0.8	**5.1**
n	*188*	**20**	*3762*	**220**	*7928*	**232**	*3254*	**119**	*11,152*	**455**

common. The lone *Lepus* femur may represent a prehistoric range extension of the critically endangered Tehuantepec jackrabbit (*Lepus flavigularis*).

The Ocós Oven Deposit

The vertebrate archaeofauna recovered from the Ocós Oven is strikingly different from that recovered from floor, fill, and trash pit contexts. Much of the bone is blackened due to burning. Fish bone constitutes 98.6 percent of the identified specimens. The vast majority of specimens represent small species or small individuals of larger species. No large individual fish are present. In fact, very few high-trophic-level fish species are identified, and all of those specimens represent small individuals.

The fish remains are dominated by cichlids (44 percent) and eleotrids (40.4 percent). Several freshwater fish, such as *Rhamdia guatemalensis* (Guatemalan chulín, n = 31) and *Roeboides* sp. (scale-eating characins, n = 8), are found only in this feature or are best represented in this feature. They include topminnows (*Poeciliopsis* sp., n = 127) and silversides (Atherinopsidae, n = 47).

OVERVIEW OF THE DIET, WITH COMMENTS ON THE ROLE OF DOMESTIC DOG

The inhabitants of Paso de la Amada ate a diverse array of animals. An examination of the collection as a whole reveals several interesting changes in the relative importance of animals by class. The results are somewhat different depending on whether one considers NISP, MNI, or estimated biomass. The data are presented in Tables 14.3 and 14.4 as relative percentages within each phase. Note that domestic dog has been separated from wild mammals. Invertebrates are not included because that assemblage was not fully analyzed. Note that the Barra sample (entirely from Mound 5) is tiny compared to the others and does not always show what are otherwise strong trends.

Two trends that stand out in both tables are a rise in fish and a fall in wild mammals, either in the Cherla phase (Table 14.3) or more gradually across the sequence from Locona to Cherla (Table 14.4). A decrease in the representation of domestic dog from Locona and Ocós to Cherla comes out more clearly in estimated biomass (Table 14.4) than in NISP or MNI (Table 14.3). A slight rise in reptiles over the sequence appears in the biomass estimates but is not clearly seen in the other measures. Finally, amphibians peak during Locona (1.4 percent biomass, 5.5 percent NISP), a pattern driven by the marine toad, a species that, as suggested above, may have been a food source in the Locona phase, albeit a minor one.

As shown in Table 14.5, a stable 80 percent of the animal component of the diet was composed of fish, dog, and large terrestrial meat packages, the latter dominated by white-tailed deer but including also brocket deer, peccary, caiman, and (largest of all) crocodile. Two additional points emerge from this presentation of the biomass data. First, the decline in representation of wild mammals observed in Table 14.4 is more dramatic when we consider large mammals only. Generally, large animals are expected to be top-ranked resources because of the high return relative to pursuit costs (e.g., Broughton et al. 2011). Thus a decline in representation of large prey in the diet could be a sign of pressure on the wild animal resource base.

Some complications associated with resource pressure are raised in the second observation to be made in Table 14.5. The representation of dog declines dramatically from Locona-Ocós to Cherla. Dog was a domesticated resource and thus, more than other faunal resources, was under control of the inhabitants of the site. If the level of exploitation of large prey was straining the wild resource base by the Cherla phase, one possible response would have been to intensify consumption of dog. Instead, dog meat as a

Table 14.4. The Paso de la Amada faunal assemblage: percentage distribution of estimated biomass, by phase and class, with domestic dogs separated from wild mammals

Class	Barra	Locona	Ocós	Ocós-Cherla	Cherla
fish	39.32	22.34	31.72	36.23	56.04
mammals, wild	58.08	53.14	42.12	44.79	30.00
domestic dog	0	13.15	15.57	6.73	1.47
reptiles	0	8.79	9.51	11.20	11.42
amphibians	0.56	1.41	0.59	0.21	0.05
birds	2.05	1.16	0.46	0.81	1.02
biomass (kg)	*0.81*	*13.88*	*20.18*	*9.95*	*31.02*

Table 14.5. Percent contribution to estimated biomass of fish, large mammals, large reptiles, and dog[a]

	Barra-Locona	Ocós	Ocós-Cherla	Cherla
fish	24.3	34.2	41.0	56.9
large mammals[b]	43.2	28.0	31.1	21.1
large reptiles[c]	0.9	2.7	0.6	3.7
dog	13.5	16.8	7.6	1.5
Total percentage of estimated biomass	**81.9**	**81.7**	**80.3**	**83.2**

[a] Numbers differ from those of Table 14.4 because specimens identified as “mammal” or “Carnivora” are excluded here.

[b] Includes deer, Artiodactyla, puma, peccary, sea mammal (Cetacea), and “large mammal.”

[c] Includes caiman and crocodile.

percentage of total biomass declines dramatically between Ocós and Cherla.

Wing (1978:40) drew attention to the importance of domestic dog in lowland diets in Mesoamerica, particularly in Late Formative to Early Classic sites in coastal Veracruz. However, the occurrence of dog is quite variable at Mesoamerican sites of different eras and regions. Our proposal is that dog was generally of secondary interest as a food source to Mesoamerican peoples (who, given a choice, preferred deer). Yet the domesticated status of dog gave it the advantage of being more fully under human control than any other faunal resource. For example, Formative villagers in central Tlaxcala, engaging in destructive farming techniques which probably impacted deer populations in their immediate catchments, raised and ate more dog late in the occupation of the single- or double-component sites (Lesure et al. 2013). In those cases, consumption of dog increased as availability of the top-ranked faunal resource (deer) declined. Dog also appears to have been used as a feasting food in Mesoamerica, probably also because of the greater control afforded by domestication: one could anticipate needs of a particular feast and intensify production accordingly. We agree with Rosenswig’s (2007:19–20) proposal that dog was probably at least occasionally consumed at feasts in the Soconusco during the Formative period, but we disagree with his suggestion that it was an elite delicacy potentially favored over deer. Dog was probably more a reliable crowd-pleaser than a food of choice. Marcus and Flannery (1996:116) report that the five or more butchered dogs represented in Feature 99 at Tierras Largas (Oaxaca) would have represented at least 50 kg of meat.

An important question concerning the role of dog is whether it was important as a *generalized* component of the diet or used *episodically* for feasts. The two possibilities are not mutually exclusive, but for the moment it is the importance of dog as a general component of Locona-Ocós diets that we wish to emphasize, based on the data

Table 14.6. Diversity and equitability based on NISP, MNI, and estimated biomass: (A) all classes; (B) fish only; (C) wild mammals only

	NISP				MNI				Estimated Biomass			
	Barra-Locona	Ocós	Ocós-Cherla	Cherla	Barra-Locona	Ocós	Ocós-Cherla	Cherla	Barra-Locona	Ocós	Ocós-Cherla	Cherla
A. All Classes												
diversity (H′)	2.83	2.93	2.37	1.63	3.42	3.52	3.61	2.70	2.59	2.52	2.74	2.47
equitability (V′)	0.70	0.70	0.59	0.36	0.86	0.86	0.91	0.61	0.67	0.62	0.69	0.55
number of taxa (S)	57	65	55	89	54	60	53	86	49	59	52	88
Total NISP, MNI, or biomass	1274	2169	1167	7163	231	226	116	529	9.9	13.8	5.6	21.9
B. Fish Only												
diversity (H′)	2.01	2.09	1.52	1.25	2.51	2.62	2.63	2.01	2.11	1.62	1.79	1.42
equitability (V′)	0.66	0.64	0.51	0.36	0.84	0.83	0.88	0.56	0.72	0.51	0.59	0.40
number of taxa (S)	21	26	20	34	20	23	20	35	19	24	21	34
Total NISP, MNI, or biomass	769	1445	799	6627	121	120	61	444	2.1	4.3	2.6	14.4
C. Wild Mammals Only												
diversity (H′)	1.82	1.93	1.76	1.93	2.02	2.06	2.40	2.55	1.17	1.29	1.57	1.78
equitability (V′)	0.79	0.80	0.69	0.68	0.88	0.86	0.93	0.90	0.51	0.56	0.63	0.63
number of taxa (S)	10	11	13	17	10	11	13	17	10	10	12	17
Total NISP, MNI, or biomass	136	268	114	185	47	47	22	32	4.6	4.3	1.2	3.7

in Tables 14.4 and 14.5. In support of a generalized use of dog as food, we note that dog remains were present in 54 percent of 57 Locona- and Ocós-phase refuse samples. That is higher than rabbit (32 percent) and armadillo (25 percent) and similar to the occurrence of deer (46 percent) and giant pocket gopher (56 percent). (It should be emphasized that dog burials and the outlier among individual bone weights are *not* included in the biomass estimates in Tables 14.4 and 14.5, as noted above in the "Materials and Methods" section.)

DIET BREADTH AT PASO DE LA AMADA

Generally we would expect to see a decrease in diet breadth associated with the transition to sedentism and agriculture. Previous observers have noted, instead, an *increase* in diet breadth in the second-millennium BC villages of the Soconusco relative to the preceding Archaic (Blake et al. 1992a; Kennett et al. 2006; Lesure and Wake 2011, 2012; Neff et al. 2006). That issue is considered in Chapter 26 of this volume. The goal here is to consider changes in diet breadth during the course of the occupation. While it is possible that not all the vertebrate animal species represented at Paso de la Amada were consumed as food, we assume they were in our analysis of diet breadth.

Measures of richness, diversity, and equitability are important tools for assessing diet breadth. *Diversity* measures such as the Shannon-Weaver index are sensitive to the number of taxa and relative abundances within taxa. *Equitability* is more purely a measure of the evenness of distribution across taxa (Reitz and Wing 2008:111–12). We present the Shannon-Weaver index (H′) and an equitability measure derived from that (V′) (Reitz and Wing 2008:111–12). High diversity means more taxa and/or relative evenness of distribution among taxa. High equitability indicates an even spread among taxa, whereas low equitability results from a more clumped distribution. Because the initial step in calculating the Shannon-Weaver index involves computing the proportional representation of each category, the calculations involved do not require ordinal data. We have therefore also calculated diversity on the biomass estimates in addition to NISP and MNI. (See, for instance, Reitz and Wing 2008:246.) Diversity/equitability values based on NISP and MNI are sensitive to the presence of all taxa no matter how small-bodied; diversity among birds, for instance, contributes significantly to the calculated values. Measures based on estimated biomass are weighted toward animals that played a more important role in the diet. Birds in that case contribute less to the computed value. One final point is that, in general, high diversity is strongly correlated with sample size and recovery methods. That is particularly an issue for the tiny Barra sample, which here is included with Locona.

Table 14.6 provides diversity and equitability split by phase for all classes of animals (A), fish only (B), and wild mammals only (C). The sample size is shown in each case as either total NISP, total MNI, or total estimated biomass (in kilograms). (The number of taxa for a given phase varies in part because some proveniences are left out of biomass calculations due to incomplete bone weight data.) The number of taxa present is correlated with sample size, as would generally be expected.

For all classes (Table 14.6A), diversity and equitability based on NISP are stable between Locona and Ocós, then decline significantly. Results based on MNI remain stable through the mixed Ocós-Cherla assemblage, then decline in Cherla. Diversity statistics based on estimated biomass exhibit no clear pattern, though equitability does decline somewhat in Cherla.

Splitting the assemblage by class reveals the source of these at-first-glance somewhat discordant results. In the case of fish (Table 14.6B), both diversity and equitability decline from Locona to Cherla. For wild mammals instead (Table 14.6C), calculations based on NISP suggest stability in diversity across the sequence, whereas the MNI and biomass results register a sharp *increase* in diversity, paired in the latter case with a more gradual increase in equitability.

Basically, in the case of NISP, the lightweight but numerous fish bones are the most significant contributor to the results for all classes. The pattern of stability in the heavier but less numerous mammal bones in that case does not counteract the downward trend in diversity of the fish.

Patterns among the mammals have a stronger impact on the biomass-based calculations. The rising diversity among mammals counteracts the declining diversity among fish to yield an overall pattern of stability in diversity among all classes (based on biomass).

What are we to conclude from these results? First, the declining diversity and equitability among fish is particularly important. The pattern appears in all three versions (NISP, MNI, and biomass), and it is strong enough to counteract any sample size effect, since the lowest diversity is observed in the largest sample (Cherla). These measures indicate a trend toward concentration on several selected fish taxa rather than a more even harvesting of a range of taxa.

Second, the rising diversity of wild mammals requires further investigation. This proves a complicated question since there are taphonomic issues involved. We discuss both these patterns further in the following sections.

The evidence in Table 14.6 for decreasing diversity and equitability in fish toward the end of the sequence is striking given that fish constituted an increasing percentage of the total biomass consumed (Table 14.5). In the Cherla phase, the inhabitants of the site were eating more fish than previously, but they were concentrating on a few taxa. That point, combined with the declining importance of dog and the likelihood that toads were a minor but nonetheless noticeable component in the Locona diet (1.41 percent biomass compared to 0.05 percent in Cherla), suggests a narrowing of breadth of diet during the course of the occupation. Early on, the inhabitants were eating more large prey, but they were also consuming a wide array of animals, including species one would expect to be secondary or even tertiary choices (gopher, rat, toad). By the Cherla phase, the overall importance of large prey had declined, but dietary breadth had also narrowed. All other things being equal, we would not expect those trends to be associated with each other; one possible response to decreasing returns from the hunting of large prey would have been an *increase* in dietary breadth. Instead, the opposite occurred. We expect that the reason for the apparent discrepancy was that "other things" were not equal. That issue is explored further in Chapter 26.

HABITATS AND RESOURCE PROCUREMENT STRATEGIES

In this section we consider the habitats available to inhabitants of Paso de la Amada for the procurement of wild resources. A topic of particular interest is whether there were changes in habitat utilization during the course of the occupation. We note changes particularly among aquatic resources and birds. Some consideration is also given to resource procurement practices.

Habitats of the Mazatán Zone

Clark (1994a) identifies five basic environmental zones in the Soconusco—littoral, swamp, savanna, forested plain, and piedmont forest—each of which can be divided into several distinct biotic communities (see also Coe and Flannery 1967:11–15; Voorhies 1976:17–23). Our rough classification of habitats in the vicinity of Paso de la Amada (Figure 14.1) is conceived at a level of specificity between Clark's "zones" and his "biotic communities." We include some of the spatial structure of the estuary-lagoon system described by Voorhies (2004). The classification, based on Lesure et al. (2009a:Table 15.5), is oriented particularly toward identifying habitat variation among the fish.

Habitats include ocean beach, marine and estuary mouth, lower estuary, upper estuary and lagoon, river, freshwater swamp, pampa and savanna, agricultural fields, forested coastal plain, and piedmont forest.

Pounding surf and strong currents help make the *ocean beach* a relatively unattractive location for wild resource

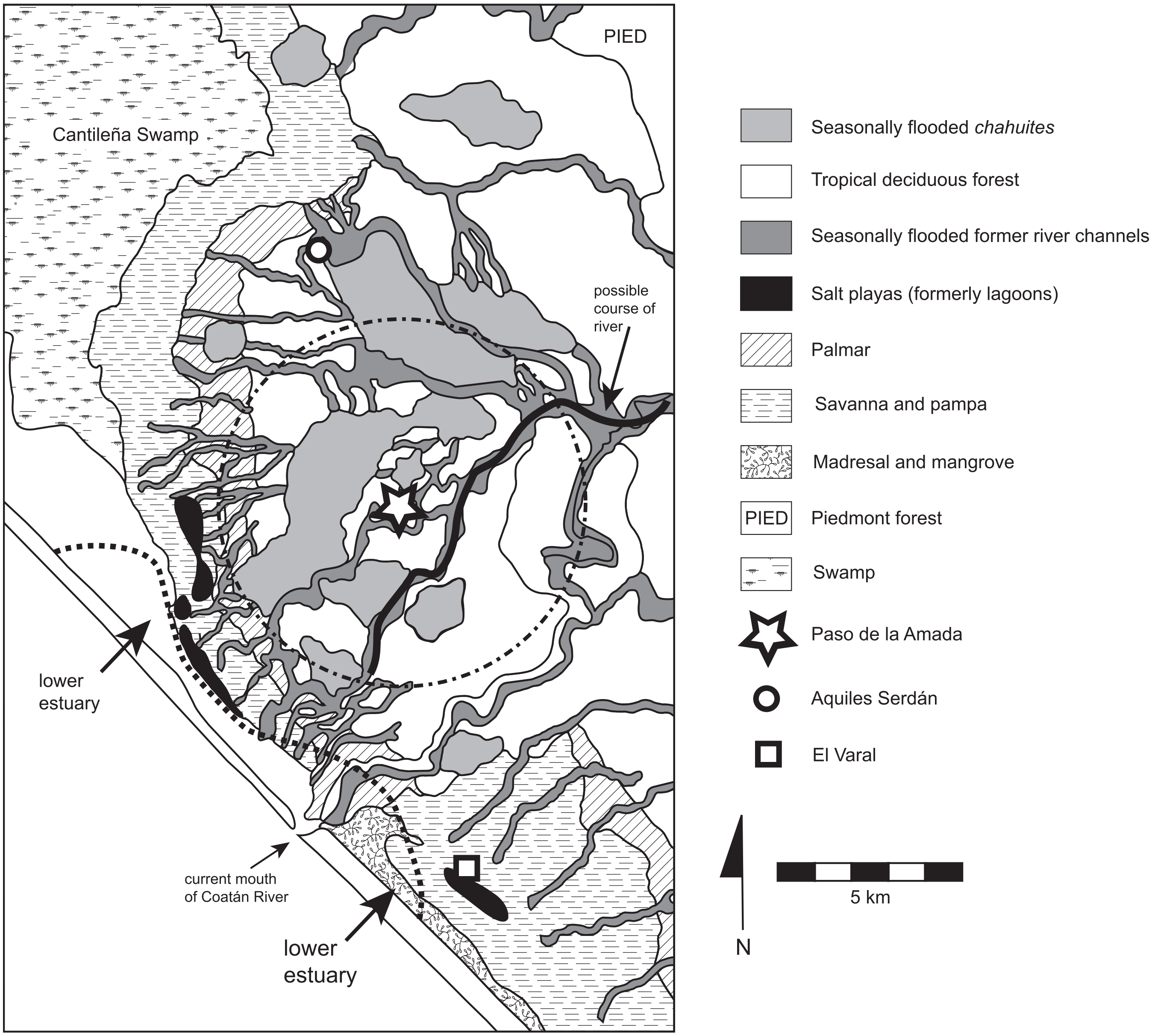


Figure 14.1. Habitats of the Mazatán region of Chiapas, with Paso de la Amada at the center, with a catchment of 5 km radius indicated. The dotted line along the coast indicates the approximate extent of the lower estuary. *Illustration by R. Lesure and Katelyn Jo Bishop, based mainly on Clark (1994a:Figure 9).*

harvesting (Clark 1994a:62). We do have various fish species that favor *marine and estuary mouth* habitats with high salinity and relatively little seasonal variation.

Following Voorhies (2004:9–14), we divide the estuary itself into a *lower estuary*, closer to the ocean and thus with generally high salinities, and an *upper estuary*, farther from the mouth, closer to inputs of freshwater, and thus with lower salinity. The *lagoons* likely received inputs of freshwater from the Coatán River and were probably generally lower in salinity than at least the lower estuary, although as Voorhies (2004:12) observes, there was likely variation in salinity within an individual lagoon based on proximity to the mouth.

A complicating factor in the estuary-lagoon system is the vast input of freshwater during the rainy season. Kennett and Voorhies (1996) identified the isotopic signatures of that annual variation in shells of the marsh clam *Polymesoda radiata* from Archaic sites in the Acapetahua estuary. Kennett and Culleton (2009) conducted a similar analysis of shells of *P. radiata*, *Chione subrugosa*, and *Protothaca metodon* from El Varal, an Early Formative estuary station near the lower mouth of the Coatán River (Figure 14.1).

They found similar traces of seasonal variations of salinity in the shells of *P. radiata*, along with evidence that harvesting by occupants of El Varal was predominantly in the dry season. Shells of *C. subrugosa* and *P. metodon* did not exhibit any such signature of seasonally varying salinity, and they postulated that those shellfish were harvested in marine contexts—the estuary mouth or ocean beach (Kennett and Culleton 2009; Lesure et al. 2009b:82–84).

Clark (1994a:63–64) draws attention to the current lack of lagoons in the estuary system of the Mazatán zone. Excavations at El Varal revealed the presence of a lagoon system to the southeast of the Coatán River during the second millennium BC. A process of gradual encroachment appears to have been under way during the occupation at El Varal (Lesure 2009c:254). Coe and Flannery (1967:14), writing of the estuary in the Ocós region toward the southeastern end of the Soconusco, note the presence of salt *playas*: small, seasonally flooded basins, still too salty to support vegetation. They identify those salt playas as remnant lagoons not yet fully encroached by vegetation.

Clark's (1994a:Figure 9) map of biotic communities in the Mazatán region includes a strip of salt playa exactly where we reconstruct the lagoon of the second millennium BC on the basis of the El Varal excavations. He also includes a curving strip of playa on the other side of the Coatán, just inland of the modern mangrove estuary. That is potentially important, because it could mean there was a lagoon in that area during the second millennium BC, within 4 to 5 km of Paso de la Amada. Based on Voorhies's (2004) observations of modern and Archaic-period lagoons, the marsh clam *Polymesoda radiata* should be an important indicator of that habitat. A selection of bags of shell crumbs from throughout the sequence at Paso de la Amada was examined particularly to look for *P. radiata*. As shown in Table 14.7, that species appears to have been rare at the site. The two main species in the bags reviewed were *Anadara grandis* and *Chione subrugosa*, both of which were probably from high-salinity marine or lower-estuary contexts, not from lagoons.

Thus an inspection of the shell remains does not provide support for the idea that lagoons existed in the area to the northwest of the mouth of the Coatán during the occupation of Paso de la Amada. Consideration of the changing course of the river during the Middle and Late Holocene suggests that siltation of lagoons in this region might have been already well advanced by the Initial Formative.

Gutiérrez (2011:152–54) identifies traces of seven main channels of the lower Coatán River in the Mazatán region. Channels 1 and 2 passed to the north of Paso de la Amada; Channel 3, which Gutiérrez considers ephemeral, passed immediately to the south of the site; and Channels 4 through 7 are farther to the east and south. In Gutiérrez's opinion, Channels 1 and 2 were active in the Early and Middle Archaic, with a shift to Channel 4 occurring sometime in the Late Archaic. The shift to Channels 5 and 6 occurred late in the second millennium BC, probably the result of a catastrophic hurricane at the time of abandonment of Cantón Corralito and burial of the site under a thick layer of sand (Gutiérrez 2011:154, 159–65). In Figure 14.1, we reconstruct a portion of the lower course of the Coatán during the occupation of Paso de la Amada along Gutiérrez's Channel 4, drawing on the ancient river courses identified on Clark's (1994a:Figure 9) map. Whether, during the occupation of Paso de la Amada, the Coatán emptied directly into the ocean, as it does today, or into the wetlands is not known. The river mouth may have been in a different position than it is currently.

The Cantileña Swamp is today a large expanse of freshwater that forms the northwest boundary of the Mazatán zone. This wetlands area has not always been freshwater. At Cerro de las Conchas, a Middle Archaic site to the northwest of Mazatán at the inland margin of the Cantileña Swamp, Voorhies found evidence of exploitation of lagoon species (particularly *Polymesoda radiata*) in the earlier levels, indicating a local habitat similar to those of the Acapetahua estuary (Voorhies 2004:96–97; Voorhies et al. 2002). In other words, what is today a freshwater swamp was, in the Middle Archaic, a brackish estuary-lagoon system. A shift in shellfish species registered in later levels at the site (still during the Middle Archaic) involved the replacement of marsh clams with species more characteristic of marine conditions or perhaps estuary mouths (*Anadara grandis*, *Anadara tuberculosa*, oysters, slipper limpets, and mussels) (Voorhies 2004:143–45). This early change at Cerro de las Conchas suggests destruction of a lagoon system by rising sea levels (Voorhies 2004:96–97). Sometime in the last 6,000 years, these conditions were reversed and these wetlands became a freshwater swamp. We have no definite knowledge of when that occurred, but the greater prevalence of freshwater fish species at Aquiles Serdán (Blake et al. 1992a:141), at the edge of the modern swamp, strongly suggests that conversion to freshwater conditions occurred prior to the earliest Formative occupation and thus before the second millennium BC.

At the inner margins of the estuary and the swamp is a succession of poorly drained lands that represent a transitional zone between the wetlands and the forested coastal plain (Clark 1994a:66–68). *Pampas* are seasonally flooded lands directly inland from the estuary and swamp (Clark 1994a:72; Coe and Flannery 1967:15). The vegetation is grass with clusters of palms. In the rainy season, the pampas flood and are incorporated into the wetlands. *Savannas* are poorly drained (but not typically flooded) grasslands with stands of palm or wild bamboo (Clark 1994a:66). We think the wild resource potential of savannas, fallow fields, field margins, and seasonally flooded/agriculturally rich *chahuites* (Clark 1994a:76) would have been similar, and we treat those together in our discussion of faunal remains.

Paso de la Amada itself was located inland of the wetlands proper, in the *forested coastal plain* (Figure 14.1). We are not sure how much of the immediate surroundings

Table 14.7. Identified shell from several units at Paso de la Amada[a]

Phase and Provenience	Total Weight of Shell Fragments (g)	Numerous Small, Unidentifiable Fragments	cf. *Polymesoda radiata*	*Anadara grandis*	cf. *Anadara similis*	*Anadara* sp.	*Chione subrugosa*	*Protothaca metodon*	Other
Locona Phase									
Md. 12 P5/5				X			XXX		unidentified large gastropod
Md. 12 P5/6				XXX		XXX	XXX	X	
Md. 6 Level 13 12N/2-4.25E Piso 5				XX					
Md. 6 Level 13 14N/5E				X					
Md. 6 Level 13 16N/7E				XX					
Md. 6 Level 13 18N/5E						X	X	X	unidentified gastropod
Md. 6 Level 13 4N/7E Piso 5				XX					
Md. 6 Level 13 4N/9E Piso 5				X				X	
Md. 6 Level 13 6N/7E Piso 5				XX					
Md. 6 Level 13 8N/3E Piso 5				XX					
Ocós Phase									
Md. 12 K11 F.19		X		X	X				
Cherla Phase									
Md. 1 F11/11	32.6			X		XXX	X	X	
Md. 1 F9/11	48.0	X		XXX			XXX	X	
Md. 1 G10/11	33.5	X	X	XXX			XXX		
Md. 1 H9/11	42.1			XXX			XXX	X	
Md. 1 I7/11	21.9	X		XXX			X	X	
Md. 1 I8/11	0.8			X			X		
Md. 1 I8/11	23.6	X		XXX			X	X	
Md. 1 I9/11	8.2	X		X					
Md. 1 J7/11	6.3			X			X	X	
Md. 1 M10/11	29.8			XXX			X	X	

[a] X = present; XX = all shells present are of this taxon; XXX = numerous fragments of this taxon present.

would have been cleared of forest. Old river channels fingering well into the coastal plain of the Coatán delta were seasonally flooded and provided the succession of resource options described by Clark (1994a:76). The *piedmont forest*, source of a variety of fruits and an optimal zone for growing cacao (Clark 1994a:80), was somewhat farther from Paso de la Amada than the other habitats considered here, approximately 12 km.

A Simplified Classification of Aquatic Habitats

One of the difficulties when considering aquatic resources is that many fish move freely among different estuary habitats. We propose a simplified version of habitats based on two sources of evidence: sets of fauna found together either in modern fishing expeditions or in archaeological contexts, and isotopic analyses of modern and archaeological fauna from the Soconusco region. There are three basic divisions among the aquatic resources, with a less certain additional category. The categories, to be justified in subsequent paragraphs, are as follows:

1. **Marine-lower estuary**: fish we expect to be most prevalent in the lower estuary and rare in the Cantileña Swamp. Important taxa include Clupeiformes, Atherinopsidae, Carangidae (including *Chloroscombrus orqueta*, *Caranx* sp., and *Oligoplites* sp.), Lutjanidae (including *Lutjanus novemfasciatus* and *Lutjanus* sp.), Gerreidae (including *Gerres cinereus* and *Eucinostomus* sp.), and Sciaenidae (including *Cynoscion* sp.). Also included are sharks, *Carcharhinus* sp., and the green turtle (*Chelonia mydas*).

2. **Estuary-river**: fish that tolerate a range of salinities and that we expect to find in a variety of estuary contexts as well as in the Coatán River. Important taxa include Ariidae (including *Ariopsis guatemalensis*, *Ariopsis* sp., *Cathorops* sp., and *Occidentarius platypogon*), Mugilidae (including *Mugil curema* and *Mugil* sp.), Centropomidae (including *Centropomus armatus*, *Centropomus nigrescens*, and *Centropomus* sp.), and Gobiidae.

3. **Lagoon-swamp:** fish that tolerate a range of salinities but that we expect to find generally in less saline parts of the estuary-lagoon system and in the freshwater Cantileña Swamp. This is the uncertain category mentioned above. Included in this category are sleepers (particularly *Dormitator latifrons*; also *Eleotris picta*) and the bigspine grunt (*Pomadasys macracanthus*). These taxa are of marine origin but occur in freshwater and lagoons.

4. **Swamp:** fish and turtles that are basically freshwater in orientation and that we expect to find mainly in the Cantileña Swamp. Important fish taxa include *Atractosteus tropicus*, *Rhamdia guatemalensis*, Poeciliidae, *Synbranchus marmoratus*, and Cichlidae (including *Amphilophus macracanthus* and *Cichlasoma trimaculatum*). Other taxa include the turtles *Kinosternon scorpioides* and *Trachemys grayi*.

The results of modern fishing trips and several archaeological contexts provide strong evidence for differentiation between categories 1 and 4, the marine-oriented lower estuary and the freshwater swamp. Table 14.8 presents data from two modern fishing expeditions to the Cantileña Swamp and two archaeological contexts from Paso de la Amada. We have organized aquatic taxa (fish and turtles) according to the four basic divisions just described. For the two recorded fishing expeditions to the Cantileña Swamp and two archaeological contexts (the Mound 6 Ocós Oven and Feature 19 at Mound 12), the occurrence of each taxon is noted, along with the overall percentage by category. The taxa recovered in the modern fishing trips fall entirely in our categories 3 and 4. We propose that the Mound 6 Ocós Oven assemblage and the vertebrate assemblage from Mound 12 Feature 19 are results of expeditions to that same habitat. In both assemblages, there is clearly background noise of fauna from a mix of other habitats, yet 95 percent of the NISP in Feature 19 and 91 percent of that from the Ocós Oven are from our categories 3 and 4. Each of these contexts appears to yield traces of an expedition to the swamp occurring not long before deposition of the remains. In the case of Feature 19, traces included several substantial sets of articulated gar scutes (tightly cohering enameled dermal scales). When a gar is roasted in its skin, masses of scutes are peeled off to get at the underlying muscle. The articulated concentrations of scutes recovered in Feature 19 appear to be the result of rapid discard and burial of such debris from a single cooking event.

Contexts that seem to capture the outcome of expeditions to the lower estuary are not so readily apparent in the assemblage. The distribution of shells—among which *Anadara grandis* and *Chione subrugosa*, likely denizens of the lower estuary, predominate—is quite clumped. Significant concentrations of shells appear only in a few contexts. An examination of the vertebrate remains in those contexts does not yield any hints of greater representation of fish expected to be common in the lower estuary. It may be that shellfish were collected on task-specific trips (presumably by canoe).

For a lower estuary context, we turn to the fauna from El Varal, a special-purpose resource extraction location of the Cuadros and Jocotal phases (1300–1000 BC). The site is located near the mouth of the Coatán River (Figure 4.1). The aquatic vertebrate fauna are presented in Table 14.9. In contrast to the preceding table, in which more than 90 percent of NISP and 75 percent of MNI were from categories 3 and 4, at El Varal, 94.3 percent of NISP and 90.5 percent of MNI are from categories 1 and 2. Even here though, despite a diversity of marine-oriented taxa from the lower estuary, the NISP values per taxon are relatively low, with only those of *Batrachoides waltersi* and *Lutjanus* sp. rising to 10 or above. That contrasts with substantial numbers of specimens of various sea catfishes, taxa in our category 3. What we have at El Varal is a lower estuary–focused assemblage that also registers the same sort of emphasis on sea catfish that we find growing over time during the occupation of Paso de la Amada. Based on the El Varal assemblage, we would expect the primary indicators of lower estuary fishing at Paso de la Amada to be snappers, toadfish, marine mojarras, mullet, jacks, and pompanos. Sea catfish would have been available in the lower estuary, but also in other parts of the estuary system.

Carbon and nitrogen isotope values for muscle tissue or bone can provide a signature of the different food pathways of fish in a complex estuary-lagoon system. Figure 14.2 is a plot of $\delta^{15}N$ and $\delta^{13}C$ for modern and archaeological

Table 14.8. Fauna associated with swamp habitats: modern and archaeological cases

Simplified Habitat Classification	Family	Taxon	Cantileña Swamp: Modern Cases		Mound 6 Ocós Oven		Mound 12 Feature 19
(with percent of individuals or NISP on the line to the right)			Wake and Lesure Fishing Trip 1997 (number of individuals)[a]	Clark Fishing Trip 1990 (number of individuals)[b]	NISP	MNI	NISP
4. Swamp			*80.1%*	*64.1%*	*50.0%*	*30.0%*	*91.6%*
	Cichlidae	*Amphilophus macracanthus*	63		103	7	
		Cichlasoma trimaculatum	56		54	6	1
		Amphilophus/ Cichlasoma	1	19	2	2	37
		Cichlidae			1472		
	Lepisosteidae	*Atractosteus tropicus*	1	21	43	1	589
	Kinosternidae	*Kinosternon scorpioides*					5
	unknown	*Trachemys* sp. or *Kinosternon* sp.		8			
	unknown	Snapping turtle		1			
	unknown	fish		1			
	Characidae	*Roeboides* sp.			8	2	
	Heptapteridae	*Rhamdia guatemalensis*			31	3	
	Poeciliidae	Poeciliidae			127	3	
3. Lagoon-Swamp			*19.9%*	*35.9%*	*41.1%*	*45.0%*	*3.5%*
	Eleotridae	*Dormitator latifrons*	30	28	1491	35	24
		Eleotris picta			8	1	
	Haemulidae				15		
2. Estuary-River					*5.7%*	*18.8%*	*4.5%*
	Ariidae	*Cathorops* sp.			1	1	2
		Ariidae			24		27
	Centropomidae	*Centropomus armatus*			13	3	
		Centropomus medius					1
		Centropomus sp.			76	9	1
	Elopidae	*Elops affinis*			2	1	
	Gobiidae	Gobiidae			3		
	Mugilidae	*Mugil* sp.			2	1	
		Mugilidae			90		
1. Marine-Lower Estuary					*3.2%*	*6.3%*	*0.4%*
	Atheriniformes				1		
	Atherinopsidae	Atherinopsidae			47		
	Belonidae	Belonidae			2		
	Carangidae	*Caranx* sp.			1	1	
		Chloroscombrus orqueta			8	1	2
		Oligoplites sp.			3	1	
	Clupeiformes				23		
	Engraulidae	Engraulidae			2		
	Gerreidae	*Gerres cinereus*			4	1	
		Gerreidae			20		1
	Lutjanidae	*Lutjanus* sp.			2	1	
	Pleuronectiformes	Pleuronectiformes			4		

[a] From Lesure et al. 2009a:Table 15.7.

[b] From Clark (1994a:68–69). We inferred likely species identifications, where we felt we could, from the following list (Clark 1994a:69): "one boa, about 8 casquitos or soup turtles, one cruzayuche or snapping turtle, 21 armados (two of these were about a meter long and about 12 kilos each), 19 mojarras, 28 zambucos (small, bottom feeder fish), one filín (small fish), and numerous shrimp."

Table 14.9. Aquatic vertebrate fauna associated with a lower estuary habitat: the site of El Varal[a]

	Common Name	Scientific Name	El Varal	
			NISP	**MNI**
1. Marine-Lower Estuary (MNI/NISP = 0.49)			*19.4%*	*27.5%*
Carcharhinidae	sharks	Carcharhinidae	2	**1**
Cheloniidae	green sea turtle	*Chelonia agassizi*	2	**2**
	sea turtles	Cheloniidae	7	
Batrachoididae	Walter's toadfish	*Batrachoides waltersi*	14	**10**
	toadfish	*Batrachoides* sp.	3	
	toadfishes	Batrachoididae	1	
Belonidae	needlefish	*Strongylura* sp.	1	**1**
Carangidae	jack	*Caranx* sp.	4	**4**
	Pacific bumper	*Chloroscombrus orqueta*	1	**1**
	pompano	*Trachinotus* sp.	4	**1**
Gerreidae	marine mojarra	*Diapterus* sp.	6	**4**
	yellowfin mojarra	*Gerres cinereus*	4	**3**
	marine mojarras	Gerreidae	1	
Haemulidae	grunt	*Haemulopsis* sp.	1	**1**
	grunts	Haemulidae	8	
Lutjanidae	snapper	*Lutjanus* sp.	50	**16**
Mugilidae	mullet	*Mugil* sp.	8	**4**
Sciaenidae	weakfish	*Cynoscion* sp.	6	**1**
	croakers	Sciaenidae	2	**2**
Scombridae	mackerels	Scombridae	1	**1**
2. Estuary-River (MNI/NISP = 0.24)			*74.9%*	*63.0%*
Ariidae	chihuil sea catfish	cf. *Bagre panamensis*	1	**1**
	blue sea catfish	*Ariopsis guatemalensis*	2	**1**
	blue sea catfish	cf. *A. guatemalensis*	6	**3**
	sea catfish	*Occidentarius/Ariopsis* sp.	28	**11**
	chili sea catfish	cf. *Notarius troscheli*	2	**1**
	sea catfishes	Ariidae	394	**71**
Centropomidae	snook	*Centropomus* sp.	54	**31**
3. Lagoon/Swamp (MNI/NISP = 0.47)			*4.9%*	*7.4%*
Eleotridae	sea chub	*Kyphosus* cf. *K. elegans*	2	**1**
	Pacific fat sleeper	*Dormitator latifrons*	2	**1**
	spotted sleeper	*Eleotris picta*	14	**4**
	sleeper	*Eleotris* sp.	3	**1**
	sleepers	Eleotridae	2	
Haemulidae	bigspine grunt	*Pomadasys macracanthus*	7	**5**
	grunt	*Pomadasys* sp.	2	**2**
4. Swamp (MNI/NISP = 0.80)			*0.8%*	*2.1%*
	tropical gar	*Atractosteus tropicus*	1	**1**
	freshwater mojarra	*Cichlasoma* sp.	3	**2**
	mud turtle	*Kinosternon scorpioides*	1	**1**

[a] Data from Wake and Steadman 2009:Table 7.3.

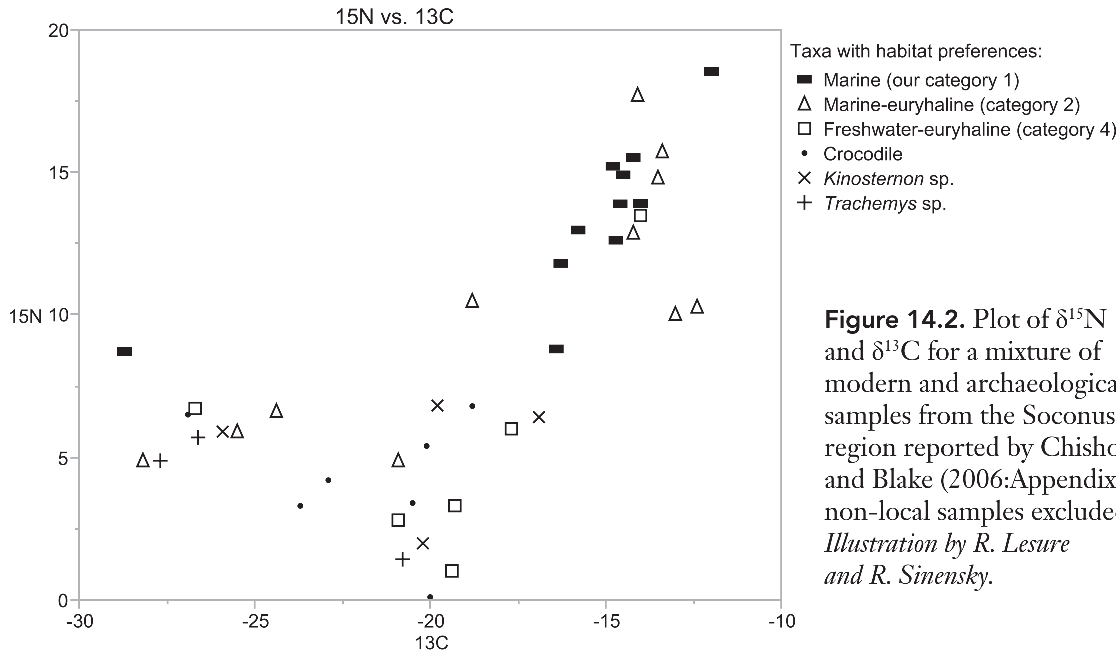


Figure 14.2. Plot of $\delta^{15}N$ and $\delta^{13}C$ for a mixture of modern and archaeological samples from the Soconusco region reported by Chisholm and Blake (2006:Appendix 2, non-local samples excluded). *Illustration by R. Lesure and R. Sinensky.*

samples from the Soconusco region reported by Chisholm and Blake (2006:Appendix 2; non-local samples excluded). Fish samples fall into our categories 1, 2, and 4 (marine-lower estuary, estuary-river, and swamp, respectively). Also plotted are turtles and crocodiles, likely denizens particularly of the Cantileña Swamp. The results support a basic threefold division of aquatic taxa. The likely marine-lower estuary samples are clearly distinguished from the swamp samples (categories 1 and 4). The species that are marine in origin but tolerate a wide range of salinities (category 2) do not fall between the other two but instead extend over the full range of the other two categories. That is consistent with the understanding of these taxa as tolerating a range of salinities.

Unfortunately, Chisholm and Blake's (2006) samples do not include sleepers (Eleotridae), the primary members of our category 3 (lagoon-swamp). Based on our own fishing expedition to the swamp in 1997, in which we recovered cichlids, gar, and sleepers, we seriously considered placing sleepers in our category 4. Yet sleepers also occur in brackish lagoons and are well represented in the vertebrate fauna of Archaic shell mounds of the Acapetahua zone (Wake et al. 2004; Wake and Voorhies 2015). Cooke et al. (2004:Table 5.6) classify *Dormitator latifrons* as a euryhaline fish of marine origin that moves from freshwater into lagoons, has been recorded in oligohaline rivers, and is rare in estuaries in Panama. Both the IUCN Red List (Van Tassel 2010) and FishBase (http://www.fishbase.se/summary/Dormitator-latifrons.html) accounts for *D. latifrons* state clearly that the species is typically found in freshwater "but freely moves to the sea" and can be found in middle estuaries, mangroves, bar-formed lagoons, and upper estuaries (with citations to Bussing 1998 and Cooke 1992). In a study of two Pacific Coast Mexican lagoons with ephemeral inlets to the ocean and thus a yearly cycle of varying salinity, Yañez-Arancibia (1981:Table 1) recorded both *D. latifrons* and *E. picta* in the low- and moderate-salinity periods. In the same periods, he recovered *Cichlasoma trimaculatum*, but he does not report gar (*Atractosteus tropicus*). Rojas Herrera et al. (2009) report collection of six sympatric fish species (*S*[*A*]. *guatemalensis*, *C. trimaculatum*, *M. curema*, *D. latifrons*, *E. picta*, and *G. maculatus*) in Laguna Tres Palos, Guerrero, Mexico, where the presence of *C. trimaculatum* indicates a relatively low salinity. We have maintained our category 3 (lagoon-swamp) in our simplified division of taxa for two reasons. First, there appears to be uncertainty about how reliably *D. latifrons* and other sleepers might be expected to co-occur with the freshwater-oriented gar and cichlids. Second, in our Cherla-phase assemblage, the representation of sleepers rises dramatically relative to gar and cichlid. Possible explanations for that shift are considered below.

Mean Fishery Trophic Levels

To explore changing fishing strategies and possible effects of overfishing highly ranked species through time at Paso de la Amada, we calculated MTL values (e.g., Wake et al. 2013). The MTL values change little over the course of the occupation: 3.34 in Locona, 3.35 in Ocós, and 3.28 in Cherla, suggesting little change in an already somewhat depleted fishery (Wake and Voorhies 2015:157).

A Simplified Classification of the Assemblage

The goal of reducing the variability of the faunal assemblage to simplified categories is to bring out basic behavioral patterns in the utilization of wild faunal resources, including resource ranking and the exploitation of different habitats within the Mazatán region. The preceding discussion has laid out the basis for division of the aquatic taxa (fish and turtles). Birds are distinguished as aquatic versus terrestrial. The rest of the assemblage consists of mainly terrestrial reptiles and mammals. In this last case, the simplified classification emphasizes body size. "Large prey" includes animals whose larger body size would have constituted substantial meat packages. Other things being equal, these are expected to have been top-ranked resources. (Other factors that could intervene would be, for instance, the presence of smaller animals susceptible to mass harvesting.) The category "small–medium prey" includes a wide range of taxa, most of them represented in small numbers in the assemblage; we postulate that these were acceptable but second-rank food resources. "Minor terrestrial" taxa, including small rodents and most snakes, were probably not particularly attractive as food and may be more commensal in nature, inhabiting human structures and taking advantage of human detritus.

The percentage distribution of the simplified categories by phase is shown in Table 14.10. Two versions are provided: based on MNI (to the left) and estimated biomass (to the right). In Part A of the table, percentages are for the entire assemblage. Below that, the percentages are recalculated for the aquatic taxa (Part B) and everything else (Part C). For the calculations based on MNI, we have left out birds. Those formed a minor component of the diet, but they include a substantial MNI count and detract attention from the patterns we are seeking here. Birds are included in the biomass calculations.

In Part A of the table, patterns to note are the rising importance of categories 2 and 3 among aquatic resources and the decline in large prey as a percentage of the collection. Other patterns already noted are declines in dog and toad.

What we take to be the most important patterns emerge more clearly when the aquatic and other resources are separated. In Part B, the reduced representation of marine-lower estuary and freshwater swamp habitats in Cherla compared to Ocós and/or Locona is evident. In calculations based on MNI, the estuary-river and lagoon-swamp taxa (categories 2 and 3) rise from 51.1 percent in Locona to 75.6 percent in Cherla. Based on estimated biomass, the percentages are 44.7 in Locona, rising to 75.3 percent in Cherla.

We have noted above that the inhabitants of Cherla-phase Paso de la Amada were eating more fish relative to other animals than previous inhabitants of the site. What emerges particularly clearly in Table 14.10B is that even as they became more reliant on fish, they concentrated more on a smaller range of aquatic habitats. The main Cherla-phase taxa are the sea catfish, particularly *Ariopsis guatemalensis* and the Pacific fat sleeper, *D. latifrons*.

We are uncertain about the exact reasons for this shift, but a distinct possibility is that it involved targeting microhabitats close to the site—in the immediate catchment of Paso de la Amada itself and focusing on specific capture techniques. Cooke et al. (2004:267) note that *A. guatemalensis* "is very abundant in lagoonal systems all along the Mexican Pacific . . . to the point of being considered a pest by artisanal fisherfolk," while *A. seemanni* "can be especially abundant around human settlements where it feeds on offal." Data collected by Cooke and Rodriguez (1994a) illustrate clearly that various sea catfish (Ariidae) were the most common fish captured by stationary gill nets in the Río Parita, Panama. Cooke (1992:37–38) suggests that Ariid catfish (large flapnose sea catfish, *Sciades dowii*) could have been captured using tidal weirs. Cooke and Tapia (1994) illustrate the success of weirs in capturing sea catfish.

The situation with the sleepers is more puzzling. We are confident that inhabitants of the site could have fished for sleepers in the Cantileña Swamp. Cichilds and gar should also have been abundant there. Yet the sharp rise in sleepers during the Cherla phase was not accompanied by an increase in cichlids and gar. There appear to be four possible explanations. First, perhaps some of the swamp denizens had been overfished by the Cherla phase. As we argue below, that seems likely for gar but not cichilds. In general, we do not find this suggestion convincing as a stand-alone explanation for the Cherla-phase shift in species emphasis. Second, Cherla-phase fishers in the Cantileña Swamp may have specifically targeted sleepers instead of cichlids and gar. Third, Pacific fat sleepers can tolerate high relative salinities and descend into upper and middle estuaries as well as bar-formed lagoons to spawn (Cooke 1992). In Ecuador spawning occurs during floods between January and April (Chang and Navas 1984). Finally, there may have been other habitats besides the Cantileña Swamp in which sleepers were more abundant than cichlids and gar. One possibility is a lagoon, especially if one existed at this time to the northwest of the current mouth of the Coatán River, based on the salt pans (playas) in Clark's (1994:Figure 9) map, shown in black in Figure 14.1. The existence of such a lagoon in the era of interest here is uncertain, as discussed in the section on habitats of the Mazatán zone.

Besides the swamp and a possible lagoon, one other habitat in which inhabitants of Paso de la Amada might have had access to sleepers would be the seasonally inundated abandoned watercourses of the Coatán during the rainy season and early dry season. Such habitats would have been abundant in the immediate vicinity of the site. Cooke (1992:36, 37) mentions that *D. latifrons* could be taken by hand out of desiccating salt flat pools. If Pacific fat sleepers could be taken out of desiccating salt flat ponds, why not add the possibility of taking them out of desiccating seasonally inundated ponds farther inland? The site of Paso de la Amada currently is surrounded by seasonally inundated low areas (Figure 1.3).

In sum, the Cherla-phase inhabitants of Paso de la Amada were more reliant on fish than their Locona- and

Table 14.10. Percentage distribution of MNI and biomass based on simplified assemblage

	MNI				Estimated Biomass			
	Locona and Barra	Ocós	Ocós-Cherla	Cherla	Locona and Barra	Ocós	Ocós-Cherla	Cherla
A. All Vertebrates								
1. marine-lower estuary	10.8	15.8	17.5	13.2	5.7	2.9	5.2	6.4
2. estuary-river	16.7	15.8	19.3	49.8	8.9	17.4	21.4	39.5
3. estuary-swamp	12.6	7.7	6.1	16.0	1.6	1.8	3.5	5.1
4. swamp	17.1	18.0	14.9	8.1	7.3	10.3	15.7	8.2
birds, aquatic					0.1	0.2	0.1	0.1
birds, terrestrial					0.4	0.0	0.4	0.9
domestic dog	2.7	2.7	3.5	1.2	15.6	19.2	8.7	1.7
large prey	5.4	3.2	4.4	1.9	47.4	35.0	36.0	27.7
minor terrestrial fauna	9.0	13.1	8.8	2.1	2.9	1.6	1.1	1.4
small–medium terrestrial prey	15.8	14.0	19.3	6.3	8.5	10.8	7.6	9.0
toads and frogs	9.9	9.9	6.1	1.6	1.7	0.8	0.3	0.1
Total biomass (in kg) or MNI	*222*	*222*	*114*	*432*	*11.7*	*16.4*	*7.7*	*27.4*
B. Aquatic Resources								
1. marine-lower estuary	18.9	27.6	30.3	15.2	24.1	9.0	11.4	10.7
2. estuary-river	29.1	27.6	33.3	57.2	37.9	53.7	46.7	66.7
3. estuary-swamp	22.0	13.4	10.6	18.4	6.8	5.5	7.6	8.6
4. swamp	29.9	31.5	25.8	9.3	31.2	31.9	34.3	13.9
Total biomass (in kg) or MNI	*127*	*127*	*66*	*376*	*2.8*	*5.3*	*3.5*	*16.2*
C. Terrestrial and Other								
birds, aquatic					0.2	0.3	0.2	0.2
birds, terrestrial					0.5	0.1	0.7	2.2
domestic dog	6.3	6.3	8.3	8.9	20.3	28.3	16.0	4.1
large prey	12.6	7.4	10.4	14.3	62.0	51.8	66.4	67.8
minor terrestrial fauna	21.1	30.5	20.8	16.1	3.7	2.4	2.1	3.5
small–medium terrestrial prey	36.8	32.6	45.8	48.2	11.1	16.0	14.0	22.1
toads and frogs	23.2	23.2	14.6	12.5	2.2	1.2	0.6	0.2
Total biomass (in kg) or MNI	*95*	*95*	*48*	*56*	*9.0*	*11.1*	*4.2*	*11.2*

Ocós-phase predecessors. Although they continued to eat a wide variety of species, they focused particularly on a few taxa. We have not fully explained why these particular species were chosen for intensification. As a hypothesis for future investigation, we propose that Cherla-phase practices involved intensified fishing in the immediate catchment of the site, including the river, upper estuary, seasonally inundated abandoned river courses, and possibly lagoon settings within 5 km or so of the site. Both the freshwater Cantileña Swamp and marine-lower estuary habitats were still exploited in the Cherla phase, but they were less important than they had been previously.

Returning briefly to Table 14.10, it is important to note the lack of change in the contribution of large prey once we remove fish from the picture. (Compare large prey statistics in Parts A and C.) The minor terrestrial resources do indeed seem minor based on biomass and, with the exception of toad (considered as a separate line in the table), are stable. Contrasting with the stability of large prey, there is a rise in small to medium terrestrial prey. That result could conceivably reflect some pressure on the terrestrial resource base, a topic to be addressed below.

Were Fish Salted and Dried for Storage?

We believe that salt was being produced during the dry season at estuary locations in the Mazatán zone, beginning in the Locona phase (see Chapter 26). The dry season would have been a good time also for catching fish as they became concentrated as inundated areas shrank. Were the inhabitants of Initial and Early Formative villages salting and drying fish for storage? The differential representation of various skeletal parts at a site or within different areas of a site has the potential to speak to prehistoric fish processing behaviors. In general, large fish may be processed for transport by having their heads removed at the location of capture or at a separate processing site, while the bodies may be returned to the habitation site for consumption (Carvajal et al. 2007:102; Norton et al. 1999:154). In such a scenario, a greater proportion of postcranial remains than cranial elements should be represented in an assemblage. Of course, such a pattern may also be related to density-mediated attrition, since most cranial elements tend to be less dense than postcranial elements, making them more likely to be destroyed by postdepositional taphonomic processes (Butler and Chatters 1994; Zohar and Cooke 1997), leaving a greater proportion of postcranial remains behind. Vertebrae, a part of the postcranial skeleton, are particularly robust and likely to survive in archaeological assemblages (Wigen and Stucki 1988:106). However, in cases where density-mediated attrition can be ruled out as the primary driving force in creating differential body part representation in an assemblage, patterns in the distribution of cranial and postcranial elements may speak to processing behaviors (Butler and Chatters 1994; Çakirlar et al. 2014; Carvajal et al. 2007; Zohar and Cooke 1997).

To explore the possibility that fish may have been processed away from Paso de la Amada at their site of capture, the distribution of elements was examined within the two most abundant families of fish identified, Ariidae (catfish) and Eleotridae (sleepers). Data Record 14.1 presents the NISP of each element in the assemblage identified to the family Ariidae, as well as the expected number of each element in a single, complete skeleton in this family. Because the number of vertebrae varies among species, comparative skeletons of all the Ariidae species identified at Paso de la Amada (*Ariopsis guatemalensis*, *Ariopsis seemani*, *Cathorops fuerthii*, *Notarius troschelli*, and *Occidentarius platypogon*) were consulted to produce an average expected number of vertebrae. This table also presents the NISP of each element identified as Ariidae at El Varal for comparison. Data Record 14.2 presents the same information for specimens identified to or within the family Eleotridae (species include *Eleotris picta* and *Dormitator latifrons*). Elements were then classified as either cranial and near-cranial elements or postcranial elements. Elements that were on the border and could be grouped into either category were assigned based on whether or not, in an instance of processing a single fish, they were likely to have been removed with the head or to have remained with the body.

If catfish or sleepers were routinely processed at the site of capture, with the heads left and the bodies perhaps salted and dried before being transported to Paso de la Amada, then we would expect an overrepresentation of postcranial remains and an underrepresentation of cranial remains at Paso de la Amada. This does not appear to be the case with specimens identified as Ariidae (Table 14.11). Cranial or near-cranial remains are expected to make up 52 percent of all bones in a single, complete Ariidae skeleton, while postcranial remains make up the remaining 48 percent. In all phases (Barra through Cherla), the opposite of the expected pattern was observed: cranial remains are overrepresented while postcranial remains are underrepresented. Catfish appear to have been returned to the site whole to be processed and consumed. Ariid cranial bones are relatively simple to identify to at least family due to their relative robustness and their distinctive rugose outer table on most elements, features that probably explain the overabundance of cranial elements compared to that expected for this taxon.

In the case of Eleotridae, a pattern potentially indicative of routine off-site processing is observed (Table 14.12). Cranial remains are consistently underrepresented compared to their expected proportional representation. The pattern becomes even stronger in the Cherla phase than previously. The most likely factor here is taphonomy and differential preservation of the thin-walled cranial bone versus the more survivable and identifiable vertebrae. We also see no practical reason to process relatively small-bodied sleepers away from the site while returning complete catfish carcasses. The eleotrid head bones are more susceptible to fragmentation due to their relative fragility; the lower rate of recovery of cranial elements in the Cherla sample is likely the result of a higher level of trampling in what is basically a tertiary deposit.

As noted in Chapter 26, we have not given up the idea that the ancient inhabitants of Paso de la Amada might have salted and dried fish during their dry season forays to the estuary. At this point, we have not managed to produce any supporting evidence for that idea among the faunal remains. Voorhies (2004:408–9) notes that in the Aca-

Table 14.11. Percentage of cranial/near-cranial and postcranial remains of Ariidae by phase at Paso de la Amada

	Expected	Barra-Locona	Ocós	Ocós-Cherla	Cherla
Cranial	51.85	75.73	64.11	69.85	69.65
Postcranial	48.15	24.27	35.89	30.15	30.35

Table 14.12. Percentage of cranial/near-cranial and postcranial remains of Eleotridae by phase at Paso de la Amada

	Expected	Barra-Locona	Ocós	Ocós-Cherla	Cherla
Cranial	63.64	28.37	21.91	31.25	13.04
Postcranial	36.36	71.63	78.09	68.75	86.96

Table 14.13. Percentages of avifaunal sample by habitat preference

	NISP		MNI	
	Locona-Ocós	Cherla	Locona-Ocós	Cherla
Terrestrial	**58**	**88**	**47**	**87**
arboreal	54.2	56.3	42.1	60.9
ground	4.2	31.3	5.3	26.1
Aquatic	**42**	**13**	**53**	**13**
wading	25.0	10.4	31.6	8.7
swimming	16.7	2.1	21.1	4.3

petahua estuary today, fish are sun-dried and transported inland without removal of any bones.

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Bird Habitats

Birds were a minor source of food, most likely taken opportunistically in chance encounters or for specific purposes (see Bishop et al. 2018). Yet a comparison of the habitats from which different bird taxa may have been obtained suggests changing frequencies of encounters with denizens of different habitats. Specifically, the bird data are consistent with the proposed narrowing in the habitats exploited between the Ocós and Cherla phases.

Each bird taxon was assigned to one of two habitats, terrestrial or aquatic, and within each of those to one of two subsequent behaviors/nesting locations: arboreal (perching) versus ground-dwelling terrestrial birds, and wading versus swimming aquatic birds. Table 14.13 presents the proportion of the avifaunal sample from each of these habitats/behaviors. (See also Data Record 14.3 for how specific species were classified.) The use of NISP in these calculations allows for a larger sample, since many birds assigned to higher taxonomic levels (genus, family) can still be assigned a habitat/behavior category. Because MNI was generally not calculated for taxa above the level of species, specimens with only family-level identifications are lost in the MNI sample in Table 14.2. Regardless, trends using NISP and MNI are overall complementary to one another.

In the combined Locona and Ocós phases, terrestrial and aquatic birds were both captured in similar abundance. Within these categories, arboreal birds dominated compared to ground-dwelling taxa, and wading birds dominated compared to swimming. In the Cherla phase, attention became focused on terrestrial birds (with arboreal still predominating) at the expense of the exploitation of aquatic birds, whose representation in the sample decreases dramatically. While exploitation of arboreal birds remains relatively consistent from Locona-Ocós to Cherla, the attention previously paid to aquatic birds seems to have shifted to a focus on ground-dwelling birds. The two aquatic habitats available (the coastal/littoral area and the Cantileña Swamp) are farther from the site, while many ground-dwelling and arboreal birds would be most commonly encountered immediately surrounding the site, especially ground-dwellers available in the surrounding coastal plain and savanna. The observed shift away from aquatic birds may be related to the Cherla-phase fishing strategy that appears more focused on catfish and sleepers. This shift in the exploitation of different types of birds from different habitats represented a narrowing in focus in the Cherla phase to birds that would have been most readily available near Paso de la Amada. This shift could also have been inspired by an expansion of agricultural fields, which often attract ground-dwelling/foraging birds.

EVIDENCE OF PRESSURE ON WILD FAUNAL RESOURCES

Increases in diet breadth may be responses to overhunting and resultant pressure on top-ranked resources (Broughton 1997, 1999; Broughton and Grayson 1993; Grayson and Delpech 1998). One generally expects large animals—those yielding a high caloric return for an individual kill—to be highly ranked (Broughton and Bayham 2003; Broughton et al. 2011; Hawkes and O'Connell 1992). Thus one indication that hunting was causing pressure on the resource base would be a decline in the representation of large prey in a faunal assemblage (Broughton 2002; Broughton et al. 2015; Nagaoka 2002). This section looks for such evidence at Paso de la Amada. We consider terrestrial mammals and reptiles (with caimans and crocodiles included among "large prey") and then turn to the fish. In each case, we look at the representation of larger animals by phase, with additional considerations particularly for fish.

At first glance, there seems reason to expect evidence of resource pressure early in the sequence rather than late. Surface survey shows that, in the era from Barra to Cherla phases, the peak regional population was during the Locona phase: 602 ha occupied compared to 41 ha in Barra, 350 ha in Ocós, and 255 ha in Cherla (Pye et al. 2011:Table 10.1). Population was less dense in the Cuauhtémoc zone, but the Locona phase there also represented an early peak in hectares occupied (Rosenswig 2008). Thus, merely in terms of local population density, pressure on the wild resource base seems more likely in the Locona phase than in Ocós or Cherla. Further, the relatively greater breadth of Locona-phase diets compared to those of the Cherla phase—documented in the preceding sections—could conceivably be the result of pressure on top-ranked resources. According to such logic, the more even use of habitats exploited, the comparatively high consumption of dog, and the use of minor resources such as toad could be indications that hunting by Locona-phase inhabitants of the Mazatán region was putting strain on top-ranked wild resources such as deer, causing people to expand use of domesticated resources such as dog as well as other, lower-ranked wild resource choices. The decreased diet breadth of the Cherla phase would (according to this scenario) be the result of relaxed resource pressure in a situation in which regional population had declined.

The results described in this section do not follow these expectations. There is some evidence for pressure on the wild resource base at Paso de la Amada, but it appears in the Cherla phase rather than in Locona, when human population density had declined from its Locona-phase peak and when diet breadth had narrowed. We lay out the evidence in this section and attempt to account for the patterns in Chapter 26.

Possible evidence of declining returns from the hunting of large prey can be observed in Table 14.10A. As a percentage of the overall faunal assemblage, large prey declines between Locona and Cherla as measured both by MNI (5.4 to 1.8 percent) and estimated biomass (47 to 28 percent). Separating out aquatic resources complicates interpretation of that pattern. With aquatic fauna removed (Table 14.10C), large prey is more stable both by MNI (Locona 12.6 percent, Cherla 14.3 percent) and estimated biomass (Locona 62 percent, Cherla 68 percent). Thus the general decline in representation of large prey seen in Table 14.10A may have been produced by a complex mix of factors that included an increased emphasis on fishing in the Cherla phase.

It is therefore helpful to isolate the terrestrial fauna and look for hints of resource pressure within that set of data. We do that by means of an index loosely inspired by the work of Broughton (1999), comparing biomass estimates of domestic dog and the smaller wild animals to the biomass of large prey. The formula in each case is the estimated biomass of the category of interest divided by the sum of the biomass of that category and the biomass of large prey. Higher values of these indices would be possible evidence of pressure on higher-ranked resources.

The results are presented in Table 14.14. Small–medium prey includes iguanas, a couple of large snakes (boas and indigo snakes), opossums, armadillos, ocelots, jaguarundis, foxes, weasels, coatis, raccoons, pacas, squirrels, giant pocket gophers, agoutis, and rabbits. That category increases relative to large prey between Locona and Cherla, though the trajectory is somewhat bumpy. (The decline in dog and in toad between Locona and Cherla have already been noted; those are related to the greater diet breadth in the earlier part of the sequence.) A greater frequency of such animals relative to large prey could signal some pressure on top-ranked resources in the Cherla phase, but there is reason to be cautious. If encounter rates with large prey were declining, one might expect the diversity and/or equitability of the small–medium fauna to increase in Cherla. The results of that analysis depend on what summary measure one takes as the basis for calculations. Results for NISP and estimated biomass are shown in Table 14.15. Based on estimated biomass, there is an increase in

Table 14.14. Indices of secondary resources in relation to large prey[a]

Index	Locona	Ocós	Ocós-Cherla	Cherla
Small–medium mammals and reptiles: large prey	1.5	2.4	1.7	2.5
Dogs: large prey	2.5	3.5	1.9	0.6
Toads and frogs: large prey	0.34	0.22	0.09	0.03
Minor terrestrial animals: large prey	0.57	0.45	0.31	0.49

[a] Based on biomass estimates. The formula for the index is X/(X + large prey).

Table 14.15. Diversity among small–medium terrestrial prey[a]

	Locona	Ocós	Ocós-Cherla	Cherla
NISP				
diversity (H′)	1.79	1.70	1.62	1.62
number of taxa (S)	11	11	12	14
equitability (V′)	0.75	0.71	0.65	0.61
Biomass				
diversity (H′)	1.20	1.47	1.35	1.67
number of taxa (S)	8	8	9	11
equitability (V′)	0.58	0.71	0.61	0.70

[a] Shannon-Weaver diversity index. See section on diet breadth at Paso de la Amada for background.

diversity and equitability among small–medium animals, consistent with increased pressure on the top-ranked wild mammalian resources. Yet calculations based on NISP yield the opposite result: a decrease in both diversity and equitability.

Our conclusion is that there is possible evidence for increased resource pressure in the Cherla phase (based on the higher small–medium animal index in Table 14.14) but that the case is not a strong one (based on mixed results in Table 14.15).

There is stronger evidence for pressure on fish resources in the Cherla phase compared to Locona and Ocós. Basically, the size of fish brought to the site seems to have declined over time in terms of both inferred length and biomass. It is possible that some of the decrease was related to shifts in emphasis among habitats in the swamp-estuary system. To boost our suggestion that resource pressure was a factor, we present additional evidence of a shift to species less vulnerable to overfishing.

The main source of the information considered here is the FishBase website (www.fishbase.org). For identified fish species (see Table 14.2), we recorded trophic level, resilience, vulnerability, maximum length, and common length. The analyses presented here draw on maximum length and the vulnerability ratings. With the focus on individual species, we choose MNI as the most appropriate summary measure.

One issue that arose in the assessment of species vulnerability is conflicting information on one species that is particularly common in the assemblage, *Ariopsis guatemalensis*. The FishBase website rates that species as highly vulnerable, apparently on the basis of modern extinction threats (Cheung et al. 2005). Yet Cooke et al. (2004) note that in some Chiapas estuaries, *A. guatemalensis* is so common as to be considered a pest, an observation that seems inconsistent with a rating of high vulnerability. Further, both the IUCN Red List (Cooke et al. 2010) and FishBase (https://www.fishbase.de/summary/13471) assess *A. guatemalensis* as a species of "least concern."

Because of this conflicting information, we have left the genus *Ariopsis* out of the analysis of vulnerability presented below. (Because *A. guatemalensis* is so common, in alternate versions that included it as either of moderate or low vulnerability, the species ended up essentially determining the results as exhibiting a decisive trend toward predominantly moderate and predominantly low vulnerability, respectively. It seems most useful to leave it out altogether and see what the pattern is in all other taxa combined.)

FishBase provides maximum length for all the species considered here, whereas the potentially more relevant "common length" is provided in only some cases. We computed a fish length index. The maximum length for each taxon was multiplied by the proportion of total fish MNI represented by that taxon. We then summed those values to obtain the fish length index for each phase.

A portion of the MNIs for each phase corresponds to identifications to genus but not species (for example, *Caranx* sp.). For both the vulnerability and the maximum length analysis, we assigned hypothetical values to that portion of the data in the following manner. Where only a single species was identified, identifications to sp. were all assigned to that species. Where more than one species were identified, identifications to sp. were divided among them according to their proportional representation in the full sample. (See Data Record 14.4.)

Finally, we have one source of direct evidence on fish size: a set of 2,304 vertebrae widths from dated deposits measured by Barry Brillantes (2011) for his UCLA undergraduate thesis. This set of values is neither complete nor random, and it is unevenly distributed across taxa. It therefore needs to be used with caution. We look particularly for instances of convergence in results in the vertebrate data and information from FishBase.

Two distinct sources of evidence suggest a decrease from Locona to Cherla in the size of fish collected. The fish length index declined steadily: from 65.5 in Locona to 57.5 in Ocós (88 percent of the Locona value) to 49.9 in Cherla (76 percent of the Locona value). (Remember that these calculations are based on the maximum length of species represented—scaled according to proportional representation in the assemblage—not the actual length of fish harvested.) The overall average of measured vertebra width also declines: from 5.19 mm in Locona to 5.09 mm in Ocós to 3.93 mm in Cherla.

Neither of these measures is fully satisfactory, since fish recovered need not have been close to the species maximum in size, and in calculating the average vertebra width, we have not controlled for the differential representation of taxa. Consideration of species vulnerability helps to alleviate such concerns, since the results are consistent with a decreasing size of fish recovered and thus pressure on fish resources. The vulnerability analysis is presented in Table 14.16. There is a sharp decline in representation of species highly vulnerable to overexploitation—the larger, less numerous, higher-trophic-level species—and an increase in the representation of low-vulnerability, more numerous, lower-trophic-level species.

We have found possible evidence for pressure on the wild resource base not during the Locona phase (1700–1500 BC), when regional population density was greatest, but instead toward the end of the occupation of Paso de la Amada (Cherla phase, 1400–1300 BC), when local population density had declined. We offer some possible explanations for this finding in Chapter 26.

OPEN LAND, EDGE, AND HOUSEHOLD TAXA

Linares (1976) proposed a "garden hunting" pattern to explain terrestrial mammal procurement at Cerro Brujo in western Caribbean coastal Panama, where hunting of terrestrial prey concentrated around cleared agricultural fields. Some species may depredate crops grown in the fields, forcing protection of the crops and providing increased opportunities to encounter potential prey drawn to a specific patch on the landscape. Garden hunting should produce a terrestrial vertebrate archaeofauna dominated by species attracted to the edges of the fields, where biodiversity tends to be greater than in primary forest or in open agricultural fields (Grayson 1973; Linares 1976, 1977; Linares and Ranere 1980; Linares and White 1980). Based on evidence for intensification of maize grinding during the occupation of Paso de la Amada (Chapter 9), one might expect an increasing representation of taxa hunted at the edges of agricultural fields in the Cherla phase compared to Locona. However, the observed pattern is the opposite of that.

Certain taxa, such as various species of doves, rabbits, gophers, toads, and iguanas, would have been attracted to the open land created by the process of clearing vegetation for agricultural fields. When we examine changes in percentages of these "open land taxa" in the assemblage over time (Table 14.17), we see that their greatest contribution is in the Barra-Locona sample. This percentage decreases in Ocós and perhaps slightly more in the Cherla phase. Similarly, other taxa, such as chachalacas, quails, and peccaries, may have been attracted to the edges of agricultural fields. These "edge taxa" form a minor percentage of the assemblage. Still other taxa are likely "household commensals" that might have been attracted to stored agricultural products in and around domestic structures. These include rice and cotton rats, deer mice, and harvest mice. Like the open land taxa, household commensals decrease as a percentage of the collection over the course of the sequence. When all three of the above are combined (in the bottom row of Table 14.17), we again find a pattern of gradual decline over the sequence.

The expectation was that the proportional contribution of these different taxa (edge, open land, household commensal) would increase over time as a result of the intensification of agricultural pursuits and the concomitant opportunistic hunting of these animals as they were attracted to fields. That pattern is not apparent. The observed results may be attributable instead to the patterns in dietary breadth discussed above. Dietary breadth narrowed over the course of the occupation of Paso de la Amada, with occupants consuming a wider array of animals early on. We propose that any tendency toward a greater representation of commensals due to gradual intensification of agricultural activities was overwhelmed in this case by other factors, in particular the high dietary diversity of the Locona phase

Table 14.16. Percentage distribution of fish MNI according to species vulnerability[a]

Vulnerability	Locona	Ocós	Ocós-Cherla	Cherla
low	36.1	39.9	40.3	51.8
moderate	39.7	42.5	49.1	38.3
high	24.2	17.6	10.6	9.8
Sum MNI	*88*	*76*	*46*	*186*

[a] Identifications to genus included. The genus Ariopsis not included in this analysis because of conflicting information about vulnerability, particularly of Ariopsis guatemalensis. (See text for discussion.) Vulnerability data from www.fishbase.org, accessed December 2017. (The row "low" includes vulnerability scores of 18 to 30; "moderate" includes scores of 31 to 56; "high" includes scores of 59 to 88.)

Table 14.17. Open land, edge, and household taxa at Paso de la Amada, split by phase

	Barra-Locona	Ocós	Ocós-Cherla	Cherla
Open land taxa	20.57	11.50	9.65	11.12
Edge taxa	0.15	0.58	0.27	1.31
Household commensals	3.27	3.89	1.77	0.40
Open land, edge, and household taxa, combined	*23.98*	*15.98*	*11.69*	*12.84*

compared to Cherla. Locona-phase inhabitants of the site were eating a higher proportion of open land, edge, and household taxa not because of greater commitments to agriculture compared to the Cherla phase but because they were in general eating a greater variety of animals.

SOCIAL AND RITUAL USES OF ANIMALS

Social Status and Access to Faunal Resources

Evidence for the differential consumption of animals by subsets of a population can relate to status differences in diet and cuisine. In a situation of emergent social complexity such as at Paso de la Amada, differences in the types of animals consumed can indicate the degree to which diet may have been controlled by sumptuary rules and restricted access to the procurement and consumption of different dietary fauna. DeFrance (2009) surveys the zooarchaeological correlates of status differences in archaeological cases across the world. While less has been done in southern Mexico than in the Maya region, research in the latter suggests that elites or people of higher status may have consumed more meat in general, a greater diversity of animals, younger animals, imported fish and marine foods, and more birds (Clutton-Brock and Hammond 1994; deFrance 2009; Emery 2003; Masson 1999; Pohl 1994; Teeter 2004). Those of lower status may have consumed less meat and meat of poorer quality, small animals, and more fish and turtles (deFrance 2009; Pohl 1994; Wing 2004). Research in the Valley of Oaxaca at the Classic-period site of El Palmillo has shown that elites may have consumed more white-tailed deer, domestic dog, rabbits, and wild fauna in general, while non-elites consumed more turtles and reptiles (Haller et al. 2006).

In the Soconusco, crocodiles are potential foci for differential access based on both the spectacularly large potential meat packages and symbolic ramifications derived from the danger they pose to humans and other animals—the latter amply demonstrated at Paso de la Amada in the preferential placement of human attributes, including forehead mirrors, on crocodile images (Figures 16.6f, 16.7n) and the elaborately carved crocodile tooth from Mound 12 (Figure 15.3f–g).

Rosenswig (2007) has argued that elites at Cuauhtémoc feasted on dog during the Conchas phase (1000–700 BC), based on the greater quantities of dog remains recovered in an elite midden compared to a non-elite midden. Domestic dog is also quite common in elite contexts during the

Conchas phase at La Blanca (Wake and Harrington 2002). At Tierras Largas, a single deposit of five butchered dogs may be the remains of processing for a feast (Marcus and Flannery 1996). On the other hand, Flannery and Marcus (2005) have argued that dogs were a common household food choice at San José Mogote. Despite these contradictions in the use of dog in the archaeological record at Formative sites, the distribution of dog remains between elite and non-elite contexts may be informative.

An abundance of deer in elite contexts has also been used as a measure for differential access to animal resources (e.g. Haller et al. 2006; Masson 1999). In ungulates in general, relatively "high-ranking" portions of the body, representing "prime cuts" with maximal meat, include the upper elements of the fore and hind limbs (humerus, scapula, femur, tibia) (Hockett 1998:297; see also Binford 1978; Emerson 1993; Metcalfe and Jones 1988). More recently, in an experimental study of the quantity of meat yielded when processing a North American pronghorn (*Antilocapra americana*), O'Brien and Liebert (2014) concluded that the femur and the axial skeleton were the most valuable in terms of both kilocalories and efficiency (measured in kilocalories per hour of processing time). It should be noted that others (see deFrance 2009:123) have cautioned against the use of such measures, especially the assumption that the differential distribution of the meatiest elements may reflect status differences, since elements that carry less meat (such as the cranium and metapodia) may still be desirable for their high fat or marrow content.

At Paso de la Amada, 945 individual dog specimens are identified, representing 25 MNI. These remains were recovered from deposits from all phases except the Barra phase and from all mounds except 13 and 14 (from which very few faunal remains were recovered in general). A total of 167 NISP and 24 MNI of deer (white-tailed deer, a single *Mazama americana* specimen, and those identified to the family Cervidae) were recovered from all time phases and all mounds excluding Mound 13. Specimens identified as belonging to the order Crocodilia (*Caiman crocodilus*, *Crocodylus acutus*, and unidentified Crocodilia), totaling 70 NISP and 11 MNI, were recovered from all phases except Barra, and only from Mounds 1, 6, and 12.

The distribution of the remains of these three types of fauna—deer, dog, and crocodilians—was examined between elite and non-elite contexts (see Chapters 7 and 25 for discussion of that distinction). There is no evidence of differential distribution of or access to any of these animals at Paso de la Amada, either in the proportion of remains in these areas or in distribution of body portion. Table 14.18 demonstrates that in the Locona and Ocós phases, a greater proportion of dog, deer, and crocodilian remains were recovered from non-elite contexts, while in the Cherla phase, the opposite is true. However, this same pattern is reflected in the overall assemblage when all faunal remains are compared between elite and non-elite contexts. For example, the proportion of dog remains in elite and non-elite contexts in the Locona and Ocós phases matches almost perfectly the expected proportional distribution based on the overall faunal assemblage.

When the distribution of different body parts (cranial, axial, forelimb, and hind limb) are examined for deer, there is still no difference in the proportional representation between elite and non-elite contexts (Table 14.19). In non-elite and elite contexts of the Locona-Ocós phases and the Cherla phase, cranial elements predominate, followed in order by hind limb elements, axial elements, and forelimb elements. The outlier is non-elite Cherla-phase contexts, but these are represented by only a single hind limb specimen. Based on research described above, we might expect portions of the axial skeleton to dominate in elite contexts if elites had access to greater quantities of meat, since the thoracic region of the spine in particular provides backstrap and tenderloin meat (O'Brien and Liebert 2014:386). This does not appear to be the case, however, especially in the Locona and Ocós phases, where this portion of the skeleton is nearly equally represented in both elite and non-elite contexts. In the Cherla phase, axial remains are missing from non-elite contexts, but this sample is small, with only two specimens in Cherla elite contexts. Additionally, we might expect elements of the hind and forelimbs to predominate, given the meat associated with the upper limbs. Even when hind and forelimbs are considered together, there is still no real difference between elite and non-elite contexts in their proportional representation. (The apparent predominance of hind/forelimbs in non-elite Cherla-phase contexts is again due to a small sample of only one specimen.) Even when just the number of femora is compared, elite contexts have either equal or fewer femora than non-elite contexts. The same is generally true when the number of scapulae, humeri, femora, and tibiae are compared, except in the Cherla phase, where there are three of these elements from elite contexts compared to only one from non-elite contexts. However, these samples are far too small to be indicative of differential access to deer meat.

When body part representation is examined in dog (Table 14.19), cranial elements, as with deer, are the most abundant in all contexts (elite, non-elite, Locona-Ocós, Cherla). There are very minor differences in body part representation between elite and non-elite contexts. While there are more forelimbs in Locona- and Ocós-phase non-elite contexts, there are more hind limb elements in elite contexts. In the Locona-Ocós phases, axial elements comprise a greater proportion of all remains recovered from elite contexts than they do in non-elite contexts, but as far as we are aware, no experimental processing of domestic dog has been done to demonstrate which portions of the body provide the most meat. The Cherla-phase non-elite sample is very small (four NISP), though interestingly, the Cherla-phase elite sample is predominantly (75 percent, 15/20 NISP) comprised of cranial elements.

A similar analysis of body part representation was done for crocodilians. Because they are of clear symbolic

Table 14.18. Percentage distributions of faunal remains between elite and non-elite contexts in the combined Locona and Ocós phases and in the Cherla phase

	Locona + Ocós		Cherla	
	Non-elite	Elite	Non-elite	Elite
Deer	63.79	36.21	3.45	96.55
Dog	58.90	41.10	16.00	84.00
Crocodile	70.83	29.17	0.00	100.00
Overall assemblage	57.56	42.44	3.62	96.38

Table 14.19. Body part representation in deer, dog, and crocodile[a]

	Skeletal Portion				
	Cranial	Axial	Fore	Hind	Fore + Hind
Deer					
Locona + Ocós					
non-elite	42.42	12.12	18.18	27.27	45.45
elite	42.86	19.05	14.29	23.81	38.10
Cherla					
non-elite	0.00	0.00	0.00	100.00	100.00
elite	59.09	9.09	4.55	27.27	31.82
Dog					
Locona + Ocós					
non-elite	66.04	9.43	20.75	3.77	24.53
elite	55.56	18.52	11.11	14.81	25.93
Cherla					
non-elite	50.00	25.00	25.00	0.00	25.00
elite	75.00	10.00	5.00	10.00	15.00
Crocodile					
Locona + Ocós					
non-elite	31.25	56.25	0.00	12.50	12.50
elite	80.00	20.00	0.00	0.00	0.00
Cherla					
non-elite	0.00	0.00	0.00	0.00	0.00
elite	3.00	50.00	20.00	30.00	50.00

[a] Cranial, axial, fore, and hind elements sum to 100 percent. "Fore + Hind" presents fore and hind limb elements together for comparison.

significance at Paso de la Amada (as evidenced by their depiction in effigy form; see Chapter 16), elites may have had better or exclusive access to crocodilians. As can be seen in Table 14.18, in the Locona-Ocós phases, the remains of crocodilians are actually better represented in non-elite contexts. In the Cherla phase, however, they are completely absent from non-elite contexts and appear only in elite contexts, though it should be noted that the overall Cherla-phase sample is small (13 NISP).

In sum, emergent inequality at Paso de la Amada was not expressed through differential access to dietary faunal resources. The distribution of deer, dog, and crocodile between elite and non-elite contexts generally matches the distribution of the overall faunal assemblage (Table 14.18). The analysis of body part representation between elite and non-elite contexts reveals similarly that status had a limited effect on the distribution of or access to different cuts of meat of potential food animals. Thus, while status may have affected in limited instances the use of different animals and different body portions, this effect was not so systematic or dominant as to create clear patterning in the zooarchaeological record. In support of this conclusion, a study of the avifauna (Bishop et al. 2018) similarly found no evidence of differential access to birds between elite and non-elite contexts, neither in quantity of birds nor types of birds.

Ritual Uses of Animals

That animals were involved in ritual practice at Paso de la Amada is most evident in the use of birds. Four individuals were deposited wholly or partly articulated at Paso de la Amada. The first three were deposited in Structure 4 in Mound 6. A nearly complete green heron (*Butorides virescens*) and Inca dove (*Columbina inca*), as well as the foot of a northern crested caracara (*Caracara cheriway*), were left on a step, the floor, and the front porch of Structure 4, respectively. These appear to have all been deposited at or near the same time in a potential act of ritual closure or dedication. Bishop et al. (2018) have suggested that the qualities of these birds (aquatic, ground, and arboreal) and their directional arrangement may have been intended to reflect the vertical ordering of the cosmos into the above, middle, and below. Additionally, the wings of a large parrot (*Amazona oratrix* or *Amazona auropalliata*) were found beneath a floor in Mound 13.

Crocodilians, as well as representing potentially a large amount of meat, appear in stone sculpture at later Formative-period sites in the region including Takalik Abaj and Izapa, as do toads. Crocodilians are present but rare at Paso de la Amada. Their potential ritual significance at Paso de la Amada is illustrated by the large carved crocodile tooth illustrated and discussed in Chapter 15 (Figure 15.3f–g) of this volume.

While we think that marine toads represent a minor food source at Paso de la Amada, the species also has potential ritual applications (Kennedy 1982). Toads are represented in stone sculpture both at Takalik Abaj and Izapa, as well as in ceramics at Paso de la Amada. We cannot rule out the possibility that toad skins, removed prior to cooking and eating as food, could have been additionally used for their potentially hallucinatory neurotoxins (bufotoxin).

Figure 15.1. Bone finger rings—finished, almost finished, and unfinished: (a–o) finished bone finger rings; (p–v) almost finished bone finger rings; (w–dd) unfinished bone finger rings. Proveniences (all from Mound 1): (a) L9/7; (b) J9/9; (c) I7/11; (d) I8/11; (e) F10/12; (f) H10/9–10; (g) K8/7; (h) I13/7; (i) K10/8; (j) J11/9; (k) I8/8; (l) I7/5; (m) I11/9–10; (n) L9/6; (o) H8/11; (p) F9/9–10; (q) J7/1; (r), K8/5; (s) F9/9–10; (t) K9/9–10; (u) H9/1; (v) I13/7; (w) L11/8; (x) G9/11; (y) H8/8; (z) K10/7; (aa) J9/7; (bb) H10/1; (cc) H8/8; (dd) I6/8. *Illustrations in this chapter by Katelyn Jo Bishop, R. Lesure, and project staff.*

CHAPTER 15

Bone Artifacts

Thomas A. Wake and Richard G. Lesure

IN TOTAL, 344 BONE ARTIFACTS were recovered from Mounds 1, 12, 13, 21, and 32. Much of the collection (249 artifacts, 69 percent) derives from Mound 1, mainly from the fill of the Cherla-phase platform.

In the descriptive sections of this chapter, we refer as appropriate to the 20 bone artifacts from Paso de la Amada previously reported by Ceja Tenorio (1985:103–6) and discuss also 18 bone artifacts from Mounds 5 and 6. The latter do not represent the full samples from those mounds but rather those that happened to travel to UCLA with the rest of the faunal remains because they had not initially been recognized as artifacts. We report them here to ensure that these data are not lost.

DESCRIPTION OF THE COLLECTION

Classification of bone artifacts followed an approach similar to Wake's previous analyses of bone tool assemblages (Wake 1997a, 1997b, 1998, 1999a, 1999b, 2001). The diagnostic bone artifacts are broken into two broad classes: ornaments and tools (Table 15.1). Ornaments and probable ornament production debitage (n = 197) are most common. There are 125 tools and probable tool production debitage. There are 40 modified bones not readily categorized as a tool or an ornament.

ORNAMENTS

Bone Finger Rings

Bone finger rings, finished and nearly finished, are particularly common; 65 were recovered. The finished rings are typically highly polished and elliptical in cross section. Most are undecorated, but 15 specimens bear fine-line incising in simple designs. Observed design fragments include circumferential incision (six cases, Figures 15.1m, 15.1v); longitudinal incision (two cases, Figures 15.1l, 15.1r); circumferential incision meeting longitudinal incision (one case); multiple, parallel diagonal incisions (two cases); opposed sets of diagonal incisions (two cases); and parallel diagonal incisions on one side of a central, circumferential incision (three cases, Figures 15.1n, 15.1o). The rings average 19.4 mm in diameter, with the bone 2.3 mm thick. The bands average 5.7 mm wide. Diameters are roughly equivalent to a modern ring of size 5, one size smaller than an average American woman's finger ring. The production sequence for rings is described in a subsequent section.

The collection is overwhelmingly from the Cherla platform at Mound 1 (89 percent). There are, in addition, one from beneath the platform at Mound 1 (H10/20, mixed Ocós-Cherla with some Locona), one from Mound 6 (48N46E/9, Locona), two from Mound 12 (E4/11, Ocós; F4/5, Ocós-Cherla ground surface under the platform), and three from Mound 32 (all from 2/239, in the pit of Mound 32 Burial 1).

Bone Tubes

The bone tube class consists of hollow long bones, predominantly of birds, with some reptiles and mammals represented as well (Figure 15.2a–l). We recovered 37 from the excavations reported in this book and an additional

Table 15.1. Worked bone from Paso de la Amada, split by excavation locale

Artifact Type	Mound 1	Mound 5	Mound 6	Mound 12	Mound 13	Mound 21	Mound 32	Trench 1	Total
Bone-Working Debitage									
debitage, string-cut	34			5			1	1	41
debitage, flake saw	15		3	10	2	1			31
Total debitage	*49*		*3*	*15*	*2*	*1*	*1*	*1*	*72*
Ornaments									
finger ring	59		1	2			3		65
dog mandible pendant				1					1
human mandible pendant		1							1
mammal long bone pendant	1								1
ocelot maxilla pendant				1					1
snake vertebra bead	16		2	5					23
crocodile tooth pendant				1					1
dog tooth pendant	3			2			1		6
drilled shark tooth	2			1					3
tube	26		3	5			6		40
worked gar scute	2			1					3
ray/shark centrum bead	7								7
ray/shark centrum earplug	3			1					4
Total ornaments	*119*	*1*	*6*	*20*			*10*		*156*
Tools									
antler	8			1	1				10
awl	6								6
awl-spatula	1								1
batten	2								2
fishhook	7			4					11
needle	7		2	8					17
pin	30		1	6	2		3		42
tooth cutter/graver	3	1		1					5
Total tools	*64*	*1*	*3*	*20*	*3*		*3*		*94*
Miscellaneous Worked Bone									
ground bone	12		3	10		1	1		27
modified human long bone				1	2				3
modified human long bone?				1					1
modified nasal bone, large mammal	1								1
polished bone	2				1				3

Artifact Type	Mound 1	Mound 5	Mound 6	Mound 12	Mound 13	Mound 21	Mound 32	Trench 1	Total
Teleostei, ground and polished	1								1
tooth pendant, carnivore				1					1
tooth pendant, Didelphis	1								1
tooth pendant, large mammal			1						1
tooth, worked, crocodile	1								1
Total miscellaneous	*18*		*4*	*13*	*3*	*1*	*1*		*40*
Overall Total	250	2	16	68	8	2	15	1	362

three from Mound 6. All of these bones have had their articular ends cut off with stone tools. The severed ends of the bone shafts are either left beveled or rounded through polishing. The finished tubes ranged between 5 mm and 15 mm in diameter and 5 mm to more than 50 mm in length. The majority are undecorated, but a few have relatively simple incised designs. Most are fragmentary.

While we strongly suspect that these artifacts were personal ornaments or costume components, we are not certain how exactly they were used. It is possible that more than one use was involved. One likely possibility is that they were strung as beads. Another is that at least some were nose ornaments, worn through a pierced septum. Their geometry would appear appropriate for the second suggestion. We have representations of nose ornaments on figurines, but we are not certain which specific artifact class was used that way. A note of caution in the second suggestion is that nose ornaments as depicted on the figurines do not resemble bone tubes. They are shown as tiny balls of clay affixed to the base of the nose. It is unclear how accurate we should expect such representations to be.

Bone tubes were used throughout the occupation at Paso de la Amada. One of the bone tubes from Mound 6 (Level 11 Lots 29–32) is securely Locona; another Locona-Ocós (Md.6 H26/6), and a third Ocós (Md.6 Basurero 1, 48N46E). Five specimens come from Late Locona deposits in Mounds 1 and 12 (though three specimens from Mound 1 Feature 15 may be from one artifact). There are seven Ocós-phase specimens from Mounds 12 and 32. The latter include five tube fragments from Feature 6 that constitute at least four and possibly five separate tubes. One of those preserves a full original length of 54 mm, and the others could be from pieces of similar original length. All these specimens from Mound 32 may be from the same necklace. Twenty-two specimens come from the redeposited Cherla midden in the Mound 1 platform. Others are from mixed contexts. From Mound 32 Unit 2 Lot 239, the lot assigned to the burial, there is a bone tube made from a long bone of a large mammal. The artifact is 17 mm in diameter and 30 mm long (original dimensions).

Snake Vertebrae Beads

The ground snake vertebrae class has few comparisons in Mesoamerica outside of the Soconusco (Figure 15.2s–v). Wake has identified ground snake vertebrae at Aquiles Serdán, La Blanca, and El Ujuxte. The artifacts are mainly vertebral centrae from large (2.5 m) individual indigo snakes (*Drymarchon melanurus*) or other large colubrid species. Nonvenomous indigo snakes are some of the largest, reaching 3 m in length, and arguably the strongest, fastest, and fiercest serpents in the region. They are renowned for eating other snakes, including venomous species such as rattlesnakes (*Crotalus simus* or *cascabel*) and lanceheads (*Bothrops asper* or *terciopelo*), and for their bold threat displays (Savage 2002).

Most of the individual vertebrae in this class have had both their dorsal and ventral surfaces ground flat. The neural keel is chipped off and ground down, and the haemal ridges are ground flat. Sometimes the anterior and posterior (prezygapophyses and postzygapophyses) portions are ground down as well. Ground snake vertebrae are commonly used for necklaces and adornment in parts of Africa, and we think that those at Paso de la Amada were suspended as beads.

Twenty-one specimens were recovered. There is one from a Late Locona context in Mound 12 (P5/5). The other four from that mound are all Ocós (F1/10, F1/10, T1E/7, K7/F.19). The remaining 16 are from the redeposited high-status midden in the platform at Mound 1. Two more ground snake vertebrae were recovered in Locona-Ocós deposits at Mound 6 (H26/6 and A25/7).

Ray and Shark Vertebrae Beads and Earspools

Bat ray, stingray (Myliobatiformes) or bull shark (*Carcharhinus leucas*) vertebral centrae were made into two distinct classes of ornament (Figure 15.2m–r). In both cases, the constricted notochord canal was purposely widened by drilling and grinding.

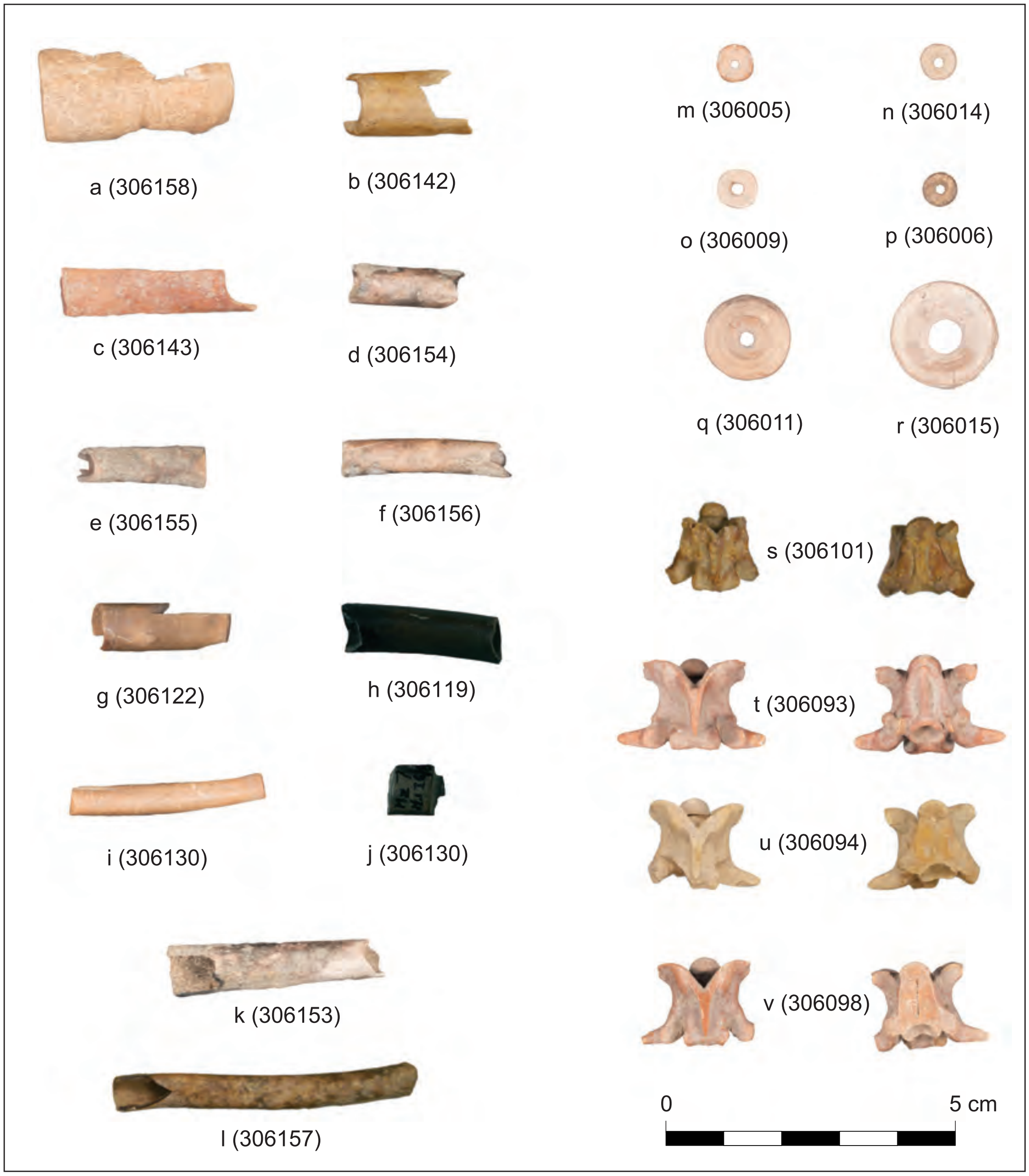


Figure 15.2. Bone ornaments: (a–l) bone tubes; (m–r) ray and shark vertebrae beads and possible earspools; (s–v) snake vertebrae beads. Proveniences: (a) Md. 32 2/239; (b–c) Md. 1 F10/E10/el.15; (d–f) Md. 32 1/211; (g) Md. 1 K10/9; (h) Md. 1 J10/7; (i–j) Md. 1 I6/11; (k) Md. 32 1/202; (l) Md. 32 1/211.

In the case of the seven small beads, the holes were widened just enough to allow a string to be passed through; resulting hole diameters range from 1.3 to 2.6 mm (Figure 15.2m-p). The outer diameters of the beads range from 5.5 to 8 mm. They are 2.8 to 4 mm thick. Ceja Tenorio (1985:103, Figure 58e) reports similar artifacts (diameter 6–8 mm, thickness 2–5 mm) from Paso de la Amada, which he classifies as ear ornaments.

There are in addition two quite different ray centrum artifacts; it is these we think are likely ear ornaments (Figure 15.2q-r). They are made from distinctly larger centrae than those used for beads, with outer diameters from 14 to an estimated 26 mm. In these cases, the central hole has been widened considerably to produce a ring of bone just 3 to 5 mm thick. Width of the band ("depth" in terminology used for ear ornaments; see Chapter 17) is 7–10 mm.

Ceja Tenorio (1985:103, 106) interpreted the ray and shark centrum artifacts as ear plugs, following Green and Lowe's (1967:31, Figure 41b) and Coe's (1961:108, Figure 59i) interpretations of similar artifacts from Altamira and La Victoria, respectively. Clark and Colman (2014:149) accept those precedents.

In our opinion, the smaller "beads" cannot have been earplugs, but the large ones probably were. There is first the issue of the dimensions. In terms of diameter, our seven "beads" and those reported by Ceja are 5.5–8.0 mm in diameter. This is at the extreme low end of the range for ceramic ear ornaments from Paso de la Amada, described in Chapter 17. Among 1,357 *ceramic* ear ornaments with measured diameters, only 1.2 percent of the collection had diameters as small as centrum "beads." Of even greater concern is whether the ray centrum artifacts were deep enough to remain in the ear. Depth of the "beads" ranged from 2 to 5 mm. Ceramic ear ornament depth (the distance between open ends) began at 8.5 mm; the two ceramic earplugs of 4 and 8 mm diameter had depths of 8.9 and 8.7 mm, respectively. In other words, the ray/shark centrum beads do not seem to be wide/deep enough to have functioned effectively as earplugs.

The larger centrum artifacts are another matter. Their dimensions fit within the range of variation of cylindrical ceramic eartubes described in Chapter 17.

The ray centrum beads and all but one of the ear ornaments come from the redeposited Cherla-phase high-status midden in the Mound 1 platform. The remaining earplug (306015) is from Locona deposits in Mound 12.

Dog Tooth Pendants

Five dog tooth pendants and a small fragment of what is probably a sixth were recovered (Figure 15.3a–b). Two have a biconical hole drilled through the root (306112: Md.1 I11/9–10, Cherla; 306345: Md.1 J9/5, probably Cherla), as does the small fragment (306356: Md.12 F1/10, Ocós). Two others are grooved just below the enamel for suspension (306113: Md.1 I8/9–10, Cherla; 306118: Md.32 T4F/201, Ocós). The final specimen is scored and ground; it was probably a pendant like the two grooved specimens (306115: Md.12 E3–4/19, Late Locona). Ceja Tenorio (1985:Figure 58a) found a dog tooth pendant similar to the grooved ones reported here.

Carved Crocodile Tooth Pendant, "El Colmillo del Rey"

One particularly interesting artifact is an intricately carved crocodile (*Crocodilus acutus*) tooth recovered from Mound 12 E4/13 (306343, Ocós). The tooth was taken from a very large individual. At 2 cm in diameter, the tooth represents an adult crocodile, perhaps up to 5 m in length (Figure 15.3f). The tooth is carved on the longer smooth root surface, avoiding the hard enamel at the tip. The piece is perforated on either side for suspension. The openwork carving features curvilinear spirals toward the front, but the design continues around the back. Figure 15.3g provides a "rollout" of the design. (See also Figure 27.4b.) The workers who found the tooth dubbed it El Colmillo del Rey.

Drilled Shark Tooth Pendants or Weapon Components

Two shark teeth from Mound 1 (306110: I7/11; 306344: E10/11, both Cherla) have two drilled holes, one in each branch of the root (Figure 15.3d). Another has a single hole drilled in the center of the root (306117: Md.12 Feature 19, Ocós). The latter, shown in Figure 15.3c, is similar to the drilled shark tooth reported by Ceja Tenorio (1985:58d). These may have been pendants, but they could also have been weapon components. Lee (1969:166–67) and Lowe and Agrinier (1960:42) refer to drilled shark teeth from Mesoamerica as components of swords or battle implements with shark teeth attached to them, similar to those found in Micronesia (Drew et al. 2013). Lowe and Agrinier (1960:42, Plate 17d) report finding a lance shank studded with 56 identical perforated shark teeth from the Late Preclassic at Chiapa de Corzo.

Miscellaneous Probable Pendants

Four additional modified bones may have been ornaments, likely pendants. From Mound 12 (T1E/13, Late Locona, 306001) there is a fragment of ocelot maxilla. The upper part of the maxilla was cut off, leaving the tooth alveoli. From Mound 12 (P1/6, the mixed Ocós-Cherla ground surface under the platform, 306002) there is a worked (ground) dog mandible in two conjoining pieces with obvious grinding facets on the labial surface. Again, this is probably an ornament, perhaps used as a pendant. From Mound 5 (T1D/4, 306003) there is a modified human mandible that has been cut off above the teeth, again probably to serve as an ornament, possibly a pendant. Finally, from Mound 1 (K8/10, Cherla, 306004) there is a long bone shaft from a large mammal with two drilled holes, possibly for suspension as a pendant.

Worked Gar Scutes

Three worked gar (*Atractosteus tropicus*) scutes may have been costume components; we can't think what other purpose they might have been intended to serve. From Md.1 L9/10 (306081, Cherla) there is a scute that has been ground flat. From Md.1 K12/18 (306082) there is one that has been worked into a teardrop shape and ground flat. Finally, from Md.12 E3/17 (306083, Ocós) there is a drilled scute.

UTILITARIAN ARTIFACTS

Tools for Weaving, Hide Working, and Basketry (with possible hair/clothing pins)

The remains of 68 bone tools that were probably for weaving, hide working, and/or basketry were recovered, including three among the faunal remains from Mound 6. Five

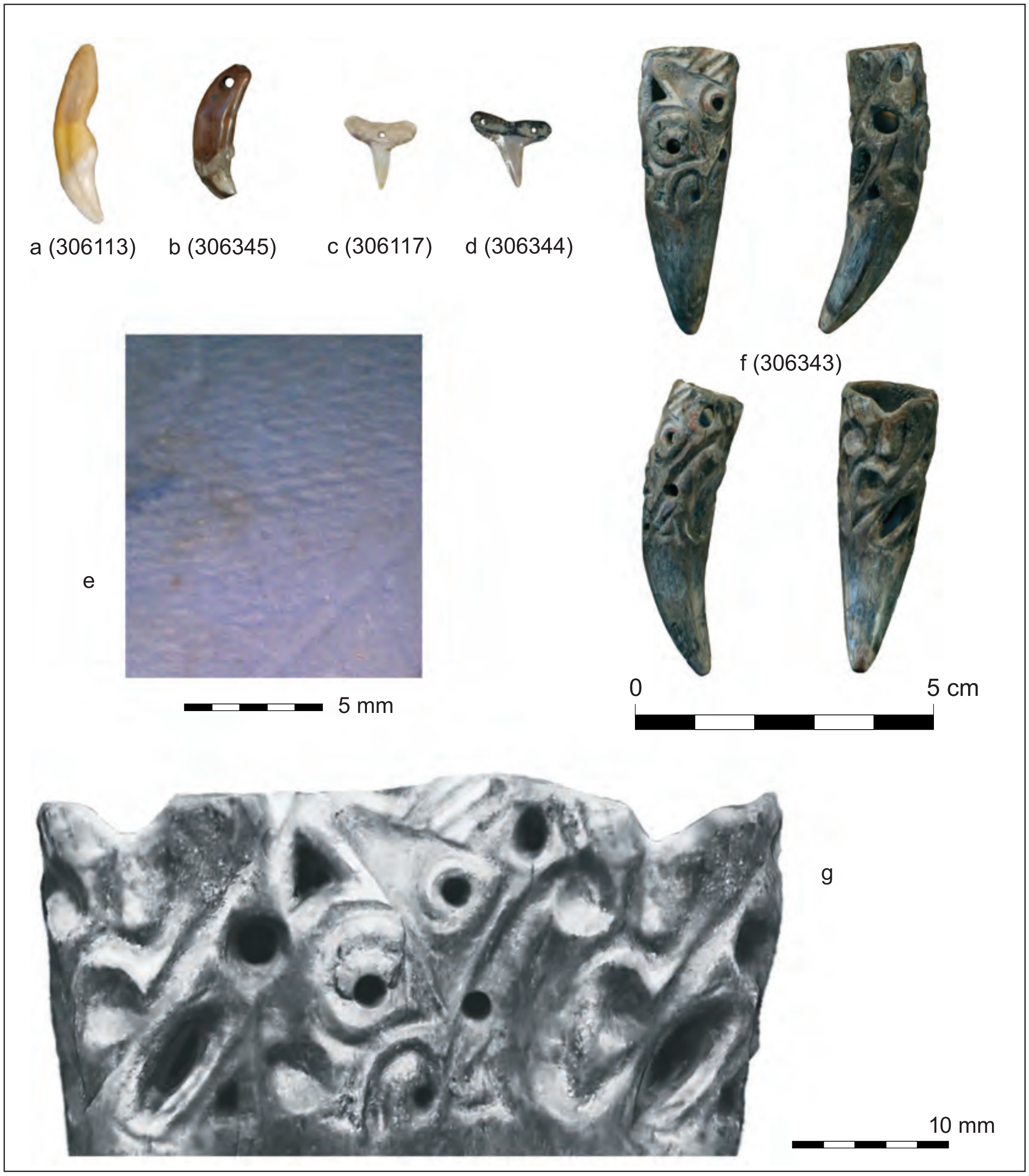


Figure 15.3. Bone ornaments: (a–b) dog tooth pendants; (c–d) drilled shark teeth; (e) impression of thread stamping on Amada Black-to-Brown body sherd; (f) carved crocodile tooth pendant; (g) rollout of design on crocodile tooth pendant. Proveniences: (a) Md. 1 I8/9–10; (b) Md. 1 J9/5; (c) Md. 12 K7/el.19; (d) Md. 1 E10/11; (f–g) Md. 12 E4/13.

classes are distinguished: needles, pins, awls, battens, and awl-spatulas (Table 15.2).

Needles

Needles are straight, slender bone shafts with drilled eyes (Figure 15.4n–p). They are close to round in cross section, with diameters mostly between 2 and 3 mm (average 2.4 mm, standard deviation 0.44). Eyeholes are round. Data on individual specimens is provided in Data Record 15.1.

Needle A. These appear to be by far the most common (Figures 15.4n, 15.4p). They are slender, with maximum diameters ranging from 1.6 to 2.8 mm. Eyeholes are approximately 1.0 mm in diameter. The maximum preserved length (of broken specimen 306213) is 32.6 mm; none were preserved whole. The total sample is 16 specimens, of which seven come from Cherla deposits in Mound 1 and at least five from Ocós contexts in Mound 12.

Needle B. This variety is defined based on a single definite specimen (Figure 15.4o), though see also the discus-

Table 15.2. Awls, pins, needles, and related tools: distribution in time and space

Phase and Locale	Awl	Awl-spatula	Batten	Needle A	Needle B	Pin or Awl	Pin A	Pin A or B	Pin B	Pin C	Pin D	Pin, Unid.	Total
Locona													
Mound 32							1						1
Ocós													
Mound 12				5			3						8
Mound 32							1	1					2
Md.12-IV													
Mound 12												1	1
Md.1-V													
Mound 1									1			1	2
Cherla													
Mound 1	3	1	2	7		2	8		3		3	4	33
Mound 13											1	1	2
No phase assignment													
Mound 1	1						3		2	1	4		11
Mound 6				2								1	3
Mound 12				2	1				1			1	5
Total	4	1	2	16	1	2	16	1	7	1	8	9	68

sion of Pin B. The Needle B specimen is slightly thicker than exemplars of Needle A (3.57 mm diameter). It is a head portion 17.6 mm long; the original length is unknown. The eyehole is approximately 1.0 mm in diameter. The defining aspect of the variety is that in addition to the standard eyehole, this needle has hole that runs longitudinally from the head end to join with the eyehole. The specimen is from the surface level of Mound 12 (T1C/1).

The closest direct evidence of textile use at Paso de la Amada other than needles are sherds of the type Amada Black-to-Brown decorated using a string-covered paddle to produce an intricate ridged pattern (Figure 15.3e).

Pins

Pins are thicker and probably were generally longer than needles (Figure 15.4a–k). In cross section, the shaft is generally sub-round, either flat, oval, or bun-shaped (that is, flat on one face and convex on the other), though see Pins B and C for further discussion of round cross sections. The objects classified as pins are heavily worked and polished, with all anatomically diagnostic features removed. Unlike needles, pins are not perforated, though Pin D (306300) does bear traces of an attempt to drill a hole in the shaft. We suspect that multiple functions were involved for objects designated "pins." Pins A and B may have been weaving/brocading tools and/or perforators with functions overlapping those of awls. Pins C and D are possible weaving tools, in particular weaving picks used to lift the warp (McCafferty and McCafferty 2008:150). Pin B varieties might be large, thick needles. Any of these could potentially have been hairpins or pins for clothes. As Halperin (2008:114) points out, use as a hairpin does not preclude other uses. Pins are divided into four varieties (Table 15.2 and Data Record 15.2).

Pin A. Shafts are flattened, oval, or bun-shaped in profile (Figures 15.4c, 15.4f, 15.4i). They taper to a point that is sometimes rather thick. For instance, in the case of 306231, tapering to a point is in one dimension only (as seen from one of the flat faces). Many of the specimens identified as Pin A are small shaft fragments; some of these could be awls. Seventeen specimens were identified.

Pin B. The shafts of these pins are round in profile and they taper to a fine point like the needles (Figure 15.4b, e). A couple of these could actually be thick needles. In particular, 306302 is of appropriate dimensions to match Needle

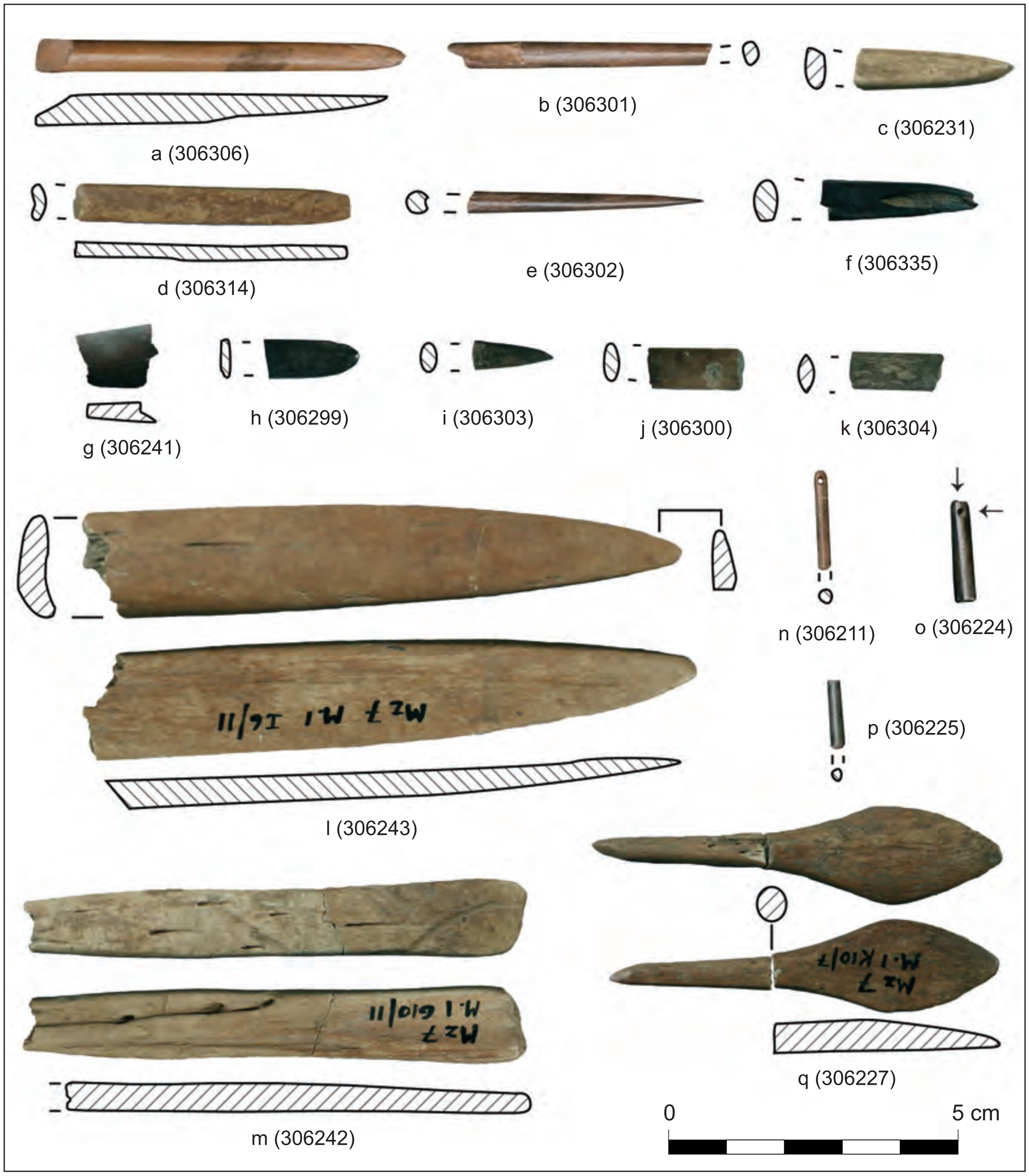


Figure 15.4. Utilitarian bone artifacts: (a–k) pins; (l–m) battens; (n–p) needles (with arrows in o noting the longitudinal hole from the end that joins the eyehole); (q) awl-spatula. Proveniences: (a) Md. 1 J12/9; (b) Md. 1 H13/4; (c) Md. 1 F11/2; (d) Md. 1 fill; (e) Md. 1 K10/5; (f) Md. 1 H8/2; (g) Md. 1 G10/2; (h) Md. 1 K8/7; (i) Md. 1 J9/2; (j) Md. 1 L11/8; (k) Md. 1 G10/11; (l) Md. 1 I6/11; (m) Md. 1 G10/11; (n) Md. 1 G10/8; (o) Md. 12 T1C/1; (p) Md. 12 T1C/3; (q) Md. 1 K10/7.

B (306224). Another Pin B, 306301, becomes rather thick as one moves up the shaft, and it is hard to envision this as a needle. Note that the head portion is missing in both these cases, so we do not know if these might originally have had eyeholes. Seven specimens were identified.

Pin C. We have only one of these, 306306 (Md.1 J12/9). A lengthy shaft with what is probably the tip (use end) of the tool is preserved (Figure 15.4a). The head is broken off. The preserved length is 61.4 mm. The defining feature of this variety is a change in the form of the cross section from oval at the broken end (toward the head) to flatter and more bun-shaped at the tip. Toward the head, the cross section is 5.2 x 4.8 mm; 2 cm from the tip it is 5.3 x 3.5 mm; 1 cm from the tip it is 4.7 x 2.2 mm. The tip is rounded rather than pointed. A single specimen was identified.

Pin D. These shafts have thin, flat, sub-rectangular or slightly oval profiles (Figures 15.4d, 15.4h, 15.4j–k). There are two shaft fragments and two ends, one probably a tip (306299), the other a tip or a head (306314). These are possible weaving tools, either picks or spacers. Eight specimens were identified.

Pin Uncertain. These are pins not identified to variety. Specimen 306241 (Md.1 G10/11) is burnt and highly polished (Figure 15.4g). It is a possible shaft fragment 13.0 mm in length. The profile is bun-shaped, 10.5 x 3.1 mm at one end and 8.6 x 3 mm at the other. In other words, the sides are not parallel but converge toward the tip. This does not seem to be an aspect of Pin D, which this piece otherwise resembles. A total of nine pins were not identified to variety.

Awls

Awls are perforating tools that taper to a point (Figure 15.5d–f). They were most typically made from deer metatarsals, and their shafts, especially away from the point, retain a U-shaped cross section. Awls were shorter and more robust than pins, and the ends are sharp. These artifacts could be directly related to textile production, such as brocading tools to split warp and weft. They may also have been used in basketry, hide working, or husking of maize (Halperin 2008). Four awls and two additional specimens classified as awls or pins were identified

Battens

Two bone artifacts are complete or fragments of uniformly shaped, flat pieces of large mammal or crocodile bone that are broader than those classified as pins. These artifacts may be battens used in belt or backstrap looms (Chase et al. 2008; Halperin 2008; McCafferty and McCafferty 2008) or other weaving utensils. The clearest specimen is 306243 (Md.1 I6/11), a strip of probable crocodile bone 17.8 mm in maximum width and with 99.5 mm of its length remaining (Figure 15.4l). At the break, it is slightly U-shaped in cross section and 5.5 mm thick. The other specimen is less strongly identifiable as a batten, though we suspect that it is at least also a weaving tool (306242: Md.1 G10/11). Like 306243, it is also made of crocodile bone. The remaining length is 83.3 mm. We seem to have the head, or non-use end (Figure 15.4m). At the break, the sides taper toward each other. The width in the middle of the specimen is 11.1 mm and the thickness is 4.2 mm, with the profile varying between flat (sub-rectangular) and oval. There is a rough, incised pattern on one face of the tool.

Awl-Spatulas

One of the few complete bone tools recovered comes from the Mound 1 platform fill (K10/7, 306227). The specimen is symmetrical and has a broad flattened handle with a point at the other end (Figure 15.4q). The tool is 72.5 mm long. It has a robust point, where the cross section is round and 4.7 mm in diameter (1 cm from the tip). The other end widens to form an almond-shaped spatula, 16.9 mm in maximum width and 4.9 mm thick. It may be a weaving implement, perhaps a loom pick (Halperin 2008; McCafferty and McCafferty 2008).

The distribution by phase and location of tools for weaving, hide working, and basketry is shown in Table 15.2. The Locona-phase pin is from the midden behind the platform at Mound 32 (3203A). From Ocós deposits at the same mound, there is one pin from each of the two large middens (3204A and 3205A). At Mound 12, Feature 19, an Ocós pit, yielded one Needle A and one Pin A. The other Ocós-phase specimens from that mound are all from the toss midden above Features 2 and 10. The Md12-IV pin is from P5/3, and the Md1-V specimens are from adjacent units, G10/25 and G11/25. The Cherla-phase assemblage from Mound 1 is all from Zone IV on the platform, and the Mound 13 pins are both from the pit feature atop that mound (1302A).

Fishhooks

The importance of fish at Paso de la Amada is indicated by thousands of fish bones recovered from all the excavated mounds. Other than notched-sherd and modeled-clay net weights, the only direct evidence of fishing technology recovered from the site are 11 fishhooks (Figure 15.5g–l). All are J-shaped, unbarbed, and carved out of bone (Data Record 15.3). Four of them have at least one groove and a small stop at the lashing point on the shank. The others are incomplete. One hook (306205) is interesting in that it smacks of a certain piscine irony. It is carved out of an extraordinarily large gar (*Atractosteus tropicus*) scute—effectively using a scute from a predatory fish to catch more fish.

Four fishhooks are from midden contexts in Mound 12: two Late Locona (306207, 306208) and two Ocós (306209, 306210). The other seven are all from Zone IV of the Cherla platform in Mound 1, the redeposited high-status Cherla midden.

Tooth Cutter/Gravers

Incisors of the giant pocket gopher (*Orthogeomys grandis*) are naturally sharp at the edge. Five specimens show significant use wear. The enamel is ground down, and in some cases striations are visible (Figure 15.5a). These appear to have been used as tools, perhaps for working perishable materials such as wood or gourds. One comes from a Barra deposit in Mound 5 (306229: Md.5 T4D/22A). Another is from an Ocós midden in Mound 12 (306230: Md.12 F2/10). The other three are from Zone IV of the Cherla platform fill at Mound 1 (H10/9–10, H9/11, and L11/10; 306111, 306228, and 306107, respectively).

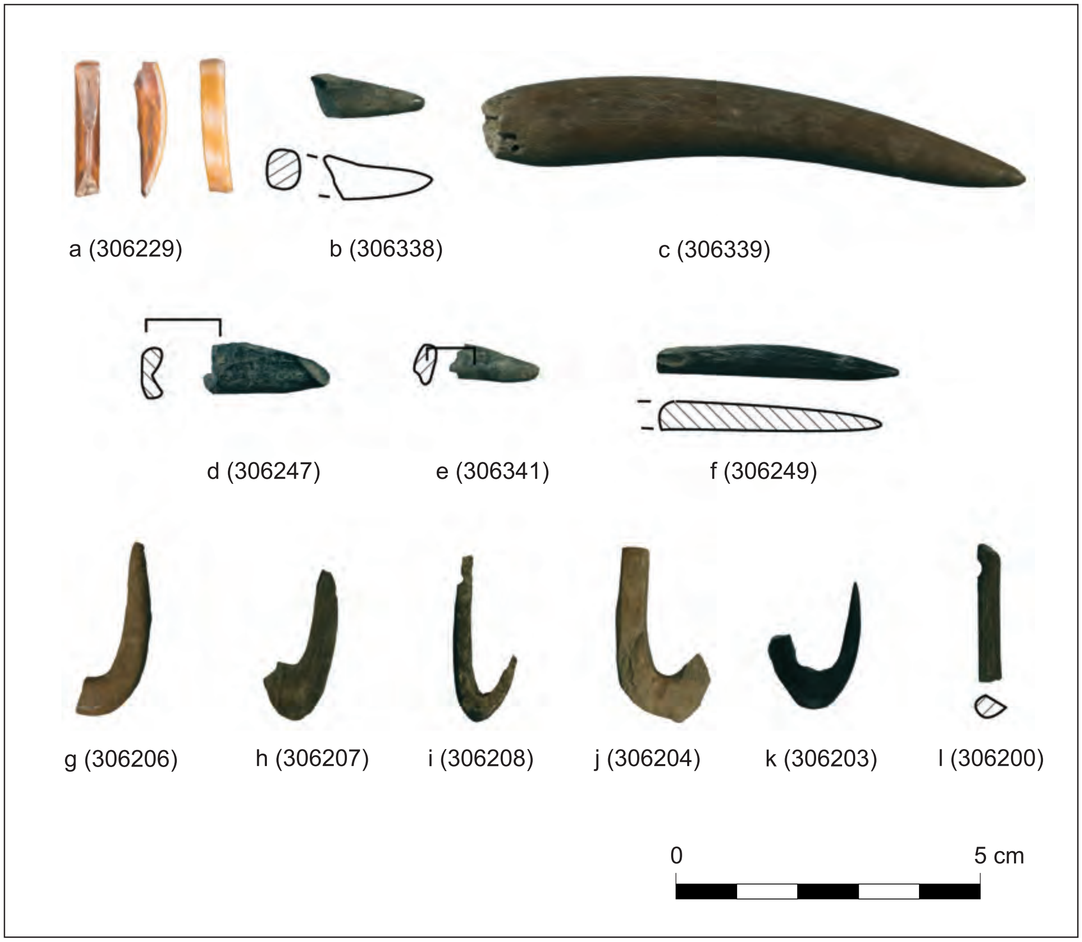


Figure 15.5. Utilitarian bone artifacts: (a) tooth cutters/gravers; (b–c) utilized antler; (d–f) awls; (g–l) fishhooks. Proveniences: (a) Md. 5 Trench 4D/229; (b) Md. 1 I7/8; (c) Md. 1 J9/7; (d) Md. 1 E10/12; (e) Md. 1 L9/8; (f) Md. 1 K9/9–10; (g) Md. 1 K9/9–10; (h) Md. 12 T1E/12; (i) Md. 12 E2/15; (j) Md. 1 H8/11; (k) Md. 1 J9/10; (l) Md. 1 I9/8.

Utilized Antler

Antler tines showing evidence of moderate use may have been used for husking maize or other purposes (Figure 15.5b–c). There are 10, mainly from Mound 1 (E12/17 [306271], F9/11, G10/11, I7/8, I7/11, H8/11, I11/9–10, J9/7). Others are from Mound 13 (P1/2) and Mound 12 (P5/6).

OTHER ARTIFACTS

Worked Crocodile Tooth

A fragmentary crocodile tooth has been smoothed. Its function is unknown, but it could have been intended to serve as an ornament (306109: Md.1 H8/11, Cherla).

Worked Opossum Tooth

An opossum tooth 4.2 cm long (*Didelphis* sp., upper right canine) has been smoothed toward the enamel, perhaps for use as an ornament but with no definite evidence of that (306108: Md.1 H8/11, Cherla).

Other Worked Teeth

Other worked teeth are 306116 (Md.12 Feature 19, a ground, flattened carnivore canine); 306107 (Md.1 L11/10, a ground tooth); and 306114 (Md.6 48N/46E Level 9, a large mammal tooth, ground and shaped to a point).

Miscellaneous Worked Bone

Other modified bones include 29 specimens bearing traces of grinding and four polished specimens. There are two fragments of modified human bone (306199: Md.12 G5–

H5/32; 306296: Md.12 P1/6) and a modified nasal bone of a large mammal (306297: Md.1 I9/11).

TOOL PRODUCTION SEQUENCES

A number of the bone artifacts bear specific features that suggest how they may have been manufactured. Not surprisingly, many of the artifacts in this assemblage, especially the finished diagnostic tools, bear subtle cut marks, grinding marks, and worked facets, as well as heavy polish, suggesting the direct application of rough stones or other abrasives during manufacture and finishing. Other bone artifacts have obvious modifications, particularly string saw marks, in combination with evidence of grinding and polishing. The presence of successive stages of modification in some unfinished artifacts leads to the identification of three distinct production sequences at Paso de la Amada, which probably generated most of the bone artifacts in this assemblage.

Fishhook Manufacture

To produce a bone fishhook, a suitably sized fragment of bone from a large mammal was cut to size and ground flat. The preform was then deeply grooved to form a generalized J shape, gradually narrowed, refined, smoothed, and finished in a point, with lashing grooves added at the opposite end.

Bone Tube Manufacture

All the tube beads identified from Paso de la Amada were made from bird or small mammal long bones. These ornaments were created by deeply scoring the circumference of the proximal and distal ends of the bones with a stone flake to remove the articulations. This resulted in a deep V-shaped groove, often with numerous accessory striations associated with the cutting. Removal of the articular ends resulted in a long cylinder of bone with often jagged beveled ends. These cylinders could be strung as is or cut, using the same technique, into shorter beads.

Manufacture of Awls, Pins, Needles, and Battens

A more complicated sequence was involved in the production of awls, needles, and pins. The primary skeletal elements exploited in this sequence are deer metapodials, both metatarsals and metacarpals. Metapodials were probably preferred for these artifacts since they are robust, have relatively small marrow cavities, are generally straighter, and have thicker and flatter sides than the other long bones. Metatarsals may have been particularly favored because they are longer and have a deeper and more extensive anterior vascular groove than do metacarpals.

Beginning with an unmodified deer metatarsal, evidence seen in the Paso de la Amada bone artifact assemblage suggests that the vascular groove was used as a guide for a stone saw, perhaps of sandstone, or else a flake or a biface. The distal termination of the vascular groove was extended by gouging or battering down the ridge of bone between the end of the groove and the articular condyles of the metatarsal, allowing the formation of a guiding groove running the length of the element. The saw was then drawn vigorously back and forth to section the metatarsal lengthwise. Similar action was undertaken on the opposite side. The result of this first phase of sectioning is two relatively flat, lengthwise halves of the metatarsal.

The next phase in this sequence involved the lengthwise sectioning of the two newly produced halves, similar to several examples from California (Wake 1997b, 1999a, 2001). The resulting four metatarsal longitudinal sections are roughly the same width and thickness as most of the diagnostic awls and pins, and non-diagnostic shaft fragments found in the assemblage and most likely represent preforms or stock from which various artifacts could be made.

The long, flat, well-polished pins and potential weaving utensils found in this assemblage could have been manufactured from one of these stock sections. It is important to note that a great number of the non-diagnostic shaft fragments and many of the finished artifacts described here bear the longitudinal striations indicative of this type of production sequence.

Bone Ring Production Using String Saws

Bone rings were made from long bones of large mammals. As opposed to the longitudinal sectioning technique used for pins and awls, this process involves the circumferential sectioning of bones that are round in cross section: the humerus, femur, tibia, and metapodials. The primary tool used in this process is some sort of string made of plant fiber, sinew, or leather, used in conjunction with a fine abrasive and a liquid. The liquid serves to keep the abrasive attached to the string and in the groove produced during the process. The process used to create the bone rings at Paso de la Amada leaves three related telltale signs on production debris and unfinished artifacts: (1) a U-shaped groove with (2) a high polish and (3) a lip or burr on the interior, marrow cavity surface.

Ethnohistoric accounts of string saw use in Central America (e.g., Lothrop 1955) note that the technique was used on stone, tortoise (sea turtle) shell, bone, and iron. Chenault (1986) used string saws experimentally, noting that fine sand worked best with natural fiber (jute or agave) and water. Coarser sand tended to fall out of the working groove and broke the string sooner.

Although string sawing is generally considered to be a lapidary technique (Chenault 1988; Kovacevich 2006; Lothrop 1955), at Paso de la Amada it is clear that the saw used to section the bones consisted of little more than a piece of wet string and some fine sand. Experimental sectioning of artiodactyl long bones (deer femurs and sheep tibiae) by Wake has reproduced all the telltale signs mentioned above. String roughly 3 mm in diameter was soaked in water and then covered in fine sand, which acts as an abrasive. Moistening the string helps the abrasive adhere to it and keeps it cool. The saw was wrapped once around the bone and moved back and forth in an alternate pulling motion, rapidly producing a groove completely around the bone. This technique accurately reproduced a U-shaped groove, the high polish and the burr on the interior surface of the bone, and other telltale signs of string saws, including shallow gouges on the polished surfaces of the cut artifacts.

Production debris recovered from Mound 1 suggests that the entire usable (shaft) length of bones was grooved in relatively equal sections. These sections were then removed individually from the core shaft. Ad hoc experimentation using string saws to section deer long bones shows that this method, once mastered, is really quite efficient and more easily controllable than cutting with stone tools. A skilled craftsman could produce many ring sections from a single femur, humerus, or tibia.

An individual section, or ring preform, continues through a number of stages before it is finished. First, the burrs left on either edge from snapping off the preforms from the core are ground down. The interior and exterior surfaces of the preforms are then shaped. The exterior surface is rounded and the interior surface widened to more easily fit over a finger. Sandstone or pumice are the obvious candidates for grinding and shaping bone (see Chapter 12). One example of a pumice artifact probably used for grinding exterior surfaces of bone rings bears deep grooves equivalent to ring preform widths. Ultimately, the rings are narrowed by grinding the edges and given an elliptical cross section by grinding and rounding the interior and exterior bone surfaces. Coe and Flannery (1967:64–65) and Coe (1961) report pumice abraders from Early Formative–period contexts at Salinas La Blanca and La Victoria.

Somewhere near the end of this process, designs and color were applied to some of the rings. Heating and burning could have provided brown or black coloration. Red ocher was found in the grooves of one bone ring fragment, similar to the ceramic ring mentioned by Ceja Tenorio (1985:100, Figure 55f). Most of the design elements appear to have been applied using abrasive strings. Only rarely are flake-cut lines encountered. Some are finished with a high polish that may represent use wear.

Other Observations on Production

Among the debitage fragments are two pieces that may have been in production to be small bone plaques, 14–15 mm long, 11–14 mm wide, and 3–4 mm thick. We have no finished specimens and do not know the purpose of the artifacts. From Mound 1 (I8/7, 306336) there is a flat tab, 14 mm wide, with grinding striations on it surfaces. It has been scored with a stone saw and snapped at both ends. From Mound 21 (P3/1, 306337) there is a flat tab, 11 mm wide, that has traces of four drill holes, two at either end. It has been snapped at each pair of holes and not subsequently worked.

Temporal Patterns

Distribution through time of bone artifacts is shown in Table 15.3. The most striking pattern is the disparity between the tiny Locona sample and the large Cherla sample. We are not sure why there were so few modified bones in the Locona deposits, though we suspect preservation issues. There are several more from Locona deposits in Mound 6, but those are not included here because they represent only those bone artifacts that happened to travel to Los Angeles with the rest of the faunal remains. The column at the far right in the table provides the percentage of each row represented by the Cherla sample at Mound 1. The values suggest that, while bone artifacts generally are concentrated in that deposit, the various classes were not concentrated there to the same degree. Sample size is likely involved in some cases (such as the ray/shark centrum beads and earplugs), but in other cases the patterns are likely the result of changing social practices.

All classes of ornament for which we have a decent sample were present throughout the sequence (or at least from Late Locona/Ocós). Use of tooth pendants and miscellaneous bone pendants may have declined in the Cherla phase. The production and use of finger rings (and perhaps snake vertebra beads) instead increased at that time, at least at Mound 1. The higher percentage of string-cut as opposed to flake-sawed debitage in the redeposited high-status midden at Mound 1 results from the production of those rings. Among the tools, the concentration of weaving implements in the Mound 1 Cherla deposit may constitute sampling error, since needles are more evenly distributed in space and time and Amada Black-to-Brown tecomates stamped using paddles wrapped with what was probably cotton thread are widely distributed in Ocós-phase deposits. What we seem to have in the high-status context at Mound 1 is a particular emphasis on the production and wearing of ornaments and clothing.

Comparison with Other Sites

Artifacts manufactured by grinding or using chipped stone or flake saws are ubiquitous in the Americas. Examples similar to those seen at Paso de la Amada are found Chiapa de Corzo, Chiapas (Lee 1969; Lowe and Agrinier 1960), California (Gifford 1940; Wake 1997b, 2001), the Ohio River valley (Jeffries 1997), and Tiwanaku in Bolivia (Janusek 1999:119–20, Figures 13 and 14), to mention just a

Table 15.3. Worked bone from Paso de la Amada, split by phase[a]

	Locona	Late Locona	Ocós	Md.12-IV	Md.1-V	Cherla	Total N	Mound 1 Cherla as a Percentage of Total N
Debitage								
String-cut (ornaments)		1	3	2		29	35	82.9
flake saw (tools)		1	3	4		16[c]	24	58.3
Ornaments								
finger ring			1	1	1	46	49	93.9
bone tube		5	7		1	20	33	60.6
misc. bone pendant		1		1		1	3	33.3
misc. tooth pendant		1	4			3	8	37.5
snake vertebra bead		1	4			15	20	75.0
worked gar scute			1			1	2	50.0
ray/shark centrum bead						7	7	100.0
ray/shark centrum earplug						2	2	100.0
Tools								
misc. weaving implement[e]						7[b]	7	85.7
needle			5			7	12	58.3
fishhook		2	2			6	10	60.0
misc. pins and awls	1		5	1	2	21[b]	30	66.7
tooth cutter/graver			1			3	4	75.0
antler		1				8[b]	9	77.8
Misc. uncertain worked bone		2	7	1		15[d]	25	48.0
Grand Total	1	15	43	10	4	207	280	71.1

[a] Partial samples from Mounds 5 and 6 not included. The Cherla sample is entirely from Mounds 1 and 13.
[b] One is from Mound 13.
[c] Two are from Mound 13.
[d] Three are from Mound 13.
[e] Includes battens, awl-spatulas, and Pins C and D.

few sites. There seems to be a certain universality throughout the Americas in the use of artiodactyl (cervid or camelid) metapodials for certain types of long durable tools such as awls, pins, and punches.

The use of string saws to produce bone artifacts around 3,000 years ago appears to be confined to the southern Pacific Coast of Mesoamerica. The only other examples of the use of this technique on bone are at other Archaic- or Formative-period sites in the general Soconusco area, including Chantuto (Voorhies 1976:176), Chiapa de Corzo (Lee 1969:166–67), La Blanca (Love 2002), and El Ujuxte (Wake 1999b), but from contexts several centuries later. Paso de la Amada provides some of the earliest evidence for the use of string saws in the production of bone artifacts in Mesoamerica.

Figure 16.1. Paqui group figurines: (a–k) Muscu type; (l–u) Nicotaca type. Proveniences: (a) Md. 1 J9/7; (b) Md. 1 I8/8; (c) Md. 1 I8/8; (d) Md. 1 H12/7; (e) Md. 1 H8/2; (f) Md. 1 I8/7; (g) Md. 1 H9/11; (h) Md. 1 K12/9; (i) Md. 1 I13/8; (j) Md. 1/11; (k) Md. 1 H9/11; (l) Md. 1 F9/11; (m) Md. 12 F4/10C; (n) Md. 1 G12/7; (o) Md. 12 T1B/4; (p) Md. 12 E3/6; (q) Md. 1 F9/11; (r) Md. 12 E4/10C; (s) Md. 1 E11/10; (t) Md. 1 Structure 1/fill; (u) Md. 1 I6/8. *Illustrations in this chapter by R. Lesure, Katelyn Jo Bishop, and project staff, with other contributions as noted.*

CHAPTER 16

Notes on the Modeled Ceramic Imagery

Richard G. Lesure and John E. Clark

MODELED CERAMIC imagery was particularly common in the excavations at Paso de la Amada. The collection is reported only summarily here because it will be described in detail, along with similar material from other excavations, in a separate monograph currently in preparation.

This chapter presents a typology of figurines and effigies, and then briefly considers distribution through time and subject matter among the effigies. The classification is hierarchical, with two basic levels (group and type) and an optional third level (variety). Group and type descriptions are provided here. The most important find is the statuette from Mound 32 (the Mokaya Matron). That is described in its own section. (For masks and effigy whistles, see Chapter 18.)

FIGURINES

In the case of figurines, *group*-level distinctions are mainly based on stylistic attributes, particularly paste and surface finish. *Types* are distinguished by stylistic attributes and/or subject matter. Where possible, we have tried to arrange for the type level to be the one at which heads, bodies, and limbs of the same figurine are classified together. Many limbs, however, are classified only to group.

PAQUI GROUP

Paqui group figurines are neither slipped nor polished. Surfaces are carefully smoothed. Some specimens bear traces of red paint. The predominant paste is hard, sandy, and light brown to gray in color, similar to that used for ceramic vessels of the Locona through Cherla phases. We refer to it as Nicotaca paste. A second paste, most common in the Muscu type, is fine, soft, and easily eroded. Essentially fired mud, it is generally light brown to gray in color but ranges to black, orange, or pink due to the vagaries of firing. We refer to it as Muscu paste. Paqui is the best-represented group in the collection, comprising 13 head-and-body fragments, 181 solid head fragments, 230 solid body fragments, and 1,263 miscellaneous fragments, most limbs. Paqui group figurines appear first in the Barra phase and persist through Cherla.

Nicotaca Type

The Nicotaca type is the most common in the Paqui group (Figure 16.1l–u). The type first appeared in the Locona phase but was most common in the subsequent Ocós and Cherla phases.

The figures are manufactured mainly from Nicotaca paste (94 percent) and are solid (not hollow). They are often quite naturalistic. Overall dimensions of 8–14 cm were probably typical, though a waist-and-leg fragment from Mound 12 at Paso de la Amada is from a figure that must have approached 25 cm in height. The most common eye (termed “punched, double-stroke trough”) was prepared by forming a trough with two strokes of a rectangular- or wedge-tipped tool and was finished with a round punch in the center to represent a pupil. Often this was executed on the rounded bulge of a carefully prepared eye socket (58 percent, Figure 16.1l-p), while in other cases no socket preparation is evident (27 percent). A minority of eyes diverge from this style in various ways (15 percent). Hair was most commonly formed with appliquéd fillets stamped with textiles or a thread-wrapped paddle to give a crinkled appearance. Sometimes these fillets cover the whole head (31 percent, Figures 16.1l–m, 16.1o), while in other cases isolated appliqués suggest tonsured hair (31 percent, Figures 16.1n, 16.1p). Additional fillets on some pieces depict further decoration. Some have pierced ears (7 percent) or ear ornaments (31 percent, Figure 16.1m–n).

The characteristic image is a standing young woman, gender being indicated by well-defined and often naturalistic breasts. Wide hips and thighs are typical. No attempt is made to depict genitals. Arms are indicated by rounded stubs, a trait that constitutes an identifying criterion for the type. (The "arms" in Figure 16.1s, for instance, are completely intact.) The figures are unclothed, but a few have small, round, appliqué pendants on the chest above the breasts (17 percent, Figure 16.1r–s). Stomachs are rounded but only rarely bulging in a way suggestive of pregnancy (8 percent, Figure 16.1r). A small number are seated rather than standing. In some cases breasts are not represented (2 percent).Totals: 61 heads, 107 torsos, 660 limbs.

Muscu Type

The Muscu type is the second most common of the Paqui group (Figure 16.1a–k). These solid figurines contrast with their Nicotaca counterparts primarily in the general crudity of execution rather than in any differences of representation. The paste is Muscu (76 percent). Representations are not particularly naturalistic and workmanship is crude to fair. Overall dimensions were probably similar to Nicotaca. Muscu appeared in the Barra phase but was most common in the Locona phase. During the Ocós and Cherla phases it was gradually replaced by Nicotaca-style figurines.

Faces are typically round or heart-shaped and flat, with the plane of the face tilted back 45 degrees from vertical. However, there is a good deal of diversity, perhaps related to the general crudity and lack of standardization of this type. There are 14 distinct eye styles (as opposed to six for Nicotaca). Most common is the punched, double-stroke trough of the Nicotaca type (32 percent), though here there is never a well-prepared eye socket. Often there is no socket preparation at all (Figure 16.1c–e). Sometimes a socket is indicated with an appliqué disk completely crossed by the impressed trough (20 percent, Figures 16.1a, 16.1g); in other cases the appliqué is lozenge-shaped (11 percent, Figure 16.1b). Mouths are often absent (58 percent, Figure 16.1e–f), as is any indication of hair (57 percent, Figures 16.1b, 16.1f). When hair is present, the patterns suggest abbreviated versions of Nicotaca styles. Only 3 percent have pierced ears and another 3 percent ear ornaments.

As with Nicotaca, arms are typically represented as stubs, though sometimes these are longer than is typical for Nicotaca. From the presence of breasts, most appear to be women (83 percent). Lack of breasts is more common than in the Nicotaca type (Figure 16.1i–j). Totals: 63 heads, five head-and-torsos, 57 torsos, 287 limbs and other fragments.

Xumay Type

The obese, costumed, and masked figures of the Xumay type are some of the most intriguing pieces in the Mazatán collection (Figure 16.2). Xumay figurines are usually solid and made from Nicotaca paste (100 percent). Heads range from 1.8 to 4.3 cm in height but vary considerably in shape. Because some figures are seated and others standing, overall dimensions vary widely. In striking contrast to the Nicotaca females with stubs for arms, the Xumay figures are generally depicted with arms and hands. Usually the arms rest on either side of the immense belly or on the chest.

Most of the heads assigned to this type are zoomorphic or fantastic (Figure 16.2a–k). Elsewhere, we have outlined the case for grouping these heads with anthropomorphic bodies and for arguing that these were representations of people wearing masks (see Clark 1991:21, 1994a:424; Lesure 1997b:235–40, 1999c:212–13). Although there is significant variability among the faces, there are at least four repeated images that appear to be renderings by different artists of the same basic subject. Among the other heads, several pairs of nearly identical mask and head styles suggest that as the sample of heads is further expanded, new stereotyped images will become evident.

The torsos assigned to this type are more diverse than those of the Nicotaca type, with which they were contemporary. Some are standing (25 percent, Figure 16.2m), but most are crouching or seated (75 percent, Figures 16.2j, 16.2n). A few are seated on stools. The characteristic belly form is distinct from that of the armless Nicotaca females identified as pregnant. In the case of the Xumay figurines, the belly is generally flattened from the top so as to protrude out on all sides of the body (Figures 16.2g, 16.2j, 16.2l–n). Crouching forms are more likely to have a long, cylindrical belly with the knees on each side. Many of the Xumay torsos are depicted wearing clothing or elaborate ornamentation (47 percent). Totals: 22 heads, three head-and-torsos, 41 torsos.

Copun Type

This type includes the relatively few animal representations that are figurines rather than effigies. Paste is usually Nicotaca, sometimes Muscu. The figures are generally solid. Totals: eight heads, two head-and-torsos, five torsos, three limbs.

Pama Type

This type was a transitional style between the local Nicotaca type and the Olmec-style Eyah group (Figure 16.3a–

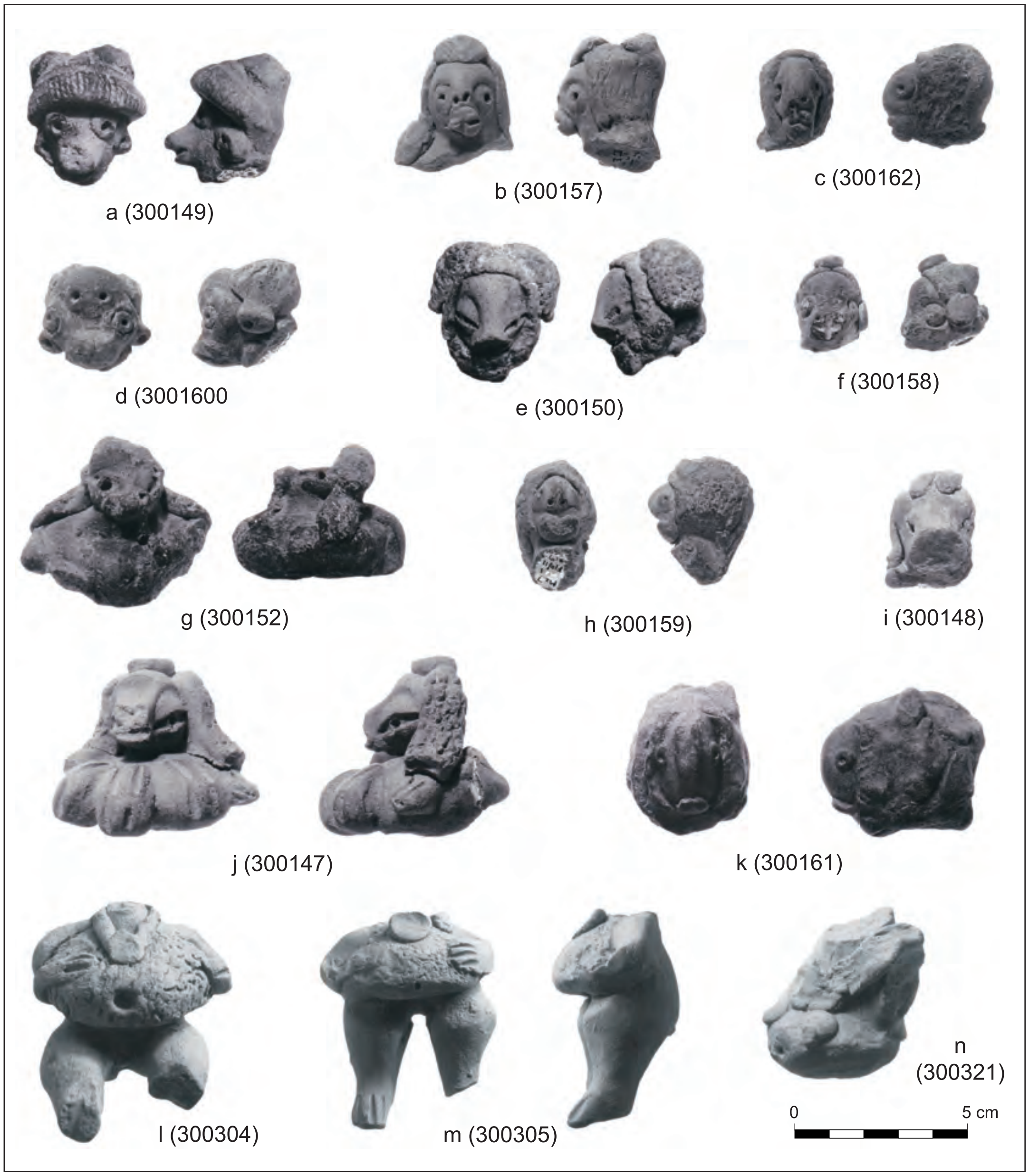


Figure 16.2. Paqui group figurines: (a–n) Xumay type. Proveniences: (a) Md. 1 H10/9–10; (b) Md. 1 J7/5; (c) Md. 1 K12/3; (d) Md. 12 Feature 21E; (e) Md. 12 E3/10a; (f) Md. 12 F3/7; (g) Md. 1 I8/9–10; (h) Md. 1 F10/11; (i) Md. 1 J9/8; (j) Md. 1 G8/11; (k) Md. 1 H9/2.

h). The paste of these solid figurines is generally similar to that of the Nicotaca type, with color varying from gray to tan. Surfaces are smoothed and neither slipped nor burnished; red paint on faces and headdresses is common. Divergences from Nicotaca include eyes formed by two wedge-shaped (rather than slot-like) preparatory impressions, with a small round punch for the pupil (Figure 16.3e–g). Sometimes the wedge-shaped impressions are extremely narrow (Figure 16.3a–c). A few of these figurines may date to the Ocós phase, but this was primarily a Cherla type that emerged from Nicotaca.

The torsos identified with this type form a diverse collection united by the presence of arms and body contours that diverge from the Nicotaca norm. Most have breasts and are probably female (79 percent, Figure 16.3h); those without breasts could be male (11 percent). Some have markings or modeling on the body that could represent clothing of various kinds (25 percent), but these are in each case unique and thus difficult to characterize. Some figures have a pendant on the chest (19 percent, Figure 16.3h). Totals: 22 heads, three head-and-torsos, 12 torsos, seven limbs.

Other Variability in the Paqui Group

A Cherla deposit in Mound 1, Paso de la Amada, yielded one torso and two limbs from figurines in the very standardized posture of the Yacsas type (see the Eyah group, below) but with a Paqui rather than an Eyah surface finish (see Figure 27.5u). These probably had Pama-type heads. If so, they could be grouped with that type, though they are clearly transitional between Pama and Yacsas. If, however, they were associated with heads in the Olmec style characteristic of Yacsas, then there could be a basis for creating a new Yacsas-like type in the Paqui group. Untyped totals in the Paqui group: five heads, eight torsos, 158 limbs, 148 miscellaneous pieces.

NACA GROUP

Contemporary with the earliest appearance of the Paqui group was a far more elaborate group of large, generally hollow figurines termed Naca. A total of 132 fragments of Naca figurines were recovered, though 73 of those were pieces of a single, statuette-size figurine from Mound 32. The Naca group appeared in the Barra phase and was prominent in the Locona phase, persisting at reduced levels into Ocós.

Naca group figures are made of Nicotaca paste and are generally hollow rather than solid. They are defined particularly on the basis of surface finish. In sharp distinction to the Paqui group, parts of their surfaces are slipped and/or burnished. Fragments of Naca-group figurines are similar in appearance to pieces of Hapac-type effigies (described later in this chapter). Both were hollow, with similar pastes and a similar range of surface finishes, the key distinction being that the effigy pots had a mouth (and were therefore containers), whereas the figurines did not. We think the figurines were generally anthropomorphic and the effigies generally zoomorphic. There are, however, a few pieces of anthropomorphic effigy pots from Barra or early Locona deposits.

Sasa Type

Sasa figurines were contemporary with the Muscu type and represent a surprising contrast to the crudity of the latter. They were large and often elaborately decorated, with slipped and burnished areas, zones of stamping, and appliqué ornamentation of various kinds (Figure 16.3l; see also Lesure 1999c:Figure 8). Most probably stood 20–30 cm high. One exception is the statuette from Mound 32, described in a separate section later in this chapter.

Sasa heads are unmasked and anthropomorphic. Eye styles are variants of those found in the Nicotaca and Muscu types. Hair and head decorations were common. Sometimes the face was slipped while the hair was left unslipped. Pierced ears are common. Gender associations of these images are uncertain; judging from fragments, some chests appear to have been flat, while on others breasts are depicted. This may indicate that both men and women were represented. The Mound 32 statuette can be interpreted as female based on the depiction of breasts. Totals: one large head-and-body fragment (the statuette from Mound 32), 21 head fragments, three torso fragments, 18 limb fragments, five fragments unidentified as to body part.

Jutzu Type

These are hollow figurines in pastes consistent with Ocós-phase pottery. The bodies are unslipped, and most appear to have had clothing represented with incised parallel lines on torsos and shoulders. Totals: seven heads, one torso, one limb, one unidentified fragment.

EYAH GROUP

Eyah group figurines are made in a hard, sandy paste similar to that of the Paqui group. Surfaces are burnished or slipped and burnished. The predominant slip colors (white, cream, gray, black, light brown) distinguish hollow Eyah pieces from Naca group figurines, which are also slipped but tend more toward red, orange, and darker brown. In addition, Eyah figurines tend to be completely covered with slip or completely burnished, in contrast to the Naca group, where zones of slipped and unslipped areas (the latter often stamped) are common. In general, Eyah group figurines tend to be recognizably Early Olmec in style, with tall cylindrical heads, trapezoidal mouths with downturned corners and flaring upper lips, and slit eyes without pupils. However, there are few heads in the collection reported here.

Poposac Type

The Poposac Type includes solid figurines that are slipped white, cream, gray, or black and are well burnished (Figure 16.3i–k). Only torsos and limbs were recovered in the excavations reported in this volume. The characteristic torso depicts a seated human, without a fat belly, and with legs straight out or bent in front of the body. Arms are present, and hands rest on the thighs or the knees. Gender is often debatable, and it is possible that at least some were deliberately unsexed. Because there is no indication of genitals, either male or female, interpretation rests on a reading of chest morphology. One figure clearly has female breasts (Figure 16.3j); others may be male (Figure 16.3k). There is no representation of clothing or ornamentation on the bodies. Poposac figurines from Paso de la Amada date to the Cherla phase. Totals: four torsos, 42 limbs.

Yacsas Type

This type includes solid figurines that are burnished but not slipped. Dimensions are similar to those of Poposac.

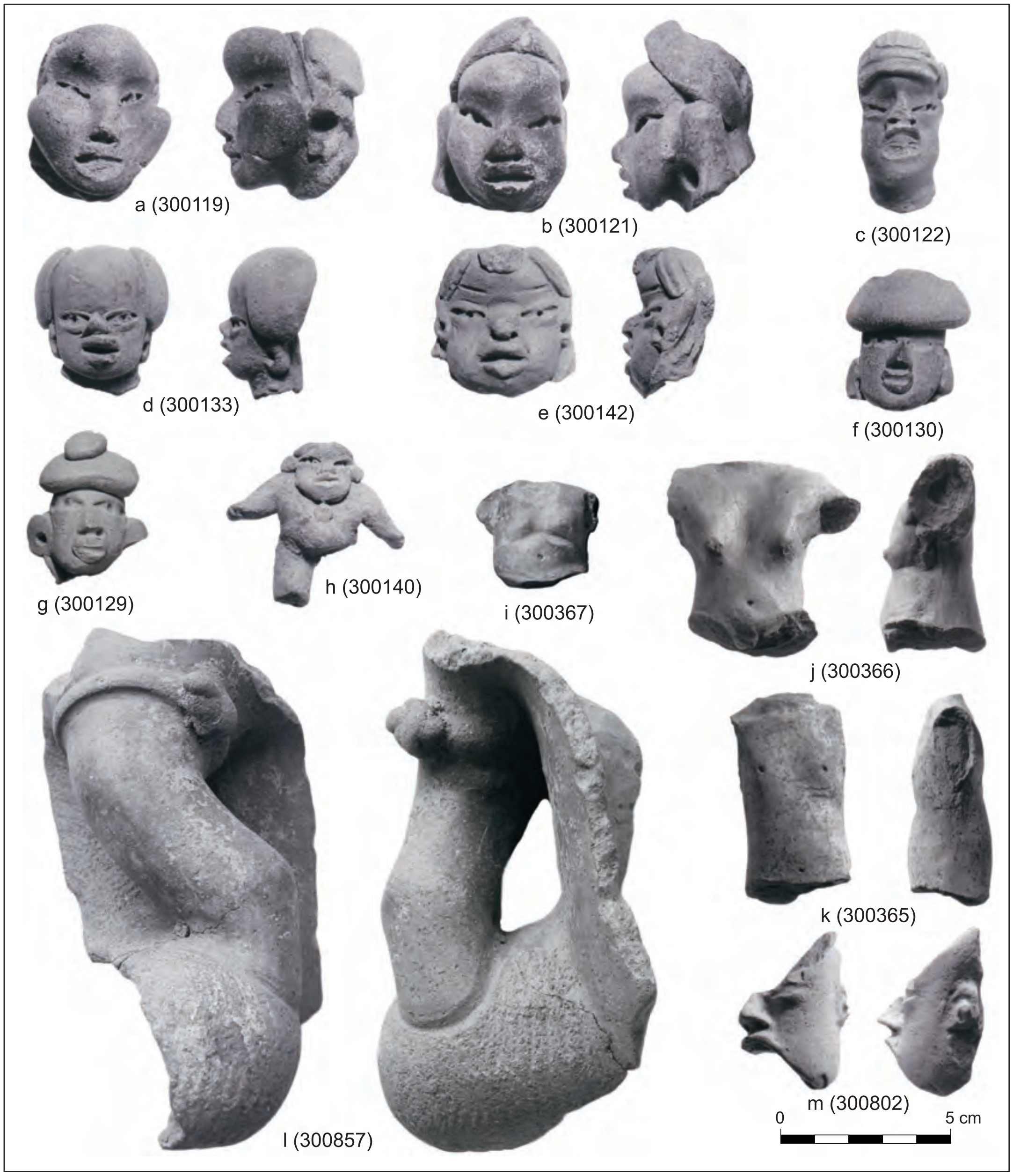


Figure 16.3. Figurines from multiple groups: (a–h) Pama type; (i–k) Poposac type; (l) Sasa type; (m) Zanga type. Proveniences: (a) Md. 13 P2/5; (b) Md. 1 H8/1; (c) Md. 1 L10/7; (d) Md. 1 K10/1; (e) Md. 1 G9/7; (f) Md. 1 H8/11; (g) Md. 1 I8/11; (h) Md. 12/3; (i) Md. 12 T1E/6; (j) Md. 1 G10/Floor 1A Section 8; (k) Md. 1 F11/11; (l) Pozo 32 Feature 1/profile; (m) Md. 12 I4/25.

Only torsos and limbs were recovered in the excavations reported here. The most common torso is the same as for Poposac: a thin, possibly male figure is shown seated, legs out straight or bent in front of the body. The hands typically rest on the thighs or knees. The problem of interpreting gender is the same as for Poposac. There is no representation of clothing or ornamentation. Yacsas figurines from Paso de la Amada date to the Cherla phase. Totals: six torsos, four limbs.

Zanga Type

Zanga comprises hollow figurines with surfaces similar to the Poposac or Yacsas types (Figure 16.3m; see also Figure 6.5). Slips range from cream and white to gray and brown. Estimated dimensions are in the range of 15 to 35 cm. Heads appear to have varied in style. Some clearly had a rather classic "Olmec" style, with downturned, trapezoidal mouths and elongated, nearly cylindrical heads. Others diverged markedly from that style. More than 80 percent were seated. Inspection of chest fragments suggests that both men and women might be represented, but at least some were probably genderless "hollow babies" (Blomster 1998:311). In contrast to the hollow figurines of the Naca group, there is no indication of clothing or ornamentation.

Zanga figurines appeared in the Cherla phase and persisted through Cuadros. The type was more common (in small fragments) in the Cherla deposits of Mound 1 at Paso de la Amada than either the Yacsas or the Poposac types, suggesting that iconographic changes in hollow figurines may have preceded analogous changes in solid figurines. Totals: six heads, five torsos, 31 limbs, nine unidentified. (Other Eyah figurines not described here include a kaolin fragment from T1T, Level 5 [80–100 cm], and three untyped limb fragments.)

EFFIGIES

Effigy making was constrained by several factors that would not have been an issue for figurines, including formal characteristics necessary to create a functional pot and gradually changing local conventions concerning what a pot should look like. Effigy pots also vary in composition in a more complex way than figurines. Three aspects of composition were considered in developing the classification: scheme, design, and facial construction.

Scheme refers to the relative balance in the making of an effigy vessel between, on the one hand, cultural standards of what a pot should look like and, on the other, the effort to create an image that takes the form of a dog, a toad, or what have you. Three different schemes are distinguished: elaborative, sculptural, and intrinsic. An *elaborative* scheme merely adds effigy elements to a standard vessel form. In a *sculptural* scheme, the form of the vessel is more dramatically subordinated to the goal of representation. The vessel does not resemble typical pots; it is more of a sculpture. The *intrinsic* scheme designates vessels that are basically elaborative but that do not fit easily into the standard ceramic typology. The vessels themselves seem instead to constitute a minor type in which the presence of an effigy is definitional. (See the Cisik type, Mec group.)

Design refers to the nature of the visual metaphor established between pot and animal referent. A *decorative* design involves the addition of isolated animal or human features to a pot—for instance, a single head or multiple heads spaced around the vessel. There is no particular effort to establish the pot as a metaphor for the animal. An *integrative* design presents the pot itself as an animal, with head, legs, and tail appropriately positioned (Figure 16.4a). In a *partitive* design, either (1) some part of the pot is modified to resemble the referent (for instance, a vessel support is shaped like an animal head or the neck of the vessel is elaborated to depict an animal) or (2) only part of the referent is depicted (for instance, just the head). In a *discrete-trait* design, multiple elements of an animal are molded around the circumference of a pot without regard to anatomical relations (Figure 16.4b).

Finally, *facial construction* proves useful as a time-sensitive basis for classification at the group level. In the case of *hollow-sculpted* effigies, the modeling of the usually zoomorphic head involves significant distortion of the wall of the vessel. The head projects outward from the general tendency of the wall. The walls of the head itself are not much thicker (and are sometimes thinner) than the vessel walls. As a result, the head at least to some degree encloses a hollow space, part of the interior of the vessel. *Minimally sculpted* effigies also involve distortion of the vessel wall, but that is usually achieved by thickening; if the head were broken off the vessel, it would not appear hollow. The most common facial construction is the *appliqué head*: the head is composed of one or more fillets and attached as a single piece to the outer wall or rim of the vessel. A final mode of facial composition is referred to as *composed features*. In this case, individual elements of the face, such as an eye, ear, and snout, are modeled on or attached to the vessel wall as separate entities rather than as a single appliqué head.

Effigies are divided into three groups, Tucuac, Tenai, and Mec, based on facial construction.

TUCUAC GROUP

The effigy pots of this group are sculptural in scheme, with facial construction either hollow-sculpted or minimally sculpted. The overall form of the vessel is distorted from the usual rounded and symmetrical to more naturalistically suggest the form of the referent. A variety of vessel forms, from open bowls to restricted-mouth bowls and tecomates, are represented.

Hapac Type

This early sculptural type is diverse in both surface treatment and subject matter (Figure 16.5d–g). One of the basic defining criteria is that multiple surface treatments are employed on the same piece, including well-smoothed zones (similar to the surfaces of Nicotaca-type figurines), slipped and/or burnished areas, zones of parallel burnished lines, and stamped zones. Contrasts between these different zones were central to the way these images represented their subjects. For instance, the face of a human subject might be slipped and burnished, while the hair was smoothed or stamped but unslipped. The scheme was sculptural and the design probably integrative in most cases. Fragments of Hapac effigy vessels may be difficult to distinguish from pieces of hollow figurines (Naca or Jutzu types) unless the rim is present. The earliest examples include quite detailed and naturalistic human images in the Barra phase (Clark 1994b:Figure 3.6). In Locona and Ocós, animal imagery is more common. Totals: 14 heads, 11 appendages, seven other/unidentified fragments.

Figure 16.4. Design schemes of effigy pots: (a) integrative design on a Tzapas-type toad pot (302092); (b) discrete trait design on Cisik-type rabbit pot (302008). *Drawings by Alana Purcell.*

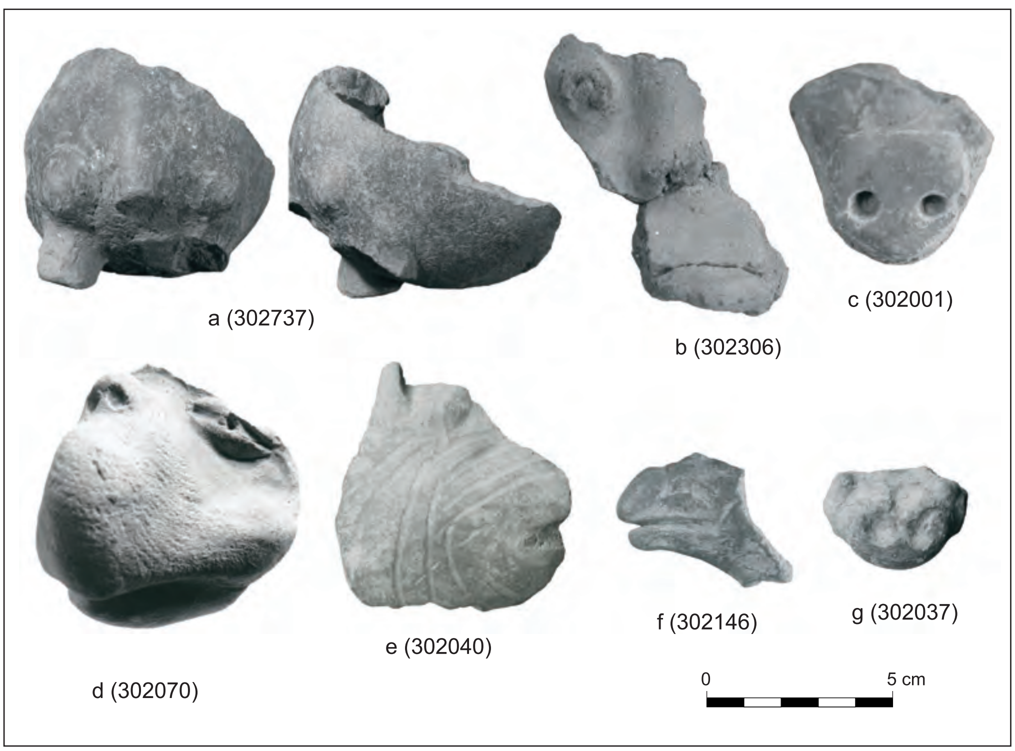


Figure 16.5. Tucuac group effigies: (a–c) Cavak type; (d–g) Hapac type. Proveniences: (a) Md. 1 I9/9–10; (b) Md. 32 2/241; (c) Md. 1 M10/profile; (d) Md. 12 T1E/7; (e) Md. 1 T1/8; (f) Md. 1 I7/2; (g) Md. 12 T1D/6.

Kux Type

These are sculptural effigy pots slipped white, gray, or black. The subject matter is predominantly zoomorphic (Figure 16.6h–l). The naturalism of the imagery is particularly notable, with fish the most common subject (Figures 16.6h, 16.6j, 16.6l). Design was probably integrative in most cases. Design in the case of the fish is uncertain: discrete-trait or decorative designs are possible, but integrative seems most likely. The viewer looking at the pot from above would have seen the side of the fish; for example, the view in Figure 16.6l looks down on the upper surface of the rim of an open bowl, with the vessel interior down on the page. Other animals include a fragment of a beautiful dog head (Figure 16.6k). The Cherla-phase ceramic types Bala White and Pino Black and White are represented among Kux effigies. Totals: 17 heads, four appendage, two other/unidentified fragments.

Cavak Type

These are red-slipped, sculptural effigy pots, sometimes with zones that lack slip (smoothed or with shell-edge or other stamping). A variety of animals and sometimes humans are represented. The extant collection is mostly in small pieces (Figure 16.5a–c). The scheme is sculptural and the design probably integrative in most cases. This type extends significantly through time from the Locona through Cuadros phases. Totals: 10 heads, seven appendage, five other/unidentified fragments.

TENAI GROUP

The defining feature of this group is that faces are *composed*: individual elements making up a face (eyes, mouth, and so on) are placed separately on the exterior wall (or sometimes a vessel support) without significantly altering the form of the vessel. Vessels are most commonly restricted-rim tecomates.

Libu Type

This type involves the elaboration of tripod tecomate supports with facial features (Figure 16.6m). The tecomates have scraped, unslipped exteriors. Supports were also unslipped and unburnished. The scheme is elaborative and the design partitive/decorative. It appears that only the vessel supports were zoomorphic on these vessels (partitive design) and that the facial imagery was repeated on each of the three supports (decorative design). The faces are very simple, most likely zoomorphic and possibly reptilian. The vessels were Michis plain-bodied tecomates with decorated rims. They date to the Locona and Ocós phases. Totals: fragments of six heads and one appendage.

Yacay Type

This type features elaboration of the unslipped exterior walls of tecomates with imagery that is zoomorphic, anthropomorphic, or mixed human–animal (Figure 16.6e–g). Faces are usually composed of elements placed separately on the upper walls of tecomates (Michis Buff and related types), often on a rather rare form with a constriction in the upper body and a convex neck (as in all the examples illustrated). Sometimes faces are between composed and appliqué, with much of the head depicted but made from two or three separate appliqués. (Single appliqués on tecomates with unslipped walls were assigned to the Yacmec type of the Mec group.) Design is decorative or partitive. Various animals are depicted. There are also anthropomorphic and mixed human–animal themes, the most common being a face-framing headdress (Figure 16.6f) that may occur with faces that are either clearly zoomorphic or perhaps anthropomorphic. The headdresses are made in a variety of specific forms, apparently in some cases including a forehead mirror. This type in its several varieties traces a tradition of imagery on plain-walled, decorated-rim tecomates from the Cherla through Jocotal phases. Totals: 42 heads, 41 appendages, two other/unidentified fragments.

Chachak Type

These are red-slipped effigy pots with faces that are composed-feature or minimally sculpted (Figure 16.6a–d). The effigy features themselves are usually slipped. The scheme was elaborative, ranging in some cases to sculptural. Design appears to have been integrative in at least some cases. The type first appeared in Locona or Ocós but was more common in the Cherla phase. Totals: fragments of 12 heads, five appendages, one other/unidentified piece.

Cunlik Type

A variety of composite-feature vessels made in a soft, temperless paste. Surfaces are sometimes burnished. Some of the vessel forms diverge from the standard set of forms, and the vessels in general are small. This may be mainly a Cherla-phase type. Totals: fragments of four heads, one other/unidentified piece.

Mavi Type

These are appliqué or composed-feature effigies on vessels of the ceramic types Mavi Buff or Mavi Red and Buff. Those types are distinguished by streaky burnishing on unslipped surfaces that vary from tan to gray to black. Totals: three heads, three appendage fragments.

Figure 16.6. Effigies from multiple groups: (a–d) Chachak type, Tenai group; (e–g) Yacay type, Tenai group; (h–l) Kux type, Tucuac group; (m) Libu type, Tenai group. Proveniences: (a) Md. 1 G9/11; (b) Md. 1 I7/7; (c) Md. 1 H9/2; (d) Md. 1 H8/11; (e) Md. 1 E10 Feature 4; (f) Md. 11 P1/3; (g) Md. 1 K10/7; (h) Md. 1/fill; (i) Md. 1 H13/19; (j) Md. 1 I11/8; (k) Md. 1 M10/11; (l) Md. 1 K10/10; (m) Md. 1 J12/7.

Cahue Type

These are composed-feature effigy faces and associated appendages on burnished (or sometimes slipped orange-brown) bowls or tecomates (not illustrated). The most common vessel form is a relatively deep, rounded-walled bowl. Cahue is related to various orange, brown, and unslipped burnished ceramic types particularly of the Cherla phase, possibly continuing through Conchas. Totals: five heads, one appendage, two other/unidentified fragments.

Ajaja Type

Composed-feature or minimally sculpted effigies that bear both red and white slip (not illustrated). Mainly a Cuadros-Jocotal type related to the ceramic type Tilapa Red on White. Totals: one appendage, one other/unidentified fragment.

MEC GROUP

The effigies in this group are constructed with appliquéd heads. Eyes and mouth appear on the same piece of clay, which is attached to the pot. The scheme is elaborative or intrinsic and the design usually integrative, with appendages placed separately around the pot in a clear imitation of approximate anatomical position. The heads tend to break off the parent vessel, and they form a substantial portion of the effigy assemblage. The heads are usually smoothed rather than slipped. Some of the heads classified as Mec group effigies may actually have been from Copun-type animal figurines, but we think the percentage is small (based on the low frequency of definite Copun figurines).

Tzapas Type

These are effigies formed with appliqué heads on red-slipped bowls and tecomates of the pottery types Chilo Red and Paso Red (Figure 16.7k–p). The most common vessel forms are convex-walled bowls with flat bases. The scheme is elaborative and the design usually integrative, with appendages, including legs and tail, placed in the appropriate anatomical position around the pot (Figures 16.4a, 16.7p). Most of the heads looked straight out from the side of the vessel, so that the pot depicted the animal referent in the latter's normal orientation. The main exception are fish pots, among which heads were oriented sideways (Figure 16.7o). The images are predominantly zoomorphic, with toads most common (Figure 16.7k–m) and fish and crocodiles also important (Figure 16.7n–o). There are a few mixed human–animal themes involving the addition of human traits (particularly jewelry) to fundamentally animal images, usually crocodiles. (See Figure 16.7n; the round appliqué between the eyes may have depicted a mirror.) Totals: fragments of 53 heads, 76 appendages, one other/unidentified. (Many heads identified only to the Mec group are probably also Tzapas.)

Cisik Type

This is the clearest example of an intrinsic scheme in the effigy collection (Figures 16.4b, 16.7h–j). The vessels in question diverge from any option in the standard pottery typology, and all of them appear to have had effigies. In other words, these appear to constitute a distinctive pottery type in which the presence of an effigy is intrinsic. The vessels are all quite small: mouths 5–6 cm or even less; maximum diameters minus effigy projections 8 cm or less. They are mostly incurving-walled bowls or tecomates with rounded sides and bases. The exterior surface and sometimes the interior is smoothed and slipped red (or perhaps sometimes painted). The surfaces are not burnished. This combination of careful smoothing (without burnishing) and slipping is otherwise unknown in the standard pottery typology. The scheme is intrinsic in that these unusual vessels, with a unique combination of surface attributes, all seem to have had effigies. A rather narrow range of animals is depicted, emphasizing particularly rabbits and dogs. Design is integrative (in the case of dogs; Figures 16.7h, 16.7i) or discrete-trait (in the case of rabbits; Figures 16.4b, 16.7j). Cisik is an Ocós-phase type, possibly beginning in Locona. Totals: 16 heads, two appendage fragments.

Camik Type

These are effigy vessels with an appliqué head design, slipped white, gray, or black (Figure 16.7a–b). The scheme is elaborative, and the design was probably usually integrative. Vessel forms include both rounded-walled bowls with flat bases and direct rims, and bowls with outsloping walls, flat bases, and thickened rims. Schematic fish that are projections from the bolstered, beveled, or everted rims of open bowls are particularly common. The type extends from the Ocós phase through Conchas, with its peak during the Cherla and Cuadros phases. Totals: nine head, four appendage fragments.

Guijarra Type

These are effigies on vessels of the ceramic type Pebble Coarse of the Locona and Ocós phases. Designs are integrative. In the small sample available, it appears that the scheme ranges from elaborative to sculptural. Totals: four heads, five appendage fragments.

Yacmec Type

This type is characterized by appliqué heads (rather than composed features) on tecomates with unslipped bodies (Figure 16.7e–g). The exterior rim is sometimes decorated, but the style is not always characteristic of the Michis types. For instance, some have a slipped and burnished rim band in which the slip is characteristic of Paso Red. The effigy heads appear immediately below the rim band. In many cases, the mouths of the vessels appear to have been unusually wide for tecomates. The scheme is elaborative and the design integrative. Phases are Locona, Ocós, and Cherla. They are probably generally earlier than but overlapping with the Yacay type of the Tenai group, in which facial construction is by composed features. Totals: 16 head fragments.

Latzo Type

These are black- or brown-slipped and/or burnished effigy vessels with stamping or gouging on the exterior and sometimes interior surfaces. Vessel forms include a variety of bowls (often relatively small) and small tecomates. Stamping is usually with a shell edge or shell back (often pre-slip), more rarely stick gouging. Latzo dates to the Lo-

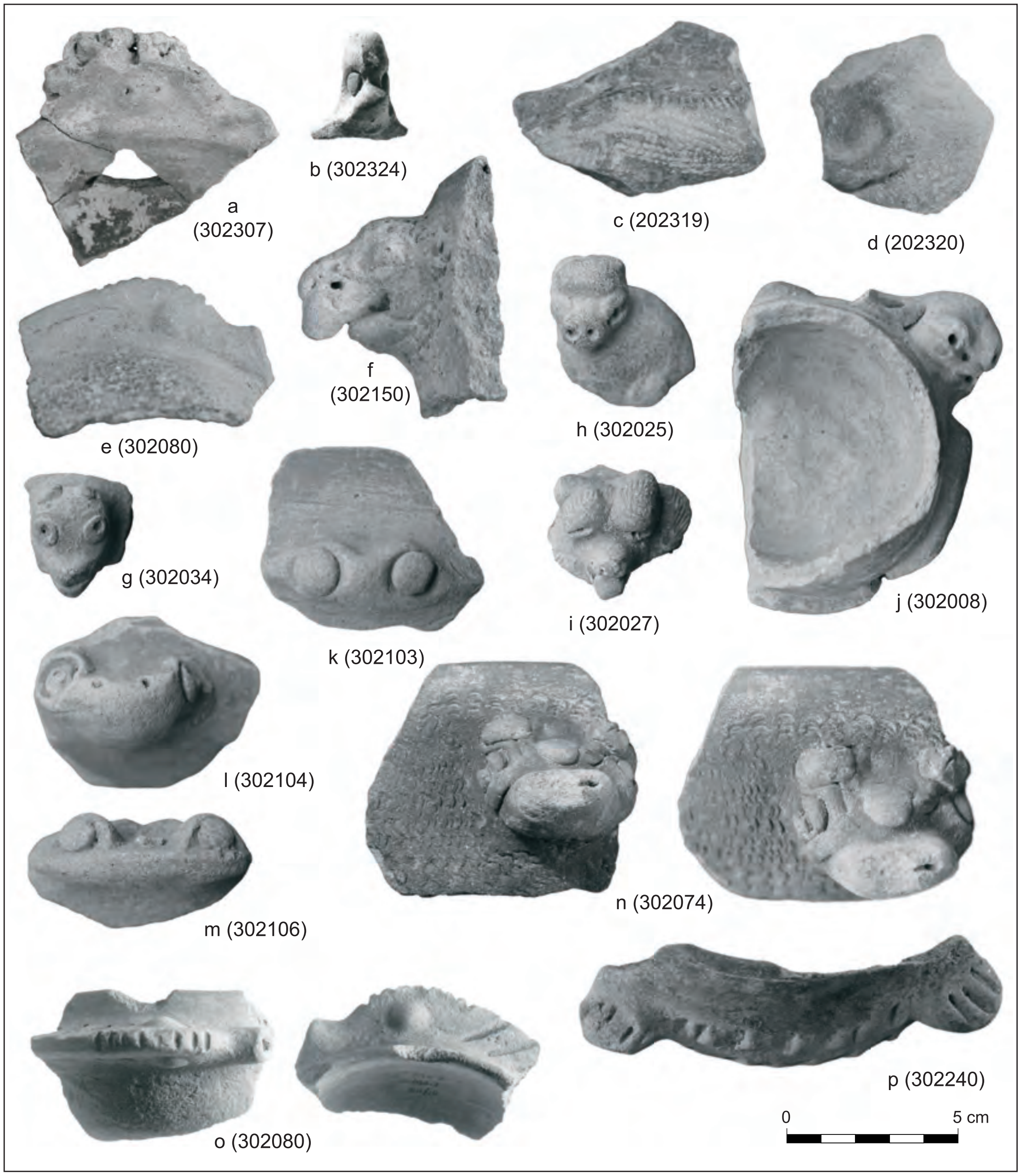


Figure 16.7. Mec group effigies: (a–b) Camik type; (c–d) Latzo type; (e–g) Yacmec type; (h–j) Cisik type; (k–p) Tzapas type. Proveniences: (a) Md. 32 T1D/11; (b) Md. 1 M10/12; (c) Md. 12 T1E/12; (d) Md. 12 H4/30; (e) Md. 1 E11/10; (f) Md. 14 P1/7; (g) Md. 1 J7/9; (h) Md. 1 I9/7; (i) Md. 1 L8/1; (j) Md. 12 P5/4; (k) Md. 1 H11/Floor B Section 4; (l) Md. 1 J12/2; (m) Md. 12 H6/25; (n) Md. 12 T1D/10A; (o) Md. 1 E11/10; (p) Md. 12 T1D/15.

cona through Cherla phases. Totals: four appendages, one other/unidentified fragment.

THE MOKAYA MATRON

The statuette from Mound 32, dubbed the Mokaya Matron (302851), was at least twice the size of typical hollow figurines at Paso de la Amada (Figure 16.8). Numerous thigh, chest, back, and head fragments were pieced together (mainly from T4F/210 but also from T4F/212, T4E/189, and Unit 2/243). The craftsmanship is excellent, and the construction and firing of such a piece required considerable skill. The statuette was slipped an orange that graded toward white. It was then painted, predominantly in red, though also with white. Traces of red appear on the headdress, the face, the sclera (white) of the eye, the preserved upper chest, the breasts (including the nipples), the waist, the thigh, and around the knee area.

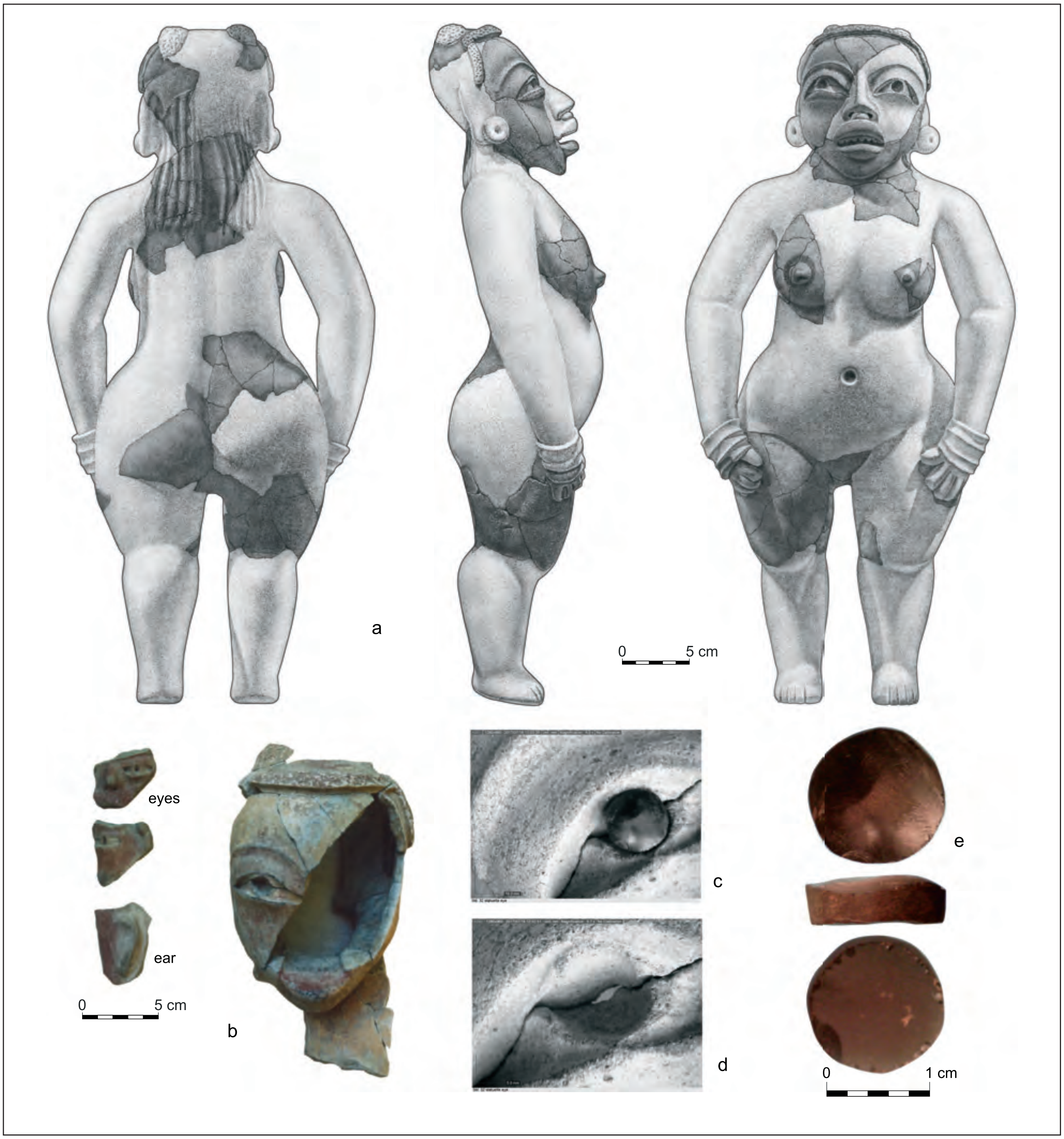


Figure 16.8. The statuette from Mound 32 (the Mokaya Matron): (a) reconstruction drawing with original fragments shown darker than reconstructed portions; (b) head portion of statuette compared to fragments from typical hollow figurines (note sizes of eyes); (c) eye of statuette, with possible obsidian mirror inlay in place; (d) eye without the obsidian inlay; (e) flaked and ground obsidian disk from Mound 32 (303115); (f–g) original pieces; (h) profiles of the pieces. The arrow in (g) points to the broken part of the base of the ear on the basis of which the artist reconstructed earspools in (a). *Drawings by Ayax Moreno, courtesy of the New World Archaeological Foundation; plate composed by R. Lesure.*

The representation was of a nude human female (as indicated by breasts). No genitals were depicted. The person was intended to be either young or ageless; there are no indications of advanced age. The head is mostly taken up by the face, though a simple headdress is shown (a sinuous strip of fabric-stamped clay from ear to ear and at least two round, stamped appliqués at the top of the head). Other than the headdress, no ornamentation is depicted

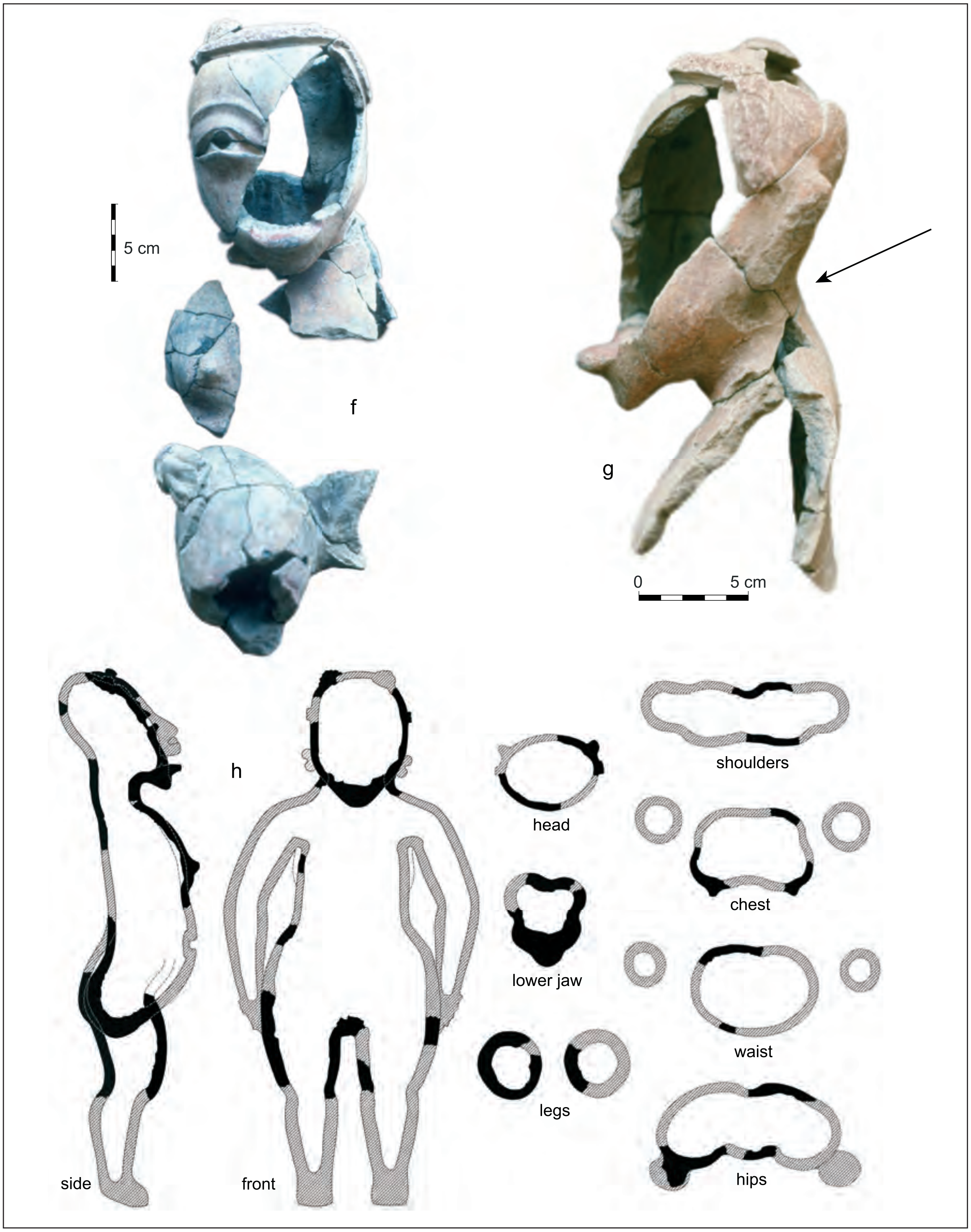


Figure 16.8. *continued.*

(and also no clothing). There is a jutting lower lip and a notched strip of clay just inside the mouth that seems to represent teeth. The figure's right hand rested on her thigh. Fingers are delineated with deep gouges, with the thumb broken off.

We are intrigued by the possibility that the obsidian mirror inlay (303115) described in Chapter 12 and shown in Figure 16.8e might have been an eye inlay for the statuette. It fits nicely in the eyehole (Figure 16.8c–d). It should be noted that 303115 could alternatively have been part of a composite ornament rather than a figurine. It is the same shape as (but considerably larger than) the component missing from the greenstone pendant (303078) shown in Figure 11.2u.

The head of the statuette measures 17 cm from the top of the head to the chin. The mouth is 4.8 cm wide, as is the eye. The ear was about 6.9 cm long (top to bottom), and the width of the wrist was 2.9 cm.

No other such figure has been discovered in Early Formative Soconusco, though there are two small pieces from Mound 6 that may derive from objects of similar size (an ear 6.2 cm long and a wrist 3.2 cm wide). The strong suspicion is that such an impressive ceramic sculpture would have had a ritual function, though it remains unknown what messages might have been conveyed by the female subject matter. (See Chapter 27 for some speculations.) Another point relevant to the issue of function is that although large portions of the original statuette are missing, it is nevertheless unusual for hollow figurines at Paso de la Amada to be found in such a high level of completeness.

DISTRIBUTION OF FIGURINES AND EFFIGIES

Both effigies and figurines were common throughout the sequence. Table 16.1 provides a view of changing frequencies over the sequence, counting head fragments only and using various methods of standardization. Note that n's for the standardization against the summed rim proportions ("per 10 vessels discarded") are less than for other standardizations, since only units for which full (Level A) ceramic analysis was available could be considered. The samples from Md12-IV and Md1-V are relatively small; we generally expect them to fall between the Ocós and Cherla samples.

The overall pattern for both effigies and figurines is continuity throughout the sequence. In terms of standardization by volume excavated, the low Locona values and high Cherla values for both classes of objects are to be expected given the much greater overall packing of artifacts in the latter case (see Chapter 2). In standardization against weight of sherds, the effigies look fairly stable, while figurines appear to perhaps decline. A pattern of slight decline in the frequency of both effigies and figurines is suggested by the frequencies per 10 vessels discarded. In the case of effigies, frequencies went from approximately one vessel out of eight bearing an effigy during the Locona phase to one out of every 14 vessels in Cherla. The corresponding measure for figurines needs to be treated with care since (unlike effigies) figurines are not actually attached to pots and there is evidence of an increased rate of discard of pots (particularly tecomates) over the course of the sequence.

The distribution of effigy groups and types through time is shown in Table 16.2. At the group level, the biggest change was the rise of the Tenai group in the Cherla phase. That shift in particular was associated with a decline in the Mec group; there was also a decline in Tucuac. Patterns to be noted at the level of the type include the dramatic decline in Hapac, clearly a Locona-Ocós type. Cisik was characteristically Ocós, but other patterns within the Mec group need to be considered in relation to the large number of untyped broken appliqué heads in the Locona and Ocós samples. For instance, the data as they stand appear to suggest a rise in the Tzapas type from Locona to Cherla, though we suspect that most of the untyped Mec fragments are actually Tzapas and that Tzapas was predominantly a Locona-Ocós type that had begun to decline in popularity in the Cherla phase.

Table 16.3 presents comparable data on the figurines. The Paqui group persisted through the entire sequence,

Table 16.1. Effigy and figurine heads: frequencies through time

	Locona[a]	Ocós	Md12-IV	Md1-V	Cherla
Head Fragments					
effigy	25	39	11	2	89
figurine	31	25	4	8	72
Effigies					
per m^3	0.52	1.29	0.71	0.12	1.80
per 100 kg sherds	4.68	5.96	4.66	1.80	4.15
per 10 vessels discarded	1.19	1.03	0.83	1.01	0.68
Figurines					
per m^3	0.64	0.82	0.26	0.47	1.46
per 100 kg sherds	5.80	3.82	1.69	7.19	3.36
per 10 vessels discarded	1.51	0.90	0.55	0.00	0.58

[a] Includes Early Locona, Locona, and Late Locona.

Table 16.2. Relative percentages of effigies (all identified fragments) by group (in bold) and by type, split by phase

Groups and Types	Locona[a]	Ocós	Ocós-Cherla	Cherla	Full Collection (n)[b]
Tucuac Group	***20.6***	***26.0***	***21.1***	***14.8***	***95***
Hapac	11.8	11.0	5.3	3.8	32
Cavak		6.8	10.5	3.4	22
Kux	2.9	5.5	5.3	4.7	23
untyped	5.9	2.7		3.0	18
Mec Group	***58.8***	***61.6***	***68.4***	***43.6***	***286***
Latzo	5.9	1.4			5
Tzapas	11.8	19.2	26.3	24.6	130
Yacmec	8.8			3.4	16
Cisik	2.9	8.2	15.8	0.8	18
Guijarra		1.4	5.3	1.3	9
Alaxax		1.4			2
Camik	2.9	1.4		3.4	13
untyped[c]	26.5	28.8	21.1	10.2	93
Tenai Group	***17.6***	***6.8***	***10.5***	***38.6***	***150***
Libu	2.9	1.4	5.3	1.3	7
Chachak	2.9			4.7	18
Yacay		1.4	5.3	23.3	85
Ajaja				0.8	2
Cahue				2.5	8
Cunlik				0.8	5
Mavi				1.7	6
untyped	11.8	4.1		3.4	19
Mec or Copun	***2.9***	***5.5***		***0.4***	***7***
Naca or Tucuac					***2***
Tenai or Mec				***1.7***	***9***
Imported Effigy				***0.8***	***2***
Unidentified (n)[d]	**4**	**6**	**2**	**11**	**38**
Totals (n)	**38**	**79**	**21**	**247**	**589**

[a] Includes Early Locona, Locona, and Late Locona.
[b] Including artifacts from contexts not assigned to a phase.
[c] Mainly animal heads broken off pots; probably mostly of the Tzapas type.
[d] Not included in the calculation of percentages.

Table 16.3. Relative percentages of figurines (all identified fragments) by group (in bold) and by type, split by phase

Groups and Types	Locona[a]	Ocós	Ocós-Cherla	Cherla	Full Collection (n)[b]
Naca	***6.08***	***1.96***	***7.07***	***2.08***	***60***
Jutzu		0.65	1.01	0.69	10
Sasa	6.08	1.31	5.05	1.39	48
untyped			1.01		2
Naca or Tucuac	***0.00***	***0.00***	***0.00***	***0.17***	***2***
Paqui	***93.92***	***96.73***	***86.87***	***90.45***	***1687***
Muscu	21.55	17.65	27.27	25.17	412
Nicotaca	49.72	55.56	49.49	36.63	828
Copun	0.55	1.31	1.01	1.39	18
Xumay	3.87	5.23	3.03	3.82	66
Pama	1.10[c]	0.65	1.01	3.99	44
Paqui, untyped	2.21	1.31		0.52	17
untyped	14.92	15.03	5.05	18.92	302
Eyah		***1.31***	***6.06***	***7.29***	***111***
Poposac		1.31[d]	2.02	1.39	46
Yacsas				1.04	10
Zanga			3.03	4.69	51
Kaolin				0.17	1
untyped			1.01		3
Yoca[e]					***3***
Unidentified (n)[f]	**18**	**3**	**2**	**10**	**59**
Totals (n)	***199***	***156***	***101***	***586***	***1922***

[a] Includes Early Locona, Locona, and Late Locona.

[b] Including artifacts from contexts not assigned to a phase.

[c] A head and a torso from Late Locona contexts. The head is from Md. 13 P2/5, just under a Cherla-phase pit; it is probably actually a Cherla-phase artifact.

[d] Two white-slipped limbs from Md. 12 T1E/7, just under a mixed Cherla and Ocós layer (T1E/6) that yielded a Poposac torso. The two limbs are probably Cherla-phase artifacts.

[e] A Jocotal-phase group not described in this chapter.

[f] Not included in the calculation of percentages.

whereas Naca was most common in Locona, and Eyah appeared during the Cherla phase. At the type level, Sasa is predominantly Locona. These hollow figurines with elaborate surface treatment were similar to the contemporary Hapac type among the effigies, and fragments of the two are difficult to tell apart. Further, early Hapac effigies include human as well as animal representations. Sasa-type figurines appear to be predominantly human. Jutzu may be basically an Ocós type. In the Paqui group, Muscu, Nicotaca, and Pama—all predominantly representations of standing young women—followed each other in a rough succession with considerable overlap. The Xumay type—predominately seated figures, many of which were masked and/or elaborately clad—appeared in Locona, peaked in Ocós, and continued into Cherla. The Eyah types were the local manifestation of Initial and Early Olmec styles. The two solid types (Poposac and Yacsas) are rare at Paso de la Amada. Fragments of hollow Zanga figurines are comparatively more common than one might expect, but of course those relatively large figurines would have broken into more pieces than their solid counterparts.

SUBJECT MATTER

The subject matter of effigies is predominantly animals that would have been present in the estuary environment (Lesure 2000). A considerable variety is represented. In some cases, the animals are specifically identifiable. In other cases, there are hints of iconographic specificity, suggesting that the animal referent was identifiable to the original makers and users even if the contemporary analyst is uncertain what animal it might be. Fish and some of the reptiles and birds seem to be instead more generic references to classes of animals. Generally among the birds, though, there is a distinction between the generic "bird" depicted on whistles (see Chapter 18) and a variety of birds (quetzal, turkey, vulture, owl, waterfowl, bird of prey) depicted among the effigies. Human imagery is present but rare among the effigies; in this small sample, each piece is unique, and little more can be said about those.

Table 16.4 shows the relative frequencies over time of the more prominent themes. Note that the miscellaneous categories of birds, mammals, and reptiles include both specifically identifiable specimens and specimens identifiable only as "bird," "mammal," or "reptile." The sample sizes here are small, but it appears that while toads were consistently popular, the presence of other classes of animals fluctuated. Both fish and birds were popular in Locona and again in Cherla. Miscellaneous mammals peaked in popularity in Ocós. Dogs were prominent particularly in Locona and Ocós. The rabbit was mainly an Ocós theme (and indeed was specific to the Cisik type). Specific birds in the Locona sample include turkey, vulture, waterfowl, and bird of prey. In the Ocós sample are turkey and bird of prey. The Cherla sample includes owl, quetzal, turkey, bird of prey, and a crested bird. Miscellaneous mammals in the Ocós phase include deer and monkey; in Cherla, coatimondi, tepezciuntle or guaqueque, and a possible sea mammal. Miscellaneous reptiles include a sea turtle in the Ocós sample.

The subject matter of the figurines is discussed by Clark (1991, 1994a) and Lesure (1997b, 1999c). Aside from a few comments in Chapter 27, we will save our further thoughts on the figurines for the monograph currently in progress.

Table 16.4. Subjects among the effigies, percentages by phase

Subject	Locona	Ocós	Cherla	*N*
toad	19.0	21.4	29.3	*27*
bird[a]	28.6	10.7	22.4	*22*
dog	23.8	14.3	5.2	*12*
miscellaneous mammal	0.0	21.4	10.3	*12*
fish	14.3	3.6	10.3	*10*
reptile	4.8	10.7	3.4	*6*
peccary	4.8	3.6	5.2	*5*
rabbit	0.0	7.1	3.4	*4*
human	4.8	0.0	6.9	*5*
crocodile	0.0	3.6	1.7	*2*
fantastic creature	0.0	3.6	1.7	*2*
n	*21*	*28*	*58*	*107*

[a] It is clear that multiple distinct types of birds are represented.

Table 17.1. Clay ear ornament (and finger ring) fragments by phase

Phase	Total Ear Ornament Fragments	Ear Ornaments per 10 kg Sherds	Ear Ornaments per m³	Volume Excavated (m³)	Weight of Sherds (kg)
Early Locona	1	0.79	0.46	2.2	12.7
Locona	1	0.05	0.03	39.1	194.3
Late Locona	1	0.03	0.05	18.7	358.2
Ocós	3	0.04	0.09	33.1	698.9
Ocós-Cherla					
Md1-Str1-2	42	8.86	12.98	3.2	47.4
Md1-Zone V	37	2.85	1.88	19.6	129.7
Md12-Zone IV	12	0.70	1.04	11.5	172.2
Cherla	2833	12.71	54.38	52.1	2228.7

Table 17.2. Clay ear ornament (and finger ring) fragments in Cherla-phase deposits

Excavation Location	Total Ear Ornament Fragments	Ear Ornaments per m³	Ear Ornaments per 10 kg Sherds	Greenstone Ornaments	Iron Ore Mirrors	Volume (m³)	Weight of Sherds (kg)
Md. 1	2735	60.10	13.3	13	9	45.51	2053.8
Md. 13	62	28.43	14.4	1	1	2.18	43.2
Tr. 1B	13	48.15	3.1			0.27	41.3
Md. 11	7	8.75	2.4			0.80	29.1
P29	2	3.92				0.51	
Md. 32	0					0.44	11.0
Tr. 1T	0					2.00	37.6

CHAPTER 17

Ear Ornaments, Finger Rings, and Cherla-Phase Social Differentiation

Richard G. Lesure

THE 1992 EXCAVATIONS in Mound 1 at Paso de la Amada yielded more than 3,000 fragments of fired-clay "napkin ring" ear ornaments and finger rings, concentrated in the Cherla-phase fill of the Mound 1 platform. Ear ornaments were also recovered from other Cherla deposits, though in considerably smaller numbers. If we add, to the resulting collection of 3,502 pieces, the 479 fragments recovered by Ceja Tenorio (1985:99), the site total approaches 4,000. This chapter describes the collection and explores what it can tell us about social life at Paso de la Amada.

TERMINOLOGY

Archaeologists often casually refer to ear ornaments from ancient Mexico as earspools. Clark and Colman (2014) show that this usage obscures a complex early history of ear ornamentation and propose a general terminology in which *earspool* is used in a specific rather than general sense. They divide cylindrical or flaring objects made to be worn through a relatively large hole in the earlobe into three basic types (Clark and Colman 2014:146–48). Earplugs are solid cylinders. Eartubes are open rings or cylinders *without* a flare at one end; they may have either straight or concave sides. Earspools are open rings that flare at one end. Alternatively, ears could be pierced with a small hole, from which a bead or pendant was suspended (Clark and Colman 2014:156).

This terminology is helpful, but the proposed distinction between eartubes and earspools does not yield the most satisfactory division of the Paso de la Amada assemblage. Instead of flaring versus nonflaring, a distinction between *straight-sided* eartubes and *concave or flared* earspools is more useful for understanding this particular collection, and that is the distinction adopted in the present chapter. It is useful to have a general term that distinguishes these forms together from (solid) earplugs. I use the terms *napkin-ring earwear* and *napkin-ring ear ornaments* to refer to the open ceramic cylinders and flares that form the bulk of the Paso de la Amada collection.

RESEARCH QUESTIONS

Napkin-ring ear ornaments had a strangely fluctuating history in Early to Middle Formative Soconusco. They were absent or very rare in the Barra and Locona phases and apparently present in small numbers in Ocós. In the Cherla phase (1400–1300 BC), they suddenly became common, to the extent that their presence is one of the most useful diagnostics for identifying deposits of that phase. Yet at the beginning of the Cuadros phase (1300–1200 BC), use of napkin-ring earwear was abandoned, seemingly as quickly as it had been pervasively adopted a century earlier. After a hiatus of approximately three centuries, in the Conchas phase (1000–800 BC), very similar ornaments became once again common items of personal adornment (Love 1991:61; Rosenswig personal communication, 2014). Based on the restricted distribution of incised ear ornaments within La Blanca and the complete absence of this particular type at outlying centers, Love (1991:61) and Rosenswig (2012:123) suggest that the different types of Conchas-phase earspools encoded rank differences.

Clark and Colman's (2014:156–64) study of depictions of ear ornaments on figurines suggests early (pre-Cherla) variation in earwear (pierced ears, pendants) but also the presence of napkin-ring varieties by the Locona phase. Depictions on figurines—especially when earspools are distinguished from pierced ears and so forth—track the changes among the actual ornaments just noted for the Cherla through Conchas phases.

Clark and Colman (2014) find somewhat similar fluctuations, at least in depictions of earspools, elsewhere in Mesoamerica. Overall, they see a general process whereby artifacts that were originally quite varied and widespread objects of personal ornamentation became increasingly differentiated by rank and sometimes almost entirely associated with the elite. At San Lorenzo on the Gulf Coast, earspools were rare, ear ornamentation was particularly associated with the elite, and the actual ornaments worn varied considerably. In the Middle Formative period at La Venta, earwear was more standardized, earspools in particular were more important, and the association of greenstone ear ornaments with the elite was strong.

Under the scenario proposed by Clark and Colman, napkin-ring ear ornaments disappeared in the Soconusco during the Cuadros phase under the influence of San Lorenzo (or people of Gulf Coast origins at Cantón Corralito) for two reasons. First, this specific type of earwear was not particularly important in the cultural repertoire of the Gulf Coast at this time. Second, sumptuary rules there already restricted ear ornamentation to the elite. Clark and Colman (2014) argue that the link to social stratification became further entrenched in the Middle Formative. Although napkin-ring earwear generally appears to have been more widely accessible in Conchas-phase Soconusco than at La Venta, types of earwear may have marked social classes, as argued by Love and Rosenswig.

Questions for study of the napkin-ring earwear of Paso de la Amada include: What was the source of inspiration and trajectory of development of napkin-ring ear ornaments at the site? Was the Cherla-phase tradition of earwear the culmination of a local trajectory of development or a borrowed practice (whether from the Gulf Coast or elsewhere)? Were ear ornaments basically objects of personal adornment or did they already symbolize rank? If they symbolized rank, how did they do so—by presence versus absence, by use of distinctive types, or by differences in size, decoration, or other elaboration? Finally, why did we find 4,000 fragments at Paso de la Amada when the more typical Formative Mesoamerican site yields more like four or at most 40?

THE COLLECTION AND METHODS OF STUDY

The collection studied includes just three earplugs (all solid cylinders). All of the rest are fragments of thin-walled, open rings made of temperless, fine-paste clay. The vast majority of the objects were eartubes and earspools. There were also finger rings. A few of the ear ornaments are whole or nearly so. However, these were fragile objects, and the collection generally is quite fragmented.

To understand variation in size, shape, and profile, a subset of the collection was studied in detail. Where at least 10 percent of the original diameter of the earspool was present, it proved possible to estimate diameter to the nearest 4 mm using a diameter chart created for that purpose. The pieces subjected to detailed study were therefore those with 10 percent of at least one diameter and the full original depth preserved.

In October and November of 1992, I supervised a student in the analysis of 1,164 such fragments from the Mound 1 excavations at Paso de la Amada and 144 from Clark and Blake's excavations at Aquiles Serdán. I am embarrassed to admit that her name is lost in the mists of time. The Mound 1 collection reviewed then included all ear ornaments identified as such in the field. More were subsequently identified in the ceramic and bone bags or flotation samples; well-preserved pieces from those collections were not studied in detail. In 2013 I analyzed all earwear from small-mound and off-mound contexts other than Mound 1 (Mounds 10, 11, 12, 13, 15, and 32 and Pits 29 and 32). Because the sample was small, I recorded all possible information on every piece recovered, even when neither rim was measurable. I also adjusted the original counts by reviewing small bags that had accumulated from various sources over the years and measured an additional six finger rings, which are used here only in the description of that type so as not to artificially inflate its frequency.

The result of these two phases of analysis is a database of 1,423 measured ear ornaments and finger rings. The materials actually considered in the metric analyses were generally a subset of this total. The *fully measurable* sample consisted of all pieces for which diameter measurements were available for both rims (because in both cases at least 10 percent of the diameter was preserved), minus the six extra finger rings recorded in 2013. This was the primary sample subjected to analysis, but it was also the smallest, consisting of 796 pieces from Mound 1, 37 pieces from other locations at Paso de la Amada, and 90 pieces from Aquiles Serdán. The *partially measurable* sample consisted of all pieces for which at least one diameter measurement was available. This sample was inappropriate for any analysis that involved distinguishing between concave and flared profiles, but it was larger than the fully measurable sample, consisting of 1,152 pieces from Mound 1, 53 from elsewhere at Paso de la Amada, and 144 from Aquiles Serdán. This sample was used in several analyses and also as a check on the robustness of patterns found in the fully measurable sample. In discussion of the chronology, distribution, and social implications of napkin-ring earwear later in this chapter, I also examine the full dataset of recovered earwear fragments (including the unmeasurable pieces not considered for the purposes of classification).

The following variables were recorded.

Diameter 1 and *Diameter 2* (in mm). Diameters were determined by comparing each ornament fragment to a series of concentric circles with diameters in increments of 4 mm (4, 8, 12, 16, etc.). If less than 10 percent of at least one diameter was not preserved on a given ornament, it was not recorded further. The smaller diameter of each ornament was recorded as Diameter 1, the larger diameter as Diameter 2. Often Diameter 1 and Diameter 2 were equal.

Depth (in mm). The distance between the two open ends of the ornament was measured with calipers and recorded to the nearest 0.1 mm. Only ornaments for which the full original depth from one "rim" to the other could be determined were recorded. The term *depth* is used (rather than *height*, *length*, etc.) because it appears most appropriate considering the orientation of an ear ornament as it would have been worn. It is the distance from front to back.

Profile. The exterior profiles were classified as concave, flared, straight, or convex. Solid earplugs (of which there were only three, two with straight exterior profiles and one with a slightly concave profile) were designated solid.

Color. A subjective description of the surface color of each ornament was recorded. Most ear ornaments were gray or black (84 percent).

Interior Painting. Interior painting in an opaque, fugitive red or orange (generally 2.5YR5/8) appeared on 32 percent of the (partially measurable) assemblage.

Exterior Painting. Exterior painting in either red or orange paint was present in a very few instances (3.7 percent of the assemblage).

Incising. Exterior incising and/or punctate designs were present on 1.9 percent of the assemblage.

During the course of analysis, several additional variables were calculated from the diameter and depth measurements taken in the field.

Average Diameter. Calculated as (Diameter 1 + Diameter 2) / 2, this variable was used in the study of flared earspools.

Depth-to-Diameter Ratio. This was calculated as depth divided by Diameter 1. In the Mound 1 assemblage, this ratio ranged from 0.17 to 2.23.

Flare. This was calculated as Diameter 2 divided by Diameter 1. For flared earspools, this is the ratio of the larger to the smaller diameter, and it is thus greater than 1.0. For all other profiles, Flare is 1.0. Flare ranged from 1.0 to 1.8.

ANALYSIS

The first goal of the metric and attribute analysis was to elucidate the principles of variation in the collection as a basis for classification. A second goal was to look for variation in attributes with context of recovery that might provide clues for social interpretation. This section pursues the first goal.

Plots of depth versus Diameter 1, split by profile, are shown in Figure 17.1. The earplugs are very few (0.3 percent). Based on just three extant pieces, their range of variation appears similar to that of straight-profile eartubes, to be discussed presently. The convex-profile ornaments (2.6 percent of the fully measurable assemblage) plot differently from the other types. They are quite shallow, the range of diameters is narrow (and appropriate for a finger), and many bear exterior incising, suggesting that the surface was meant to be seen. These are the finger rings. They are less common than the similarly decorated finger rings in bone (also plotted in Figure 17.1 and described in Chapter 15).

The focus of the analysis was on the remaining 97.1 percent of the collection, the concave, flared, and straight-profile ear ornaments (respectively, 66.2 percent, 21.1 percent, and 9.8 percent of the fully measurable sample). The plot of depth versus Diameter 1 for the straight profile ornaments reveals a basically linear relation in which depth increases with diameter. A simple linear regression yields the relation depth = 5.945 + 0.4968 * Diameter 1, with $R^2 = 0.51$.

The plots for depth versus Diameter 1 for concave and flared earspools are similar to each other but more complex than for straight profiles. In each case, the cloud of points is M-shaped or, more roughly, V-shaped, with one arm of the V (or two points of the M) corresponding to the range of variation in straight profiles (see Figure 17.1). It appears that formal variation of concave and flared ornaments followed similar principles. In each case there were basically two distinct kinds of graded variation. There were deep ear ornaments, among which depth increased with increasing diameter, just as for straight-profile ornaments. There were also shallow ornaments, for which depth remained essentially the same with increasing diameter.

On the basis of these observations, the straight-profile ornaments are referred to here as eartubes and the concave and flared profile ornaments as earspools. The plots reveal a fundamental similarity in the logic behind formal variation in concave and flared profiles and a significant divide between those and straight profiles. This usage differs from that of Clark and Colman (2014) only in the classification of concave profiles, which they would consider eartubes rather than earspools.

The diameter of an earspool was relevant to the wearer because the ornament needed to fit snugly in the earlobe hole. Individuals began with small holes in their earlobes and thus necessarily earspools with small diameters. The earlobe adjusts to larger and larger ornament sizes, but that is necessarily a gradual process. The linear relations between the dimensions in Figure 17.1 suggest that as wearers gradually increased the size of their earlobe holes, the metric properties of their earspools changed gradually. Yet wearers chose one of two logics as they selected earspools of ever larger diameter.

At large diameters or large depths, it is easy to separate deep from shallow earspools. At small diameters and depths—toward the lower left in Figure 17.1—any ob-

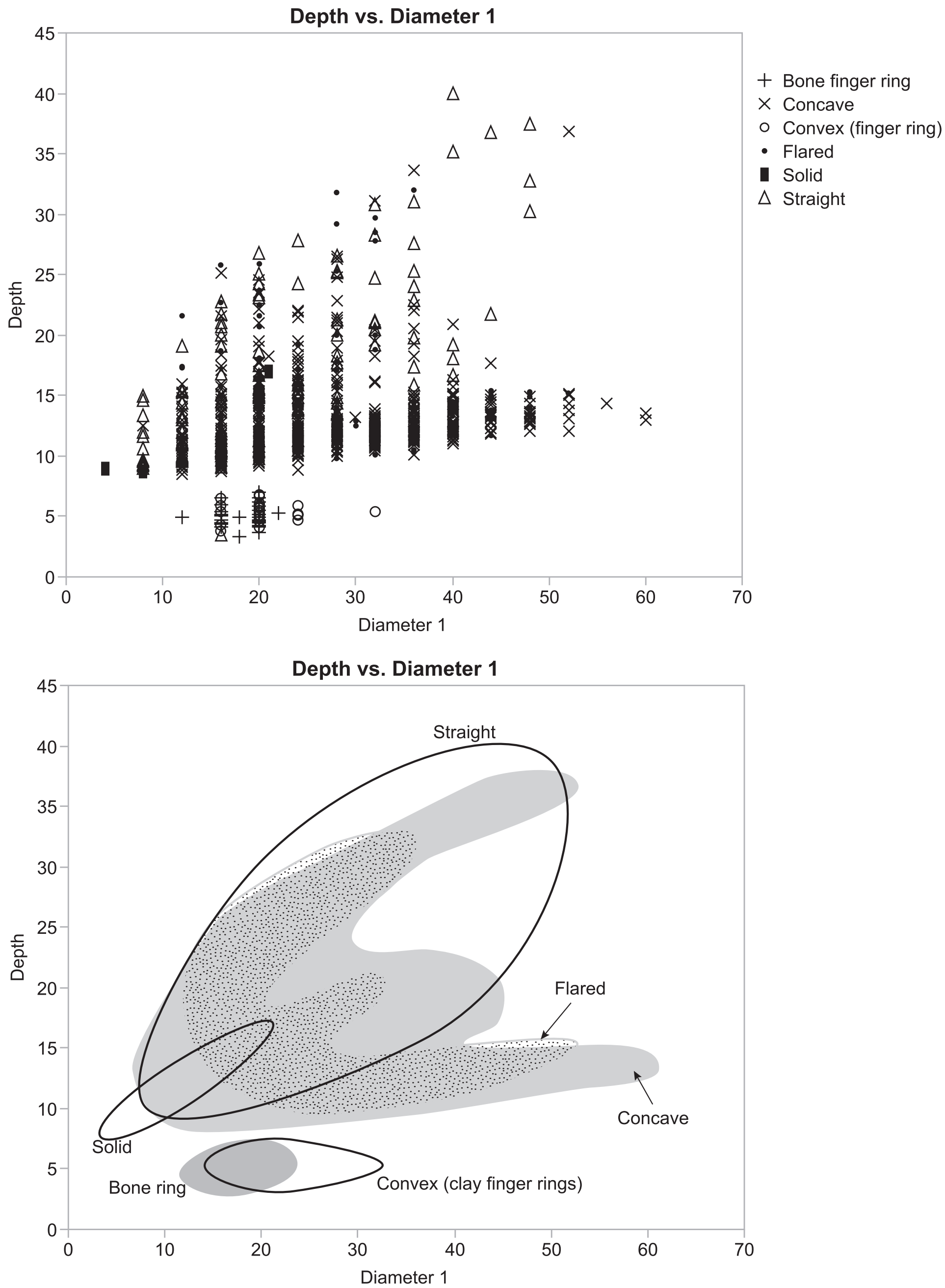


Figure 17.1. Plot of ear ornament depth versus diameter (Diameter 1), both in millimeters, split by profile. Top: full plot of specimens; bottom: rough outer boundaries of the distribution of points for each profile. Bone finger rings are included; they overlap, as expected, with ceramic finger rings. *Illustrations in this chapter by R. Lesure.*

jective separation is impossible. I initially considered two ways in which deep and shallow might be divided arbitrarily at small depths and diameters (Figure 17.2). One way would be to assign a depth threshold of 16 mm (Figure 17.2 top). The second approach would be to separate the two with a depth-to-diameter ratio; an appropriate cut-off in that case would be 0.5 (Figure 17.2 bottom). I have chosen the second approach. It yields a cloud of points for deep earspools that corresponds quite closely with that of the straight-profile eartubes. Further, the deep earspools, as a set, have metric properties similar to those of eartubes (Figure 17.3). They also share other attributes, in particular the frequency of painting. That last outcome was in no way an assumption of the analysis and suggests that this

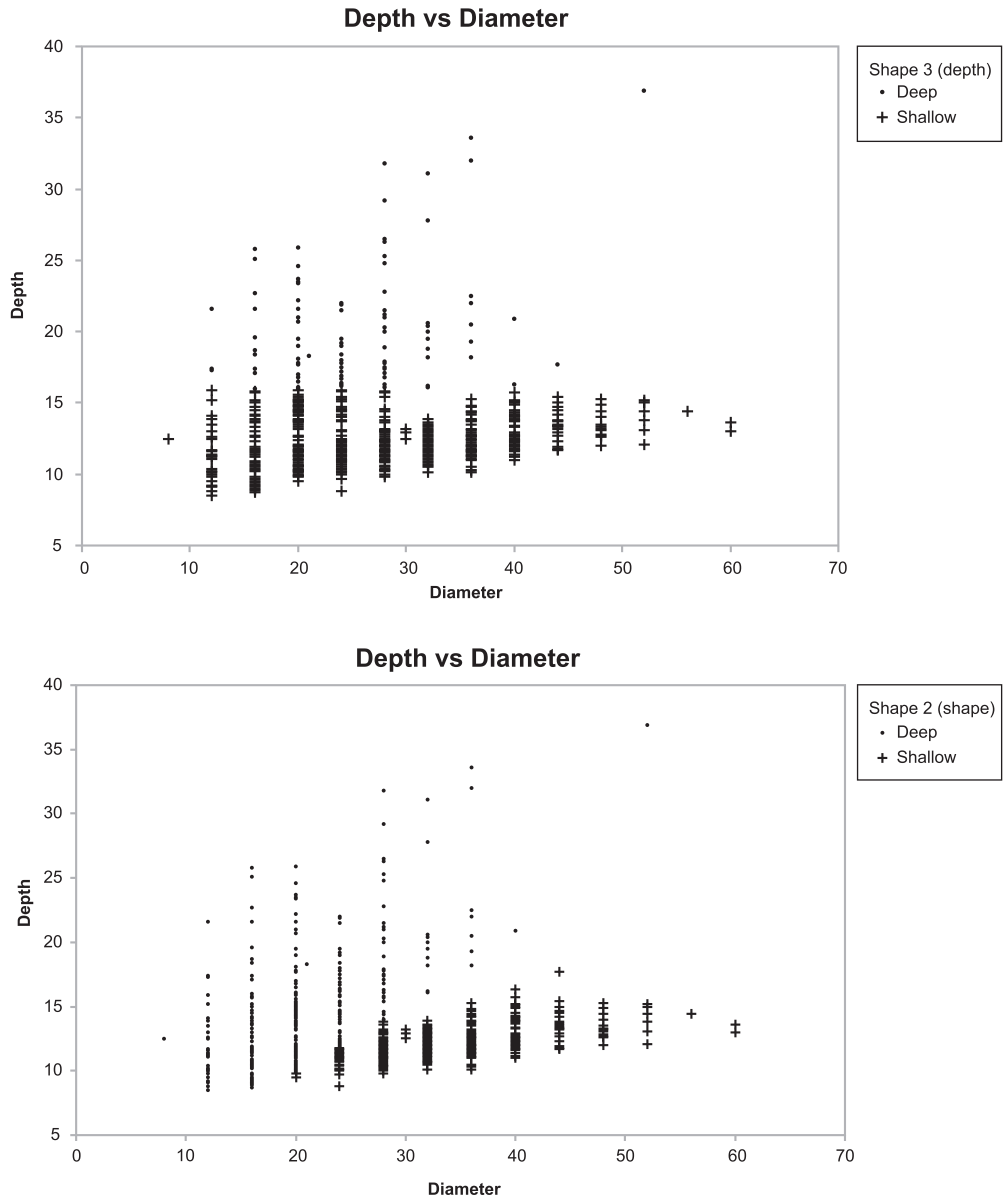


Figure 17.2. Divisions of shallow versus deep ear ornaments: two versions. The bottom one was chosen. (See discussion in text.)

way of distinguishing deep from shallow gets at patterning that is really present in the collection.

When the collection is divided, as in Figure 17.2 (bottom), shallow earspools are either concave (75 percent) or flared (25 percent) in profile and increase only slightly in depth with increasing diameter. Deep earspools increase much more dramatically in depth with increasing diameter, following a logic equivalent to that of eartubes. Among deep earspools, 75 percent have concave profiles and 25 percent flared, the same percentages as for shallow earspools. Among flared earspools, the range of the variable flare (Diameter 2 / Diameter 1) is similar for shallow and deep varieties, but the tendency is for less flare among shallow earspools. For shallow, the interquartile range was 1.11 to 1.20, with the median 1.14. For deep, the interquartile range was 1.19 to 1.33, with the median 1.25. Further, painting was more common on deep earspools (47 percent) than on shallow earspools (27 percent). The incidence of painting on eartubes was similar to that of deep earspools (41 percent). The differences in distribution are significant ($p < 0.05$) under a variety of ways of composing the table for chi-square analysis (for example, lumping or splitting of flared and concave profiles).

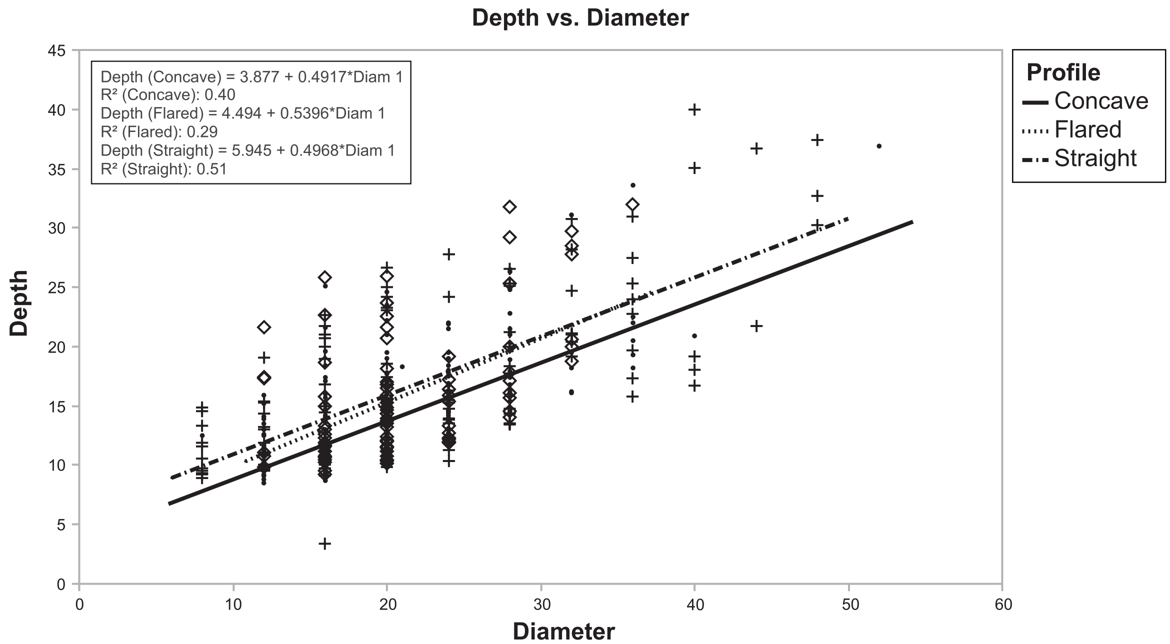


Figure 17.3. Plot of ear ornament depth versus diameter (Diameter 1) for deep earspools and straight eartubes, with regression lines in each case. The deep earspools are divided by profile into concave and flared.

CLASSIFICATION

Based on the foregoing analysis, seven types were distinguished among the clay ear ornaments and finger rings (Figure 17.4). The frequencies in the following description refer to the collection from Paso de la Amada only.

Finger rings are very shallow (3.8 to 6.8 mm, median 5.5) and have convex exterior profiles. Exterior diameter varies from 16 to 32 mm (median 20). Of all the types, these are by far the most likely to bear exterior incising (41 percent), no doubt because, unlike ornaments worn through a hole in the earlobe, the exterior surface of finger rings was visible on the wearer's hand. Incised decoration consists of punctations or multiple diagonal jabs. Seven percent bear exterior red paint. N = 23 in the fully measurable sample (plus another six identified and measured in 2013).

Earplugs are solid cylinders with straight or slightly concave exterior profiles. Diameter varies from 4 to 21 mm and depth from 8.7 to 17.0 mm. None are painted or incised. N = 3 in the fully measurable sample.

Eartubes are open cylinders with straight sides. Diameter varies from 8 to 44 mm (median 16 mm). Depth varies from 3.4 to 36.7 mm (median 14.6). The median depth-to-diameter ratio is 0.83, and flare varies from 1.0 to 1.2. (For the overwhelming majority, flare is 1.0, meaning that there is no flare.) Overall, 41 percent bear traces of paint. Painting is most common on the interior of the cylinder (36.2 percent with red paint, 1.2 percent with orange paint) but occurs as well on the exterior (6.25 percent with red paint, 1.2 percent with orange). Only one fragment is incised (1.2 percent). N = 80 in the fully measurable sample.

Earspools are divided into four types, based on exterior profile and whether they are deep versus shallow. It should be borne in mind that the distinction between deep and shallow is arbitrary at small depths and diameters; I have defined shallow earspools as curved-profile ornaments with depth less than half the diameter (depth / diameter 1 < 0.5). Deep earspools are thus curved-profile ornaments with depth greater than or equal to half the diameter (depth / Diameter 1 ≥ 0.5).

Shallow earspools with concave profiles, the most common type, have diameters that range from 20 to 60 mm (median 32 cm). Depth varies from 8.8 to 17.7 mm (median 12.2), and the median depth-to-diameter ratio is 0.37. Overall, 28 percent bear traces of paint, mostly red paint on the interior (27 percent), more rarely red paint on the exterior (1 percent). A single specimen is incised (0.35 percent). N = 289 in the fully measurable sample.

Shallow earspools with flared profiles have average diameters ranging from 22 to 56 mm (median 34 mm) and depths ranging from 9.5 to 15.4 mm (median 12.4). The depth-to-diameter ratio is 0.38, and flare ranges from 1.08 to 1.57 (median 1.14). Overall, 25 percent are painted, mostly with red on the interior (24.2 percent), though one piece has red on the exterior (1.0 percent). A single specimen is incised (1.0 percent). N = 99 in the fully measurable sample.

Deep earspools with concave profiles are the second most common of the types. Diameter ranges from 8 to 52 mm (median 20) and depth from 8.5 to 36.9 mm (median 12.7). The median depth-to-diameter ratio is 0.64. Overall, 49 percent bear traces of paint, mostly red or orange paint on the interior (45.1 and 2.3 percent, respectively), though in some cases red or orange on the exterior (3.1 and 0.4 percent, respectively). Two specimens are incised (0.8 percent). N = 257 in the fully measurable sample.

Deep earspools with flared profiles have diameters ranging from 12 to 36 mm (median 20) and depths ranging from 9.2 to 32.0 mm (median 14.4). The median depth-to-diameter ratio is 0.70, and flare ranges from 1.11 to 1.80 (median 1.25). Overall, 46 percent have traces of paint, mostly red or orange on the interior (41.5 and 2.4 percent, respectively), occasionally red on the exterior (3.7 percent). A single specimen is incised (1.2 percent). N = 83 in the fully measurable sample.

THE DISTRIBUTION OF EAR ORNAMENTS AT PASO DE LA AMADA

The distribution of napkin-ring earwear at Paso de la Amada is strongly patterned in both time and space. This section documents those patterns by considering the full set of frequency data. Distributions by type are considered in the next section.

Data Record 17.1 provides counts of ear ornament fragments by minimal provenience. The overwhelming majority (96 percent) are from Mound 1. Another 2 percent of the collection is from Mound 13, leaving just 2 percent for all other locations. Of those from Mound 1, 93.4 percent are from the Cherla-phase platform, 3.5 percent from the plow zone or slope wash off the platform, 1.2 percent from the remains of Structure 1-2, and 1.8 percent from the Locona-Cherla ground surface beneath the platform or features therein.

Table 17.1 (see page 378) shows chronological patterns. Napkin-ring earwear is highly concentrated in Cherla-phase deposits. Occurrence of ear ornaments in lower frequencies in the three mixed Ocós-Cherla contexts is consistent with the hypothesis that what we are seeing here are simply Cherla artifacts mixed in with earlier materials. The three samples are ordered according to descending overall proportions of Cherla sherds, and frequencies of ear ornaments decline in that same order.

Only six earwear fragments were recovered from dated contexts that should be pre-Cherla, and suspicions may be raised about three of those. The early Locona ear ornament is from Feature 10 at Mound 1, not far below platform and Zone V deposits that contained earwear fragments. Given rodent activity and root disturbance, it is likely that this is a Cherla-phase specimen that worked its way down to here. The same holds for the specimen registered as Locona, which is from Level 6 in Mound 13 Pit 2, underneath an intrusive Cherla pit, the boundaries of which were difficult to identify. Finally, one of the Ocós specimens is from Mound 12 E1/8 in a lot just underneath the mixed Ocós-Cherla occupation surface.

In the other three cases of pre-Ocós ornaments, mixing from overlying Cherla deposits seems less likely (though such deposits are present in each case). The Late Locona specimen is from Feature 15 at Mound 1. Although in concept this feature would have the same danger of contamination as Feature 10, mixing seems less likely here because the pit was partly sealed by the remains of a hearth, and the collection of artifacts from the pit appeared to have a high degree of integrity as intact secondary refuse. The remaining Ocós specimens are from Mound 12 T1C/8 and F2/9. The second of those is the most interesting. It is a fragment of a flared earspool that is unusually thick at the flared end, unlike the overwhelming majority of earspools from Mound 1. Plausibly, this subtle stylistic difference is chronological and represents an Ocós trait.

To summarize the chronological patterns: use of clay ear ornaments (and finger rings) was highly concentrated in the Cherla phase. As Clark and Colman (2014:149) suggest, these objects may have been made in small numbers in Ocós or even in late Locona. However, the most salient patterns are the rarity of these objects in the Ocós phase and the rapid proliferation in Cherla.

Table 17.2 (see page 378) breaks down the Cherla sample by mound (or off-mound location). Also noted are counts of greenstone ornaments (both beads and pendants) and iron ore mirrors, both likely markers of high status.

Particularly noteworthy is that in the two cases (Mounds 1 and 13) in which frequencies of ear ornaments are high under both methods of standardization, both greenstone ornaments and iron ore mirrors are also present. It appears that earspools were related to social status in the Cherla phase. Further, the Cherla-phase occupants of Mound 13 seem to have been of a status similar to that of the pre-platform inhabitants of Mound 1.

In the other deposits of Cherla-phase secondary refuse, the standardized frequencies of ear ornaments are much lower. The one exception is the volumetric density in Tr.1B Feature 1, which seems to be the result of cultural materials being densely packed in that pit. While ear ornaments were not as common in these other locations, they were regularly present. Their distribution in slope wash or other disturbed contexts (where they probably derived from Cherla occupation but were not associated with intact refuse and thus not suitable for the calculations presented in Table 17.2) extends their distribution further. There is one from Mound 15, another from Mound 32, a couple from Mound 10, and a dozen from Mound 12. Overall, the data appear to indicate that although there was a link between high status and the wearing of napkin-ring earwear, it was not a categorical distinction. The wearing of ear ornaments per se was not restricted to people of high rank; however, high-ranking people were more intensively involved in enhancing their self-presentation by wearing such ornaments.

Table 17.3 (see page 388) breaks down the collection

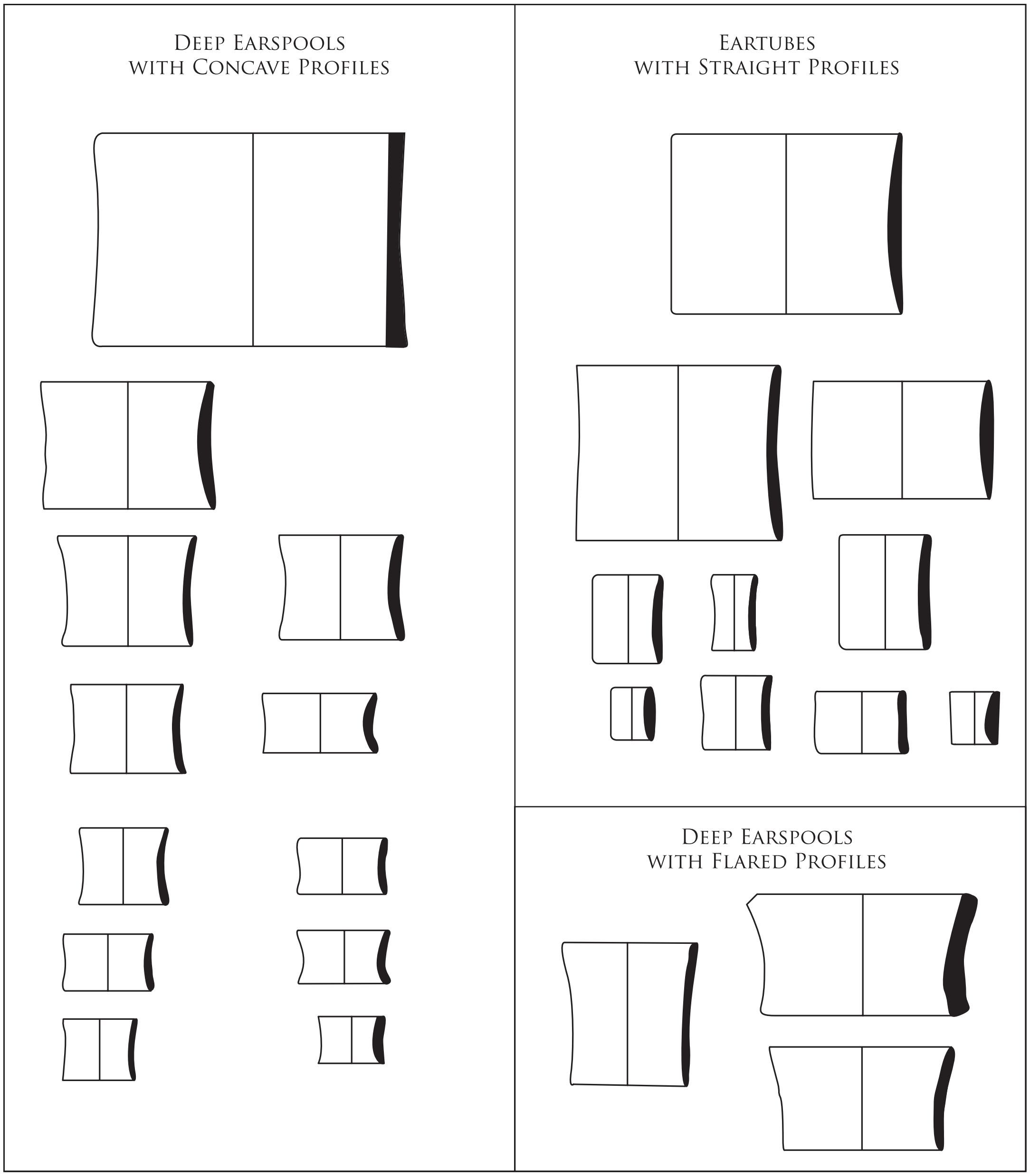


Figure 17.4. Types of ear ornaments showing ranges of variation. Iron ore mirrors are included for comparison.

from Mound 1 stratigraphically, with the platform deposit divided by lot. I would direct attention to three points. First, ear ornaments were more densely concentrated in the lower levels of the platform (Lots 8–12) than the upper levels (Lots 2–3 and 5–7, Lot 4, and the plow zone). The reason for this is that the upper levels were more mixed with Locona and Ocós, as discussed in Chapter 3. The appearance of greenstone and iron ore suggests that the Cherla component in these upper levels derives from the same source as that of the lower levels. Second, the high standardized frequencies of ear ornaments in Feature 4 (the small concentration of secondary refuse descending into Zone V immediately beside Structure 1-2) bolster my suggestion that the inhabitants of Structure 1-2 were probably among the people who generated the original midden that we find redeposited as platform fill. Third, the low frequencies of ear ornaments in slope wash deposits in Trenches 1, 2, and 3—that is, in deposits formed after construction of the platform—are notable. The high rate of discard of ear ornaments at Mound 1 appears to have ceased with construction of the platform. I now think this is because the platform was not the base for a high-status residence but rather for a nonresidential, public building (see Chapter 7). With the construction of the platform at Mound 1, deposi-

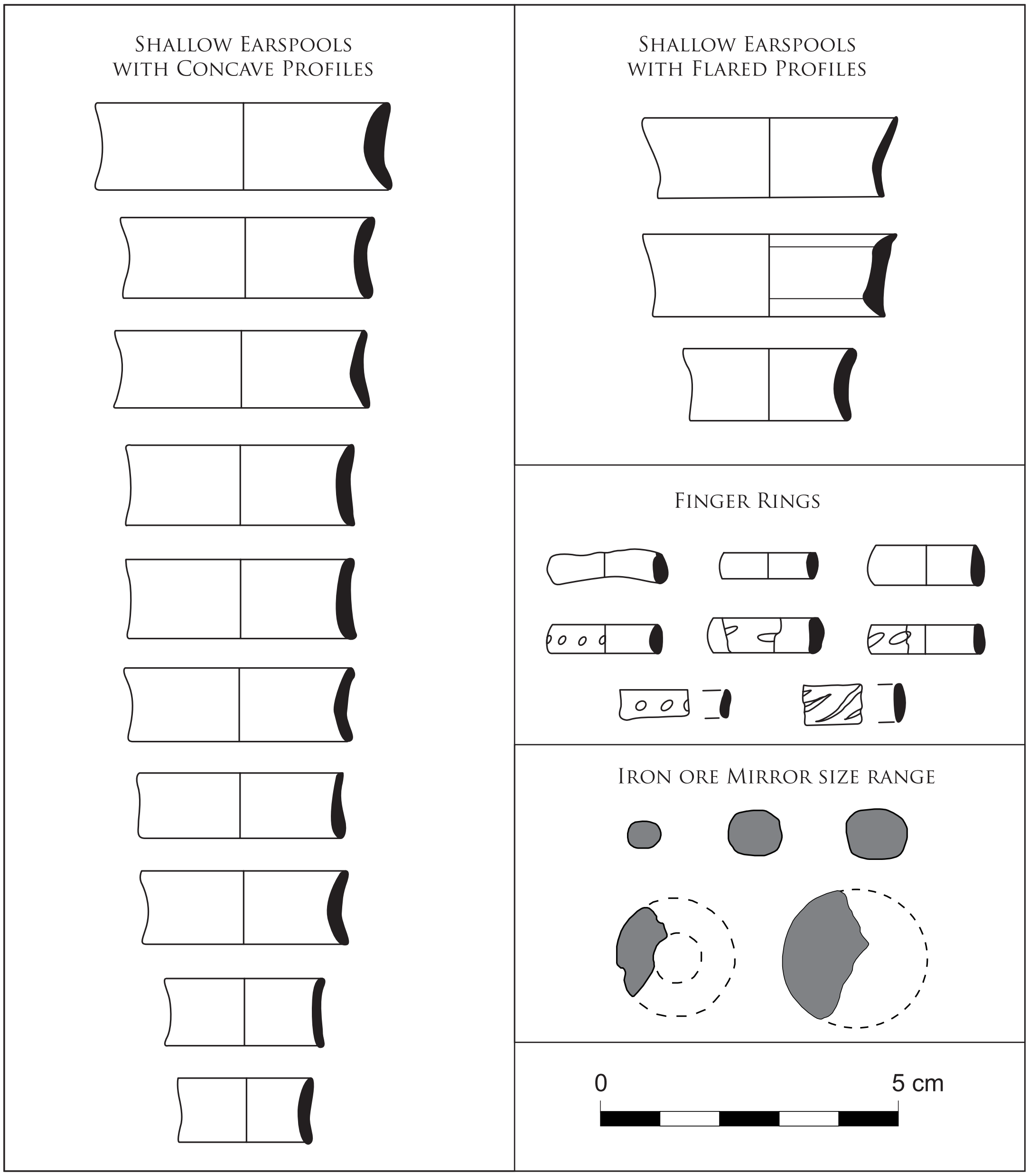


Figure 17.4. *continued.*

tion of earwear fragments ceased in this location, because domestic garbage was no longer deposited here.

CONTEXTUAL VARIATION IN TYPES, DECORATION, AND FORMAL ELABORATION

The disparities in the distribution of earspools during the Cherla phase and the correlation of high concentrations of earspools with iron ore mirrors and greenstone ornaments (Table 17.2) suggest significant social inequality. One goal of the detailed metric and attribute analyses was to seek support for the idea that wearers of earspools at Mounds 1 and 13 were of elevated status. Specifically, the question was whether the collections of earspools from those mounds were special in some way, for instance in the mix of types present or the degree of decoration. Because the collection from other contexts at Paso de la Amada is so small, the assemblage from Aquiles Serdán was also considered in the effort to assess whether the Mound 1 and Mound 13 collections were in any way special. Comparison with Aquiles Serdán also raises the question of whether there might have been community-level distinctions in ear ornamentation.

Table 17.3. The distribution of ear ornament (and finger ring) fragments at Mound 1[a]

Row Labels	Count of Ear Ornament Fragments	Ear Ornaments per m³	Ear Ornaments per 10 kg Sherds	Greenstone Ornaments	Iron Ore Mirrors
Plow zone (Lot 1)	102	6.34	2.87	5	
Slope wash	16	2.84	1.09	1	
Platform (all)	3123	47.76	12.01	18	13
Lot 4	0				
Lot 2	126	17.30	7.06		
Lot 3	11	5.57	2.23		
Lot 5	225	25.36	8.91	4	3
Lot 6	34	28.15	7.34	1	
Lot 7	245	34.29	7.99	4	1
Lot 8	469	59.70	12.28	3	1
Lots 9–10	1233	58.66	12.38	2	5
Lot 11	700	81.78	20.79	4	3
Lot 12	80	71.43	21.81		
Feature 4	22	113.99	25.61		
Structure 1-2	42	12.98	8.86		
Ground surface	37	1.88	2.85	1	
Feature 15	1	1.82	0.37		
Feature 8	0				
Feature 10	1	1.30	1.36		

[a] Contexts are in approximate stratigraphic order from late (top) to early (bottom).

Overall, few differences were found in comparisons by context. One pattern (prevalence of painting) might be attributed to the elevated status of the residents at Mound 1, but it does not hold also for the Mound 13 assemblage. There are a few instances of what may have been a community-level differences between Paso de la Amada and Aquiles Serdán. Finally, there was a differential distribution of types within Paso that is not readily interpretable.

The collection was broken down in various ways (by type, presence of painting, and so on), and differences in the distributions were assessed using chi-square tests. In each case, attention was given to the relative contributions to the total chi-square of individual cells. In the following paragraphs, I consider differentiation by type, by decoration (incising and painting), and by formal elaboration (degree of flare, distribution of diameters, and depth).

The distribution of types by context is shown in Table 17.4. For the chi-square analyses, earplugs and finger rings were not included. When the table is broken down in different ways, it becomes clear that there is one primary source of any significant results: the high frequency of straight-profile eartubes outside of Mound 1. The distribution of types at Aquiles Serdán, in contrast, is very similar to that at Mound 1. This is the pattern I do not find readily interpretable. It seems surprising that the distribution of types at Paso de la Amada Mound 1 is so similar to that at Aquiles Serdán (standard deviation 3.634, p = 0.46) but different from that at all other locations at Paso de la Amada when those are considered together (standard deviation 13.168, p = 0.01). The sample from the other locations is, of course, small, and this is one reason I am disinclined to make too much of this pattern. However, it should be pointed out that within the existing sample the pattern is robust in that it is preserved under a whole variety of

Table 17.4. Distribution of types of ear ornament by site and location[a]

Context	Shallow Earspool (concave)	Shallow Earspool (flared)	Deep Earspool (concave)	Deep Earspool (flared)	Eartube (straight)	Earplug (solid)	Finger Ring (convex)	Context Totals
Aquiles Serdan	30 (35.3)	6 (7.1)	30 (35.3)	7 (8.2)	11 (12.9)		1 (1.2)	85 (100.0)
Paso de la Amada								
Mound 1	278 (34.9)	97 (12.2)	249 (31.3)	77 (9.7)	70 (8.8)	2 (0.2)	23 (2.9)	796 (100.0)
Mound 13	6 (42.9)	1 (7.1)	1 (7.1)	3 (21.4)	3 (21.4)			14 (99.9)
Other locations (all)	5 (21.7)	1 (4.4)	7 (30.4)	3 (13.0)	6 (26.1)	1 (4.4)		23 (100.0)
Mound 10	1							1
Mound 11					1			1
Mound 12			5	2	5			12
Mound 15			1					1
Test Pit 29		1						1
Tr. 1B	1		1	1				3
Type totals	319	105	287	90	90	3	24	918

[a] Frequencies in the fully measurable sample, followed by the percentage in parentheses. The "Other locations (all)" sample is broken down, giving frequencies only.

ways of breaking down the data. The distribution of types at Mound 13 is not significantly different from that of all other locations considered together. The high frequency of straight profiles is apparent in a breakdown by mound (observed at Mounds 11, 12, and 13). Further, the pattern becomes stronger (and expands to other locations) when one increases sample size by considering the partially measurable sample. One might conclude that eartubes were low-status earwear, but that seems counterintuitive, given that these are among the most likely types to be elaborated through painting (and the percentage of straight-profile ornaments that are painted is virtually identical between Mound 1 and other locations).

Incised decoration is much more common on finger rings (41 percent) than on ear ornaments (0.8 percent at Paso de la Amada) for reasons that surely have to do with visibility of the exterior when worn. However, when incised decoration appears on earspools and eartubes, it can be elaborate (Figure 17.5). Once finger rings are removed, the sample of incised ornaments at Paso de la Amada is small. It is confined to Mound 1, but the expected frequency for other locations together, given the frequency of incising at Mound 1, is less than one. Thus the lack of incising outside Mound 1 really tells us nothing. The interesting point here is that incised decoration on earwear is more common at Aquiles Serdán (3.5 percent) than at Mound 1 (0.8 percent), a difference that is statistically significant (standard deviation 8.472, $p < 0.01$). This could be a community-level difference in earwear, though except perhaps for the absence of the intriguing mat design at Paso de la Amada, there does not seem to be divergence of actual motifs between the two sites (Figure 17.5).

Instead of incising, it is a higher incidence of red or orange paint on earwear that distinguishes Mound 1 (38.4 percent) from Mound 13 (20.0 percent, standard deviation 3.479, $p = 0.0621$), from all other locations at Paso de la Amada (18.5 percent, standard deviation 4.413, $p = 0.0357$), and from Aquiles Serdán (15.4 percent, standard deviation 29.166, $p < 0.0001$). The high incidence of painting at Mound 1 is the only pattern emerging from the metric and attribute analysis that plausibly bolsters the case for status differentiation in the use of ear ornaments. The pattern does not extend to Mound 13. (It will be noted that Mound 13 just misses diverging significantly from Mound 1 at the 0.05 level; however, it is better placed with the other Paso de la Amada contexts: standard deviation 0.018, $p = 0.8923$.)

A final set of analyses considered whether the ear ornaments of Mounds 1 and 13 might differ from those of other locations at Paso de la Amada in their formal properties. Specifically, the idea was that the ornaments from high-status contexts might be larger or otherwise more exaggerated in form. The method used was to examine the distributions of several numerical variables when the collection was split into four contexts: Mound 1, Mound 13, other Paso de la Amada, and Aquiles Serdán. The distributions (which were generally skewed) were compared using box plots, and the significance of any differences was assessed

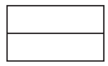
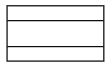
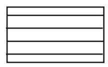
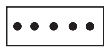
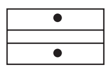
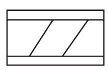
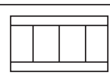
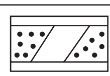
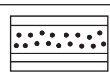
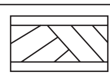
Schematic Drawing	Aquiles Serdán	Paso de la Amada (Mound 1)			Description
	earspools	earspools	eartubes	rings	
			1		single circumferential groove
		1			two circumferential grooves
	1	1			multiple circumferential grooves
				2	circumferential line of punctations
				8	circumferential line of gouges
		1			two circumferential lines with punctations
	1				paired diagonal lines within circumferential boundaries
			1		spaced vertical lines within circumferential boundaries
	2	1			zones of punctations within circumferential boundaries
		1			band of punctations within circumferential boundaries
	1				mat design within circumferential boundaries
design uncertain		3	1		

Figure 17.5. Incised decoration on ceramic ear ornaments observed at Aquiles Serdán and Paso de la Amada.

with Wilcoxon/Kruskal-Wallis rank sum tests between pairs of contexts. The small sample sizes outside of Mound 1 again hampered the analysis. To somewhat increase sample sizes, shallow earspools with concave and flared profiles were considered together in a "shallow" set and eartubes plus deep earspools were pooled as a "deep" set.

Four numerical variables were examined: Diameter 1, flare, depth, and, somewhat exotically, the residuals of depth that resulted from a linear regression against Diameter 1. Here is a brief account of what these might tell us. Earspools of greater diameter would generally have been worn by older people as the result of a lengthy process in which the earlobe hole was gradually expanded. If, as suggested in the previous section, high-status people were more attentive than others to enhancing their appearance with earspools or eartubes, then we might expect high-status collections to range up to higher diameters. (Note that the analysis of Diameter 1 was conducted separately on the shallow and deep sets.) Plausibly as well, high-status people might have chosen earspools with exaggerated flare or with greater depths. (Note that in the case of flare, shallow and deep were considered together due to sample size; in the case of depth, only the deep set was considered.) The idea in examining the residuals of depth regressed against diameter was to explore the possibility that, for any given diameter of eartube or earspool, high-status people might have chosen ornaments with greater (and thus more impressive) depths.

Two patterns recur in these analyses. First, the ear ornaments of Aquiles Serdán are more modest in dimensions than those of Paso de la Amada. That pattern is present for both diameter and depth in the deep set of earspools and eartubes as well as among the residuals of depth. Flare at Aquiles Serdán is similar to that at Paso de la Amada, as are diameters of shallow earspools.

The second pattern is that, at Paso de la Amada, it is the minor contexts that tend toward greater exaggeration of dimensions, with Mound 13 sometimes but not always falling in that group. (Sample size enters to recommend caution here. The ranges of variation in the minor contexts are very large, raising the worry that this is actually not a coherent set.) Degrees of flare and the diameters of shallow earspools are again similar between the different contexts; it is among the deep set (eartubes and deep earspools) that differences are observed. Median *diameter* is 20 mm at Mound 1, 28 mm at Mound 13, and 22.5 mm in other Paso locations (n = 396, 7, and 16, respectively). Median *depth* is 14.2 mm at Mound 1, 15.7 mm at Mound 13, and 17.6 mm at other Paso locations. The *residuals of depth* are chaotic, with differences in distribution not significant, but the set from other Paso locations ranges higher than either Mound 1 or Mound 13. Clearly, any expectations for more flamboyant formal properties in high-status contexts are not met.

The analyses reviewed in this section reveal a few suggestive hints of inter-site differences between Aquiles Serdán and Paso de la Amada (more incising at the former site, more painting at the latter, and more modest dimensions of eartubes and deep earspools at Aquiles Serdán). However, there are few hints of status differences within Paso de la Amada among the attributes of the earspools themselves. Although high-status people appear to have worn earspools more often than lower-status people, their ear ornaments were not more elaborate than those worn by other people, with the possible exception of painting. Even differential painting, although clear at Mound 1, needs to be treated with caution since it is not replicated at Mound 13. In other words, the clay ear ornaments worn by high-status people looked quite similar to those of low-status people. Evidence from the clay ear ornaments points toward gradations of status rather than categorical divides. In the next section I consider another possible source of division.

IRON ORE MIRRORS AS EARWEAR

The results of the last section are not the last word on the question of status differences in earwear at Paso de la Amada. It is possible that the highest social ranks were marked by display of a completely different class of ear ornament. Iron ore mirrors appear during the Cherla phase. At Paso de la Amada, Clark excavated an adult female who was buried with disk-shaped iron ore mirrors at her ears (Clark and Colman 2014:149). These were not perforated and so must have been affixed to something perishable. It therefore remains unknown whether they were throat disks in perishable earspools or whether they were suspended from the ear.

Related objects from the small-mound excavations are described in Chapter 11. It seems likely that some or all of the round or oval specimens are from ear ornaments, yielding a total of at least 13 known from the site, including 10 solid disks and fragments of three washer-shaped disks with a central hole. Clark and Colman (2014:150) interpret the latter as flares from earspools.

It is useful to compare the dimensions of the iron ore mirrors to those of ceramic earwear. The mirrors range from 6 to 25 mm in their largest dimension, with a median of 15 (the washer-shaped ones are at the larger end of that range but overlap with the largest of the solid disks). Straight-profile ceramic eartubes range from 8 to 44 mm in external diameter with a median of 16. Flared-profile earspools range from 16 to 60 mm (median 32) in exterior diameter at the flared end and 12 to 52 mm (median 28) at the smaller end.

It is important to remember that our diameter measurements of the clay ear ornaments were taken on the exterior rather than interior. Still, the important point that emerges from this comparison is that if iron ore mirrors were throat disks for earspools, then they were concentrated in the lower size range, particularly of shallow earspools but also of eartubes. Thus people who had stretched their earlobes sufficiently to wear large-diameter earspools or eartubes would no longer have been able to wear mirror-enhanced earspools unless the mirrors were set onto perishable disks that were considerably bigger than the mirrors. (The diameters of our earplugs—4, 8, and 21 mm—overlap pretty well with those of mirrors.)

In sum, it seems likely that high rank was categorically marked in earwear not with ornaments in clay, a medium to which everyone ultimately had access, but with composite ornaments that included iron ore mirrors, an exotic import that was more effectively controlled. It is possible that mirror-enhanced ornaments were worn suspended from the ear. If they were instead part of composite earspools, then either the highest-status individuals at the site did not wear the largest-diameter earspools or many of the mirrors would have been a relatively small addition to a larger perishable earplug.

EAR ORNAMENTS IN BONE

Ceja Tenorio (1985:Figure 58e) reports seven worked fish vertebrae from Paso de la Amada that he interprets as earspools; others are reported from Altamira (Green and Lowe 1967:31, Figure 41b) and La Victoria (Coe 1961:108, Figure 59i). These appear to be what Wake identifies as Elasmobranch centrum artifacts. Our assessment is provided in Chapter 15. Wake and I think that most are beads, but two of them may have been eartubes. Most are from the Cherla-phase platform at Mound 1, so if they were ear ornaments, they were a virtually irrelevant sideshow to their clay counterparts.

EAR ORNAMENTS DEPICTED ON FIGURINES

Since Lesure (1999c:Table 1) and Clark and Colman (2014:152–74) have compiled evidence on ear ornamentation as depicted in figurines, and because we are at work on a comprehensive database of early modeled ceramic imagery of the Soconusco, it seems most useful to narrow the focus here. Table 17.5 shows the distribution of ear ornamentation on figurine heads from the same deposits considered in the counts of earspools by phase in Table 17.1. The figurines are divided by type (see Chapter 16). Note that the Cherla sample is mainly from Lots 7 to 12 of the platform fill in Mound 1, which did have Locona and Ocós admixture. Some of the Nicotaca figurines and most (perhaps all) of the Muscu figurines in that sample are carry-ups from the Locona-Ocós occupation at Mound 1.

Overall, the percentage of figurines with earspools or eartubes (represented as a round ear appliqué with a central punctation) goes up from none in Locona to 14 percent in Late Locona, 21 percent in Ocós, and 24 percent in Cherla (with simply pierced ears an additional 21 percent in Ocós and 8 percent in Cherla). The pre-Cherla percentages seem pretty high given the paucity of actual ear ornaments in the deposits. Either figurines were given earspools at a higher rate than people actually wore them or we have to consider earspools in perishable materials. The high incidence of what appear to be pierced ears in Ocós supports the idea that ear ornamentation was quite varied at that time.

If, in the Cherla sample, we focus in on the Pama type as definitively of that phase and likely more representative of what people (particularly young women) actually looked like than the rather complex Xumay-type figurines (see Chapter 16), then the Cherla percentages climb significantly, to 54 percent with earspools and 15 percent with pierced ears (Pama type only). These kinds of percentages seem more appropriate given the high frequencies of actual ear ornaments in the deposits. However, it is important to note that even in this case, when we have thrown out all heads that could possibly be carry-ups, we still have 31 percent of (Pama) figurines without earspools or pierced ears. Among Cherla figurines, not everyone is depicted wearing earspools/eartubes. Some are depicted with pierced ears and others are shown with no ear ornamentation at all.

A LARGER PERSPECTIVE ON EAR ORNAMENTS OF PASO DE LA AMADA

Adding the ear ornaments found by Ceja Tenorio (1985:99–101, Table 20) to those reported here yields a total of 3,981 known from Paso de la Amada. There were not many at Mounds 6 and 7, but what was there is likely to put the total for the site over 4,000. As far as I can tell, no other sites come close to this total for the Early Formative and possibly for any period in Mesoamerica. Even if we were to discount the Mound 1 collection as a bizarre aberration, we would be left with an unusually large assemblage of 139 earspools from the site.

Clay earspools, eartubes, or earplugs generally occur in quite small numbers at Early and Middle Formative sites. Coe and Diehl (1980:288) report a single example from San Lorenzo, and Drucker (1952:142) reports a single possible clay earflare from La Venta; from the latter site, of course, various jade earspools from elite burials are known (Clark and Colman 2014:174–83). Drennan (1976a:Figure 74b) reports a single clay eartube from Fábrica San José. Several jade earspools were recovered at San José Mogote (Flannery and Marcus 2005), but clay versions were very rare or absent altogether. The nine clay earplugs from Tlapacoya are mainly of the Ticoman phase and thus comparatively late (Niederberger 1976:235). Fewer than 10 eartubes, earspools, and earplugs were found in middle-period deposits at Zacatenco (Vaillant 1930:47, Plates 40 and 41). The diverse collection of solid and hollow clay ear ornaments from Chalcatzingo is, at 51, unusually large (Grove 1987b:271–73); most are from the Cantera phase, though some may be Barranca. The collection of 19 from Chiapa de Corzo ranges in time from Middle Preclassic to Protoclassic (Lee 1969:89–91). A single fragment of a napkin-ring ear ornament in clay was recovered at K'axob (Bartlett 2004:266–67).

Moving closer to Paso de la Amada, we finally encounter collections that rise above 100. Other Early Formative sites from the Mazatán zone have yielded sizable collections. Cheetham (2010a:435–36, Table 9.7) recovered 236 ear ornaments from a Cherla midden at Cantón Corralito. In the collections of the New World Archaeological Foundation there are several dozen from Chilo and several hundred from Aquiles Serdán, all Early Formative. Love's (1991:61) initial investigations at La Blanca yielded 650 fragments of ear ornaments from Conchas deposits. Rosenswig (personal communication, 2014) found numerous fragments in both Cherla and Conchas deposits at Cuauhtémoc. Farther to the southeast, at Chalchuapa (El Salvador), Sheets (1978:53–60) reports 136 napkin-ring ear ornaments from Early Preclassic deposits and 233 from the Middle Preclassic occupation.

From the available information on these other collections from the southeastern Pacific Coast, the actual objects appear similar to those from Paso de la Amada. Not surprisingly, differences increase with spatial and temporal distance. The ear ornaments of Aquiles Serdán have been compared in detail to those of Paso de la Amada in preparation of the present chapter; they are basically the same, with only a few subtle, community-level differences apparent. The ear ornaments from Cantón Corralito illustrated by Cheetham (2012:Figure 116) also appear similar and include some of the same decorative schemes observed at Paso de la Amada. Two Conchas-phase ear ornaments illustrated by Love (1991:Figure 8 right and bottom) have depths that are within the range of variation of eartubes from Paso de la Amada but well above the median. The specific incised motifs do not match any from Paso. The illustrated pieces are examples of the type that both Love (1991:61) and Rosenswig (2007:10, 2012:123) suggest were restricted to the highest-ranking households of the para-

Table 17.5. Ear ornamentation depicted on figurine heads, divided by type[a]

	Muscu		Nicotaca				Xumay		Pama					
Phase	No Ornament or Piercing	Pierced	No Ornament or Piercing	Pierced	Earspool	Earspool with Attached Pendant	No Ornament or Piercing	Earspool	No Ornament or Piercing	Pierced	Earspool	Earspool with Attached Pendant	Solid Appliqué at Ear	Total
Locona	2		2											4
Late Locona	4		1		1		1							7
Ocós	4		1	3	2		3	1						14
Cherla	20	2	7		3	1	5	1	4	1	6	1	1	51

[a] See Chapter 16 for description of the figurine types.

mount center. From the perspective of the collections from Paso de la Amada and Aquiles Serdán, dating 300 years earlier, these fancy Conchas eartubes look "nice" but not extraordinary. The overall percentage of incised designs at La Blanca (4.2 percent) is closer to that of earwear at Aquiles Serdán (3.5 percent) than at Paso de la Amada (0.8 percent), though Love (1991:61) notes that the distribution within La Blanca is highly restricted, so within elite contexts themselves, the percentage would be higher than 4.2.

The assemblage from Chalchuapa is better published. It appears broadly comparable to the deep earspools with concave profiles from Paso de la Amada. At Chalchuapa (Sheets 1978:53), the mean diameter of undecorated concave-walled earspools (92 percent of the Early Preclassic collection) is 22 mm (standard deviation 6 mm) and the mean depth is 17 mm (standard deviation 4 mm); comparable statistics for the concave-profile/deep type from Paso are 20 mm mean diameter (standard deviation 5.5) and 14 mm mean depth (standard deviation 4.3). Correspondence is much less with our concave-walled/shallow type (mean diameter 34 mm with standard deviation 7.3, mean depth 12.3 mm with standard deviation 1.2; it should be remembered that all the distributions at Paso are skewed, making the use of means and standard deviations problematic). Flared profiles are less common at Chalchuapa (6 percent of undecorated concave types) than in our concave deep type (25 percent). At Chalchuapa, 4.4 percent of the Early Preclassic collection is decorated, a percentage that matches Early Formative Aquiles Serdán or Middle Formative La Blanca better than it does the collection from Paso de la Amada. Overall, the Chalchuapa assemblage appears slightly more decorated than that of Paso but less diverse in shape. There is also, from Paso de la Amada, a greater variety of surface colors.

The patterns just considered suggest the existence of a tradition that Paso de la Amada shared with sites to the southeast along the Pacific Coast. The existence of such a tradition would help make sense of the strange disappearance and reappearance of clay ear ornaments (as a relatively common object of personal adornment) in Early and Middle Formative Soconusco. The resurgence in the use of earspools after a 300-year break was probably facilitated by continuation of the tradition without any such break in coastal societies toward the southeast.

What about the *origins* of this tradition—of clay napkin-ring ear ornaments used as relatively common objects of personal adornment? Clark and Colman (2014:149) regard the tradition in the Soconusco as a local development beginning probably in the Ocós phase but possibly earlier. As we have seen, in the excavations reported here, the case for Ocós napkin-ring earwear cannot be dismissed, but at the same time it is not particularly strong, with just three specimens being likely late Locona-Ocós objects from good (but not completely unassailable) contexts. An alternative scenario would see napkin-ring ear ornaments as part of the suite of Gulf Coast traits of material culture emulated in Cherla-phase Soconusco. Cheetham (2012:219) found one of six ear ornaments from Cantón Corralito submitted for neutron activation sourcing analysis to be probably made at San Lorenzo; he wondered whether thin-walled earspools at San Lorenzo might have disintegrated in the acidic soils of the area. At this point, Clark and Colman's proposals appear to cover a greater diversity of evidence, including the lack of earspools on Gulf Coast figurines and the disappearance of ear ornaments in the Soconusco, both as objects of the archaeological record and as depicted on figurines.

The main contribution to that discussion offered here is the possibility of an early southeast-coastal tradition of clay napkin-ring earwear. One possibility is that the sudden expansion of ear ornamentation at Paso de la Amada was the result of contacts with societies toward the *southeast* rather than toward the Gulf Coast; however, that scenario would not account for the import from San Lorenzo recovered at Cantón Corralito. An alternative might begin with the observation that Clark and Colman (2014:165–67) do find iconographic evidence of ear ornaments (in considerable variety) at San Lorenzo. Their point is not that ear ornaments were absent on the Gulf Coast but rather that they (1) varied in form and (2) were already restricted to very high-status individuals. Perhaps Pacific Coast peoples borrowed clay ear ornaments from a Gulf Coast repertoire in which they were highly restricted and reinterpreted them as more common items of adornment, leading to a level of use of these objects not seen elsewhere in Mesoamerica during the Early and Middle Formative periods.

CONCLUSIONS

The clay napkin-ring ear ornaments of Paso de la Amada have been examined at several levels of analysis. Study of a subset of relatively intact pieces led to the identification of seven types, including finger rings, earplugs, eartubes, and four varieties of earspools separated by wall profile and the relation between diameter and depth.

One question of interest has been the social role of ear ornaments in the Cherla phase: Were they markers of social status or more widely used objects of personal adornment? The simplest answer is that they were both. People across the site had access to ear ornaments. It is possible that higher-status people were more apt to wear ornaments with red paint. Beyond that, however, there were no differences in the formal properties of clay earwear worn by high- and low-status people. The difference appears to have been in the frequency of use of earspools. People with access to imported greenstone beads and iron ore mirrors discarded earspools at a significantly higher rate than other people.

What practices led to these dramatically different rates of discard are not clear. There were no rigid sumptuary rules that excluded all lower-status people from wearing earspools, yet it would appear that many of them did not do so, while most high-status people did. One possibility is that kin groups were internally ranked and that use of ear ornamentation was differentially distributed both within and between kin groups. Thus even within low-status kin groups there were individuals of relatively higher status who wore earspools or eartubes. Such practices would seem capable of generating the pattern of widespread occurrence but highly differentiated frequency observed at the site. Continuing this line of argument, it may be that, in the higher-ranking kin groups, most everyone wore clay ear ornaments, while the most high-status individuals, at least on occasion, donned a whole other class of ear ornament bearing iron ore mirrors. This would not be any particular surprise. Tolstoy (1989a:109–11) found iron ore mirrors to be the defining symbol of highest rank at Tlatilco. If this general line of argument is correct or approximately so, then we can qualify our initial response to the question of whether ear ornaments were mere ornamentation or symbols of status. They were fundamentally the latter, but the status system was something along the lines of a conical clan rather than a class-divided society.

Another topic has been the trajectory of development of ear ornamentation in Early Formative Soconusco. Clark and Colman (2014) see a variety of earwear beginning in the Barra phase, with napkin-ring forms probably appearing in Ocós. The evidence presented here can be taken as supporting that scenario, possibly pushing the appearance of clay napkin-ring forms back to late Locona. However, when we focus in on the best contexts, the occurrence before the Cherla phase is meager. So while consideration of the figurines certainly suggests that napkin-ring earwear was increasingly common during the Ocós phase, the actual archaeological record in clay holds out the possibility that these were introduced in the Cherla phase. The issue of origins aside, Paso de la Amada clearly fits into a regional picture in which napkin-ring earwear expanded vastly in frequency in the Cherla phase, disappeared in the subsequent Cuadros phase, and surged again 300 years later in the Conchas phase, with the epicenter at that point being the paramount center of La Blanca.

On balance, I think current evidence suggests that the clay earwear tradition of Early Formative Soconusco was a local development that somehow gained relevance in the sociopolitical context of the Cherla phase. This is the scenario proposed by Clark and Colman (2014). Gulf Coast immigrants were likely already in residence at Cantón Corralito in the Cherla phase, and many changes in material culture at that time can be explained as emulation of Gulf Coast practices (Clark and Blake 1989), including the appearance of cylinder seals, clay spatulas, and white-slipped figurines, and a shift from red slips to black, gray, white, and brown surface colors for pottery. Magnetite mirrors may have been manufactured at Cantón Corralito (Cheetham 2012:218–19). Under this scenario, clay ear ornaments constitute something of an exception among the various classes of material culture, since they were the product of a local tradition of development that expanded explosively in a situation of foreign contacts and emulation of Gulf Coast practices. Clay ear ornaments were also adopted at Cantón Corralito, potentially by people originating from San Lorenzo, before shortly thereafter being abandoned altogether. This scenario accounts for a diverse array of evidence. Its biggest drawback is the extreme paucity of clay ear ornaments before the Cherla phase.

An alternative scenario would be that clay ear ornaments were adopted from the Gulf Coast along with the other elements of material culture that typify the Cherla phase. Given the lack of actual ear ornaments and the rarity of specifically napkin-ring forms in anthropomorphic representations from San Lorenzo, it would be necessary to posit that people of the Soconusco took an element of Gulf Coast culture that is documented in only a single neutron activation result from Cantón Corralito and reinterpreted it, making it a much more common item of personal adornment. It seems wise at this point not to absolutely rule out the scenario, but it accounts for the diversity of current evidence less well than that of local development.

Moving beyond this dichotomy of local versus Olmec origin is a suggestion, based on the clustering of archaeological assemblages with large numbers of clay ear ornaments, that the temporally bimodal occurrence in the

Soconusco should be seen as part of an Early–Middle Formative tradition more generally along the Pacific Coast. This suggestion of course needs to be verified with the identification of additional cases. It is of interest because it helps make comprehensible the dramatic reappearance of earwear at La Blanca after the Olmec interregnum.

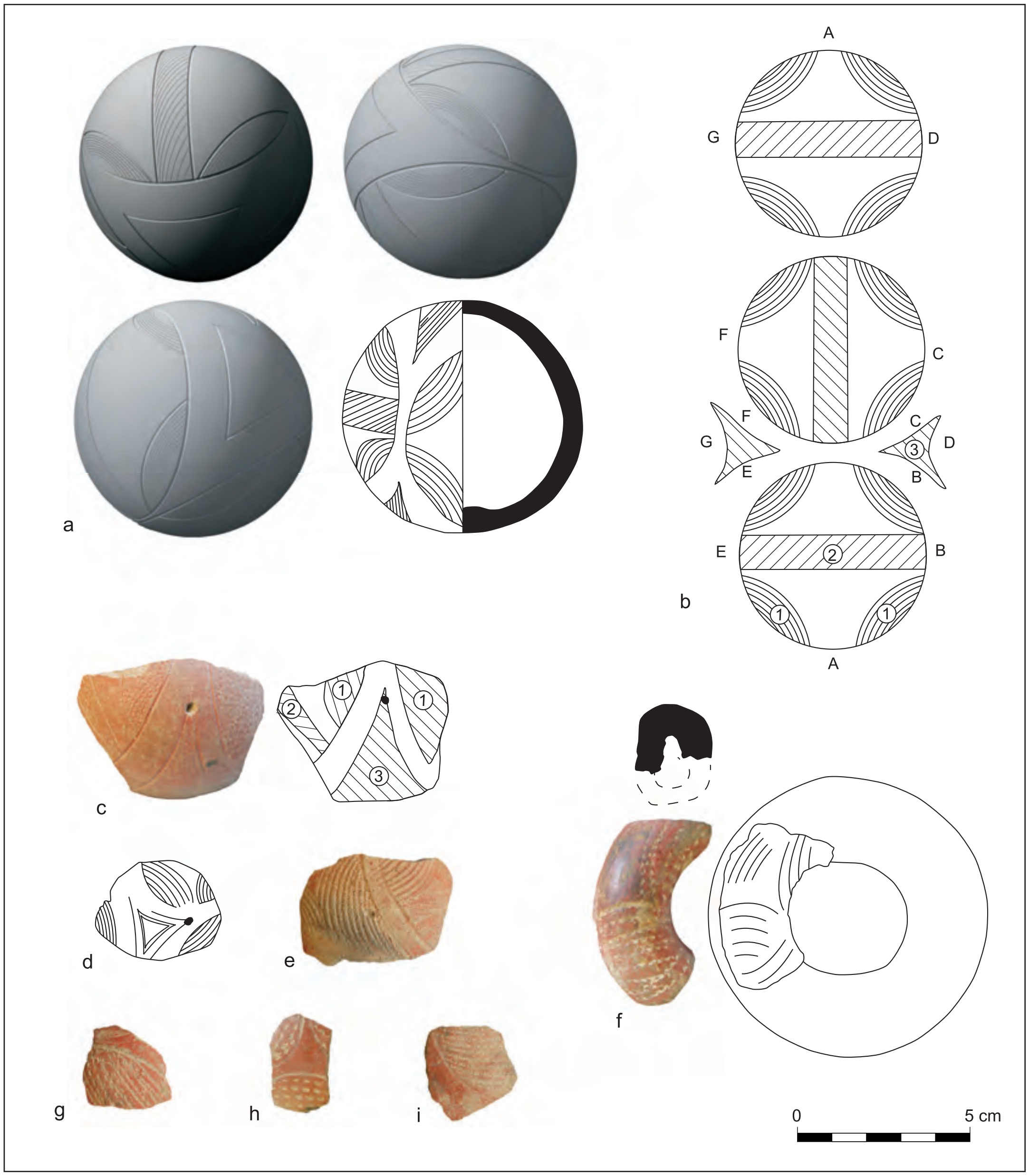


Figure 18.1. Ceramic rattles: (a) reconstructed design of large Ocós-phase rattle fragment; (b) rollout of the design of the same specimen, with capital letters indicating the points that match up on the spherical original and numbers representing elements discussed in the text; (c) small fragment with zones labeled; (d–e, g–i) miscellaneous rattle fragments; (f) fragment of ring-shaped rattle. Proveniences: (a–b) Md. 12 F.19; (c) Md. 1/8; (d) Mz-7 Pit 33/2; (e) Md. 12 G5/25; (f), Md. 12 T1E/17; (g) Md. 12 E4/10A; (h) Md. 1 E12 Feature 12; (i) Md. 12 E4/10C. *Illustrations in this chapter by R. Lesure, Anna Bishop, Barry Brillantes, and Katelyn Jo Bishop, with other contributions as noted. Reconstruction drawing by Alana Purcell.*

CHAPTER 18

Miscellaneous Ceramic Artifacts

Richard G. Lesure

THIS CHAPTER presents ceramic artifacts of diverse functions not covered in previous chapters. Categories described include items of ritual or social engagement (rattles, whistles, masks, cylinder seals, stamps, and spatulas), items of personal adornment (pendants and beads), net weights, possible spindle whorls, and miscellaneous modeled ceramic artifacts, along with evidence of production. Also discussed are worked sherds and fragments of burnt earth.

ITEMS OF RITUAL OR SOCIAL ENGAGEMENT

Rattles

Among sherd collections particularly of the Locona and Ocós phases, there are often small fragments of what initially appear to be small, red-slipped vessels but that were actually hollow, spherical rattles (Figure 18.1). Clark found a complete specimen in the collections of the New World Archaeological Foundation that still functions as a rattle. He includes an example in his reconstructed vessel assemblage for the Ocós phase (the slightly more distant of the three small objects in the foreground in Clark and Pye 2000:Figure 23).

Rattle fragments are identifiable in sherd assemblages based on their small diameters, red slip, and zoned shell-edge rocker stamping. The interiors are roughly finished, as might be expected with a spherical object with no mouth and thus no access by the maker after the basic form is put together.

Rattle pastes match those of Locona-Ocós pottery. The typical form was a hollow sphere of 6 to 7 cm diameter. Walls are 4–8 mm thick. There are often several small perforations, no doubt intended to keep the rattle from exploding during firing. The exterior surfaces were finished with as much care as were ceramic serving vessels, and the firing was of a similar quality. A unique piece from Mound 12 (T1E/17) has surface decoration consistent with the spherical rattles, but in form it appears to have been a doughnut-shaped ring (Figure 18.1f).

The rattles of Paso de la Amada were rather similar in size to gourd rattles used by the Lacandon Maya, though the latter have a handle in the form of a stick affixed to the gourd with copal gum (Hammond 1972:7). No evidence of handles is observable on the rattles of Paso de la Amada. They may have been held in the hand, as Overholtzer (2012:Figure 16) envisions for Aztec anthropomorphic rattles. Other possibilities are that a string was threaded through the perforations or the sphere was tied in a net.

The characteristic decoration aids greatly in the identification of rattle fragments in sherd collections. A curvilinear design was created by contrasting smooth and stamped surfaces. Stamping was usually a fine, dentate, shell-edge rocker stamping. Zones of stamping were delineated with shallow grooves. The red slip corresponds either to Chilo Specular Red or Paso Red. Black slip was occasionally used instead of red.

A fairly large rattle fragment from Feature 19 at Mound 12 provides a basis for reconstruction of what appears to have been a common design scheme during the Ocós phase (Figure 18.1a–b). The design, shown rolled out in Figure 18.1b, was composed of four basic elements. Three grooved circles were laid out around the sphere. Within

Table 18.1. Rattle fragment frequencies over time[a]

Phase	Count	Rattle Fragments per m^3	Rattle Fragments per 10 kg Sherds
Early Locona	2	0.9	1.6
Locona	37	1.3	2.1
Late Locona	55	3.1	1.6
Ocós	177	5.8	2.7
Md12-IV	28	1.8	1.2
Cherla	120	2.3	0.5

[a] Md1-V not included because the ceramic bags were not reviewed in 2017.

each circle, four almond-shaped zones of stamping were positioned to form, in the center of the circle, the negative image of a four-pointed star (labeled 1 in Figure 18.1b). A wide band of stamping ran between two of the points of the star (2). The design was completed with two trianguloid forms (3), which appear to be fillers that helped to visually integrate the design. A repeatedly observed pattern is for one of the central bands (2) to be oriented perpendicular to the other two. The two ends of that band are adjacent to the other two circles, whereas the ends of the other two bands are adjacent to the faces of the trianguloid fillers. Perforations are most commonly placed at points of the trianguloid fillers (Figure 18.1c–d). Because the composition is difficult to envision when the scheme is rolled out, as it in Figure 18.1b, the design was sketched out on a toy ball. The combination of three circles and two trianguloid fillers does indeed create a design that fills the surface of the sphere.

The complete rattle in the collections of the New World Archaeological Foundation has a related but not identical design and six perforations, one at each point of the two trianguloid fillers.

In total, 465 rattle fragments were registered in the study of ceramics. There are undoubtedly more still in some of the ceramics bags, but that figure includes results of a 2017 review of most units of the Extended Study Sample. Table 18.1 provides frequencies per cubic meter and per 10 kg of sherds. Rattles are well represented in Locona. Frequency peaks in Ocós and declines in the Cherla phase. They occur at all Locona-Ocós locations at which significant excavations were conducted, suggesting that they were widely distributed implements that were fairly common in household inventories, though less common than figurines.

Some suggestions on the use of rattles at Paso de la Amada can be ventured based on later evidence from Mesoamerica. It is likely that the use of rattles, possibly in conjunction with other instruments, was not simply for entertainment but instead a means of interacting with spirits, deities, and/or supernatural forces. In Postclassic Mesoamerica, both lords and deities were portrayed shaking rattles. For instance, in the mural from Corozal Town, Belize, an elaborately costumed deity, Ek Chuah, beats a drum with one hand and shakes a rattle with the other (Hammond 1972:3). In the Nuttall Codex, Monkey plays the drum with his right hand and shakes a rattle with his left (Stevenson 1968:45n). Lines 1593–1594 of the Chilam Balam of Chumayel read, "Sounded was his drum; / Sounded was the rattle of the Lord of 11 Ahau" (Edmonson 1986:108). Whether or not drums were used at Paso de la Amada is unknown; they would likely have been made of wood (Hammond 1972:2–3; Stevenson 1968:41).

One question to be considered is the scale of activities involving rattles. They might have been used in public ceremonies, as depicted on the Late Classic Bonampak murals (Hammond 1972:7–8; Miller and Brittenham 2013:115–16, Figures 218, 221). At Bonampak, five members of the band on the east and south walls of Room 1 shake large rattles (with red heads and handles), one in each hand. Alternatively, rattles might have been used in smaller-scale domestic ritual, as Overholtzer (2012) argues for Aztec anthropomorphic rattles. Her specific suggestion in that case is rituals associated with reproduction, an interpretation supported by the iconography of the pieces.

The two uses are not necessarily mutually exclusive. Still, given the wide dispersal of rattle fragments throughout the site, small-scale, domestic contexts of use seem particularly likely. The proposal would be that the inhabitants of Paso de la Amada regularly used the music of the rattle in their engagement with a larger world of spirits, deities, or supernatural forces. The contexts of use likely involved domestic settings. It is possible that rattle music (and thus engagement with the supernatural) was integrated into the daily rhythms of domestic life at the site in a way similar to that suggested by Stöckli (2007) for flute music at Late Classic Aguateca. At Paso de la Amada, the rattle is a more likely candidate for a common music-making implement than the whistle. Whistles were present and also widely distributed (see next section) but significantly rarer.

Whistles

Twenty-eight readily identifiable fragments of zoomorphic whistles or ocarinas were recovered (Figure 18.2). Most seem to have been in the form of birds. Only a single piece from this set is definitively not from a bird; that one is still probably zoomorphic.

Initially, only the above were identified as whistles. Review of the entire set of modeled imagery from Initial and Early Formative Mazatán, currently under way for a separate monograph, reveals one definitively identifiable armadillo whistle. That discovery raises the question of whether three fragments of what were originally classified as hollow armadillo figurines from Paso de la Amada Mound 1 might have been whistles. We leave this issue unresolved here since it can be decided only with reference to a larg-

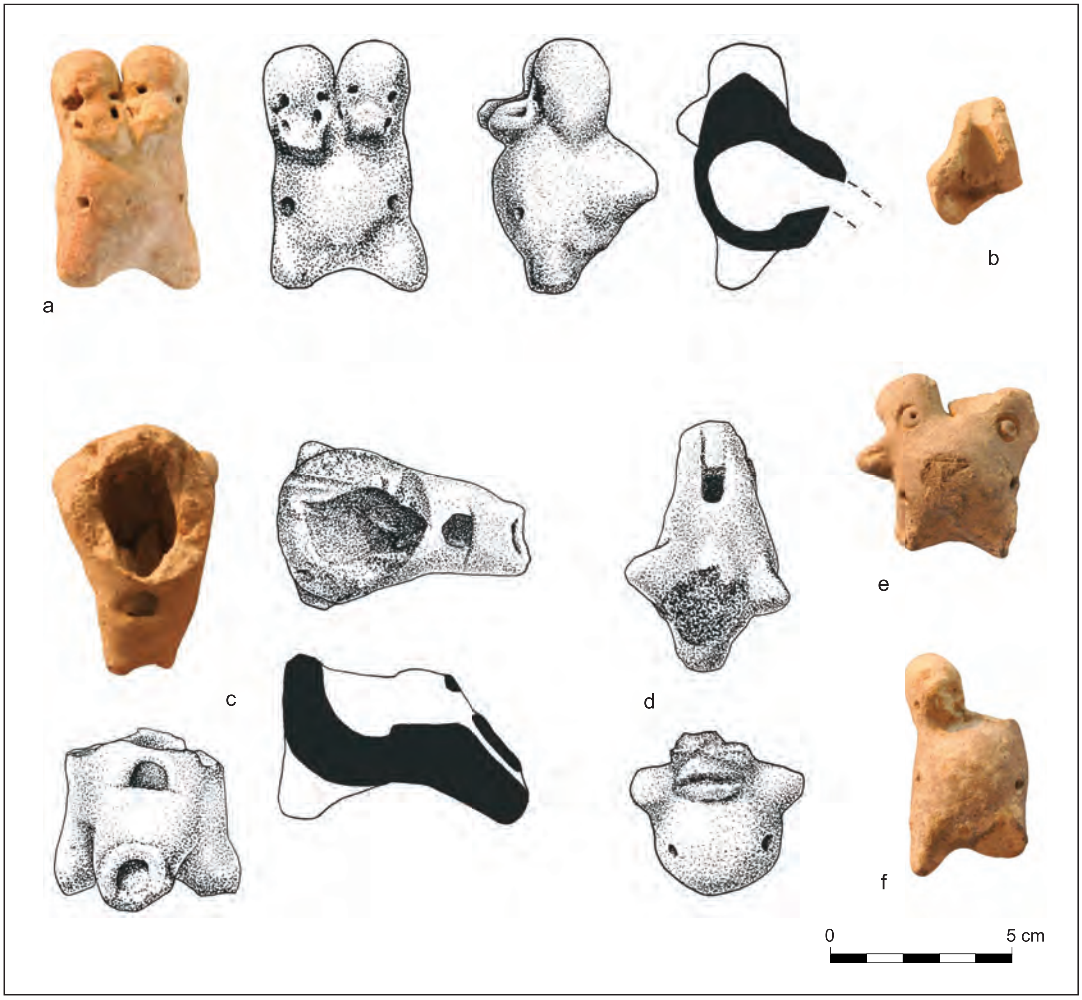


Figure 18.2. Ceramic whistles: (a) bird with two heads looking to front; (b) small mouthpiece fragment; (c) bird missing head or heads; (d) bird with single head; (e) bird with two heads looking to side; beak of one head missing; (f) bird with two heads looking to front; one head missing. Proveniences: (a) Md. 12 F2/23; (b) Md. 1 I8/11; (c) Md. 1 K10/1; (d) Md. 1 Lot 9; (e) Md. 1 I9/9–10; (f) Md. 12 F2/17. *Drawings by Alana Purcell.*

er collection. The following description of whistles focuses on the 28 specimens originally identified.

The collection consists of five head-plus-body fragments, five body fragments, and 18 mouthpieces. Overrepresentation of the highly distinctive mouthpieces indicates that other fragments of whistles lie unidentified among the sherds. They are probably so broken up that they would not add significant additional information.

The paste used for whistles is similar to that of Ocós-phase pottery. Surfaces are smoothed with varying degrees of care, after the practice used for figurines in that era. Two pieces bear traces of red paint (Md. 12 F2/23 and T1D/12). The bodies were hollow sounding chambers and the heads generally solid. The whistles would have stood upright on three supports when not in use. Two bumps in the front are schematized legs, and a projecting tail in the back served as the third support. The tail was also the mouthpiece of the device. It was perforated with a long, flat object to yield a hole wider (4–6 mm) than it is tall (1.5–2 mm). The user would blow into the instrument from the tip of the tail. The stream of air from the mouthpiece met another, larger hole (7–8 mm diameter) at the join between the tail and the body: the entrance to the hollow sounding chamber. Within the sounding chamber, there is usually a ramp of clay, flattened with the same tool used to make the blowhole, that ascends to the intersection of blowhole and sounding chamber. This ramp is at a distinct angle relative to the blowhole (typically 120–130 degrees but ranging from 115 to 145 degrees). In every case in which it is possible to determine, there were two small perforations (2 mm diameter) at the front or sides of the body. These perforations are stops for the production of multiple notes, making the corresponding artifacts ocarinas according to Lee's (1969:66) definition. Among the better-preserved pieces, the total length from tip of tail to front of body ranges from 4.5 to 7.0 cm. Height from feet to top of head varies from 4.0 to 6.2 cm.

In four of five cases with heads preserved, the bird is depicted with two heads emerging from the same body (Md. 12 T1D/12, Md. 12 F2/17, Md. 12 F2/23, Md. 1 I9/9–10). The fifth specimen has a single head (Md. 1 Lot 9, unscreened unit). The heads all face to the front except for a single specimen (Md. 1 I9/9–10) in which both heads face to the right (from the perspective of the user of the whistle).

The appearance of double-headed representations places these objects in the realm of imaginary creatures. Reinforcing that point is a contrast between the schematic depictions of birds among the whistles and the greater naturalism of bird effigies on pots, among which birds of prey, waterfowl, songbirds, and so forth were differentiated in some variety (Lesure 2000:Figure 9). The whistles, instead, seem more generic, references perhaps simply to "bird" or "songbird." There does not appear to have been any attempt to distinguish between different species of birds. The implication is that the theme of specificity of reference found among effigies on pots (Lesure 2000) was not relevant to the social context in which whistles were used. Perhaps, in the rituals or social interactions in which whistles were employed, the idea was to reference birdsongs in a general way. An alternative possibility is raised by the double-headed versions: the music produced might have referenced a particular legend or perhaps a specific mythical creature.

Whistles were rare in comparison to rattles and figurines. The bird whistles appear to date mainly to the Ocós phase, though they probably continued into Cherla. Interestingly, the fragment from the earliest context (Md. 12 T1B/8, late Locona) is also the one fragment that cannot be envisioned as originally part of a bird whistle. The possibility raised for future investigation is that Locona whistles were not so predominantly aviform as during the subsequent Ocós phase. (The fragments of possible armadillo whistles could all be Cherla in date.) There are four whistles from Ocós midden deposits (Md. 12 F2/17, Md. 12 F2/23, Md. 12 T1D/12, Md. 32 Feature 3). Another two pieces are from likely Ocós levels that are not included in the Refuse Study Sample (Md. 12 I6/30 and J6/30). There are three specimens from the Ocós-Cherla ground surface at Mound 12 (G6/28, T1D/6, T1E/6) and one from the pre-platform surface at Mound 1 (H11/20). There are seven from screened units of Zone IV of the Mound 1 platform (F10/11, F11/9–10, I6/10, I8/11, I9/9–10, K8/7, M10/11). There are six more from Zones I and III (or from unscreened units generally) of the Mound 1 platform and two from platform fill at Mound 12. The final fragment is from Mound 14 (P1/5).

The bird whistles of Paso de la Amada, previously identified by Ceja Tenorio (1985:101, Figure 55g–j), were part of a local Formative tradition documented also at La Victoria and Altamira (Coe 1961:100–1, Figure 40a–c; Green and Lowe 1967:124, Figure 95m). More widely across Mesoamerica, whistles are often reported from Initial, Early, and Middle Formative sites, generally in small numbers (a dozen or less) but sometimes more (105 from Chalcatzingo: Grove 1987b:276). The recurring theme is for those to be bird effigies, like those of Paso de la Amada. Cases include Mirador and Chiapa de Corzo in Chiapas; interestingly, the latter site yielded two fragments of double-headed birds in Protoclassic levels, more than 1,000 years later than those from Paso de la Amada (Agrinier 2000:145, Figure 113c; Lee 1969:66–69). In Central Mexico, there are Early Formative examples from Tlapacoya and Middle Formative cases from Chalcatzingo, Tlapacoya, and Zacatenco (Grove 1987b:276, Figure 16.6; Niederberger 1976:233, Lám. 2:10, 13, 14, 18; Valliant 1930:155, Plate 38 top, 3–4). There are Middle Formative cases from the Valley of Oaxaca and the Gulf Coast (Drucker 1952:Plate 39q; Flannery and Marcus 2005:416, Figure 23.6g). Sometimes in the above cases there are plain whistles, ocarinas, or flutes without effigies. From the Middle Formative, other imagery besides birds, either animal or human, is common.

If we were to subject Initial–Middle Formative whistle imagery to the sort of synthesis I have described elsewhere for anthropomorphic figurines (Lesure 2011b:115–26), we would find that bird themes pattern out quite differently than any other theme. Bird imagery on whistles extends across most of Mesoamerica in this era, whereas other themes appear to be localized variants: an old man from La Blanca whose cheeks were sound chambers (Arroyo 2002:221); generalized anthropomorphs from Chiapa de Corzo whose fat bodies were the sound chambers (Lee 1969:66–69); a variety of animals depicted in Oaxaca and Tehuacán (Drennan 1976a:234; MacNeish et al. 1970:35, 52). It is possible that a more extensive review of the literature would reveal other instances of long-distance similarities. For instance, like the piece mentioned from La Blanca, there are two fat-cheeked human faces from Chalcatzingo whose cheeks were sound chambers (Grove 1987b:276, Figure 16.6k–l). (Grove reinterprets a piece from Tlapacoya [Niederberger 1976:Lám. 2:8] as something similar.) Still, it is clearly the bird theme that occurs most widely, both through time and across linguistic boundaries. Birds make a minor but consistent appearance among the spectacularly diverse corpus of Late Classic Maya figurine-whistles (Laporte 2009:1026; Triadan 2007:Table 4, Figure 11b; Willey 1978:17–19, 36).

How do we account for these patterns and where does Paso de la Amada fit in all of this? Two suggestions appear to be likely factors, even given that their conceptual bases are rather crude. First, looking ahead from the bird whistles of Paso de la Amada, we see increasing diversification in the imagery associated with whistles, a process that appears to track the increasing complexity of Formative and then Classic social formations. Laporte (2009) suggests that the whistle imagery of Late Classic Tikal referenced diverse characters of a rich mythology. Under this first line of argument, the references of the whistles of Paso de la

Table 18.2. Stamps and seals from Paso de la Amada

Cat. No.	Provenience	Classification	Pigment Traces (interior or exterior)	Motifs[a]						
				CB	HB	VB	DB	RE	HU	CC
307001	Md. 1 K10/1	cylinder seal	exterior/interior	X					X	
307002	Md. 1 J7/5	cylinder seal	exterior			M				
307003	Md. 1 J12/7	cylinder seal	interior	M						
307004	Md. 1 I8/8	cylinder seal								X
307005	Md. 1 J12/8	cylinder seal					X	X		
307006	Md. 1 F10/9-10	cylinder seal		M						
307007	Md. 1 I9/9-10	cylinder seal	exterior/interior	M						
307008	Md. 1 I13/9-10	cylinder seal				X	X			
307009	Md. 1 G9/11	flat stamp								
307010	Md. 12 H7/28	cylinder seal			M	M				

[a] Codes for motifs (registered for cylinder seals only): CB: circumferential band (a band that is not observed to end on the preserved specimen); HB: horizontal band (observed to end); VB: vertical band (running end to end on the cylinder seal rather than circumferentially); DB: diagonal band; RE: band with recurved end; HU: horizontal U-shaped element; CC: complex curvilinear motif. X indicates a single observed instance; M indicates more than one instance on the same piece.

Amada appear to have been narrower, with the two-headed bird being a primary focus. Second, it may be that the music associated with simple wind instruments is readily, even naturally, associated with birds. In other words, the whistle as bird effigy may have been repeatedly invented in Formative Mesoamerica, or the association appeared so natural that it easily spread across linguistic boundaries. The occurrence of double-headed bird effigies both at Paso de la Amada (where they may have constituted the majority of whistles) and at Istmo-phase Chiapa de Corzo (Lee 1969:69), over a millennium later, is intriguing. There are surely more cases out there.

Seals and Stamps

Nine fragments of ceramic cylinder seals and one piece of a flat-faced stamp were recovered. All likely date to the Cherla phase. Table 18.2 provides information on individual specimens, which are referred to by catalog number in this section. Ceja Tenorio (1985:Figure 55k–l) also found fragments of a flat stamp and a cylinder seal in his Test Pits 2 and 3 at Mound 1.

Pastes of the stamps and seals are similar to those of contemporaneous pottery. Surfaces are well smoothed in a manner similar to those of Nicotaca figurines. None are slipped, but some of the cylinder seals bear traces of red pigment. Those traces may occur on all parts of the object: on the exterior raised surface, in the exterior carved designs, or within the hollow of the cylinder.

The flat stamp (Figure 18.3i) appears to have been rectangular, with a vertical or slightly angled handle on the side opposite the stamping surface. The remaining original dimension of the face is 3.4 cm. Assuming that the handle was in the center, the length of the rectangle would have been about 9 cm.

The cylinder seals were 3 to 5 cm in diameter, with most apparently close to 4 cm. They were hollow, with walls 0.8 to 1.2 cm thick. A complete length (between the open ends) of 6.5 cm is preserved on one specimen, which has a typical diameter of approximately 4 cm.

All but one cylinder seal were recovered from the fill of the Cherla platform at Mound 1. (Ceja's were also from the Mound 1 platform.) Two of those reported here are from the more mixed upper layers of the platform: 307001 from Lot 1, which was mixed plow zone and platform, and 307002 from Zone III. That leaves seven from the more Cherla Zone IV (Lots 7–12) yielding a density of 0.15 per cubic meter or a frequency of 0.34 per 100 kg of sherds. As Cheetham (2010a:430–33, Table 9.7) observes, this frequency is noticeably less than that of stamps and seals in Cherla midden deposits at Cantón Corralito (0.55 per cubic meter). The remaining specimen from Paso de la Amada (307010) is from Zone IV at Mound 12, the Ocós-Cherla ground surface beneath the platform. That specific unit was in one of the Cherla hot spots on the pre-platform ground surface, with five fragments of ear ornaments and at least 20 percent of the pottery diagnostics assigned to the Cherla complex (see Figure 4.21).

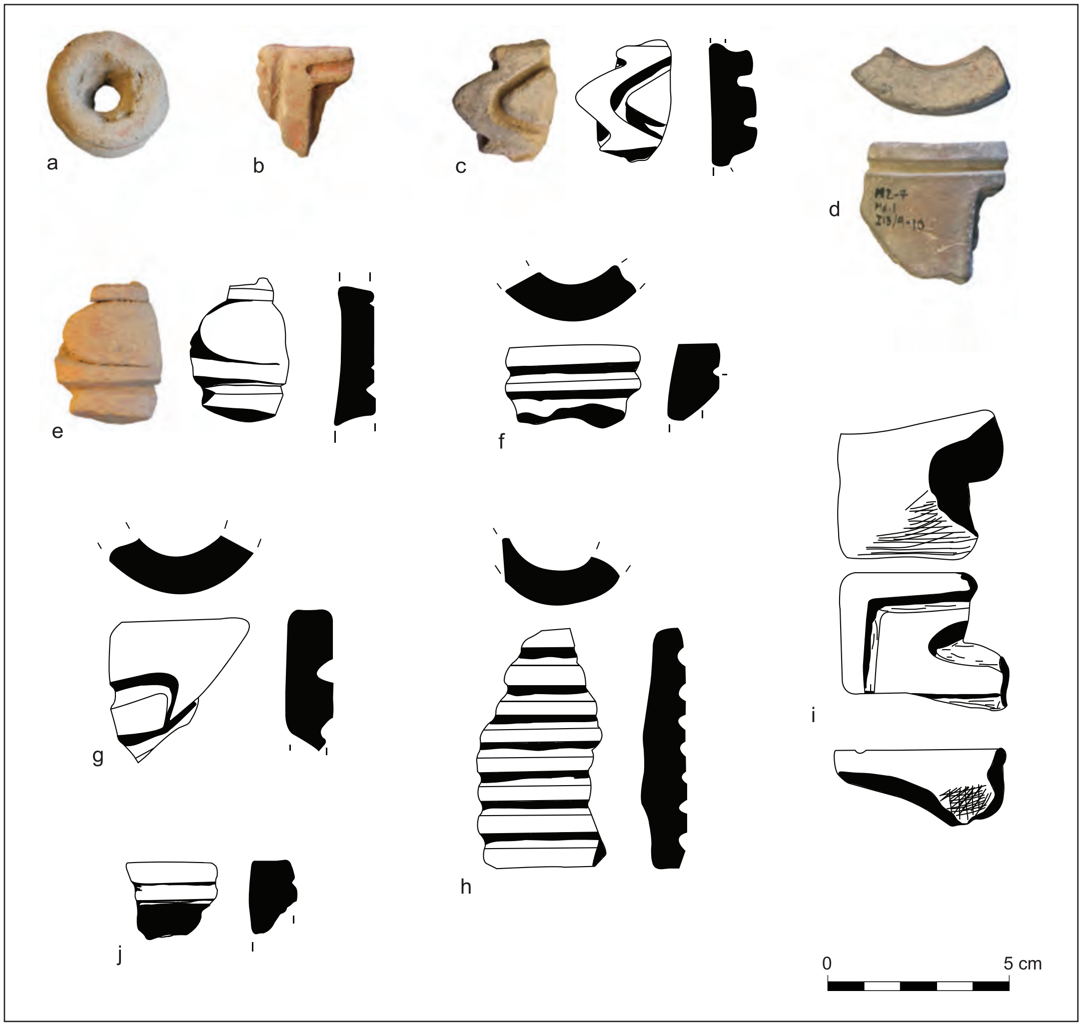


Figure 18.3. Ceramic seals and stamps: (a–h, j) fragments of cylinder seals; (i) flat stamp with broken handle that was originally perpendicular to the face of the stamp. Proveniences: (a) Md. 1 J7/5; (b) Md. 12 H7/28; (c) Md. 1 I8/8; (d) Md. 1 I13/9–10; (e) Md. 1 K10/1; (f) Md. 1 J12/7; (g) Md. 1 J12/8; (h) Md. 1 I7 Lots 9–10; (i) Md. 1 G9/11; (j) Md. 1 F10/9–10.

Because the collection is quite fragmented, the original motifs remain poorly understood. The stamp appears to have been composed of a squared U shape containing a round element (Figure 18.3i). One of the cylinder seals may have rolled out simply as eight parallel lines (Figure 18.3h). Other motifs appear to have been more complex. The two reported by Ceja Tenorio (1985) are completely different from those I excavated, suggesting that our understanding of the original corpus is far from complete. Table 18.2 codifies what can be observed of combinations of elements. In the terminology used, the "vertical" dimension is between the open ends of the device and thus perpendicular to the direction of motion when used to roll out a design; the "horizontal" dimension is parallel to the direction of motion.

Circumstantial evidence suggests that stamps and cylinder seals were part of a package of elements, originating ultimately at San Lorenzo, adopted by the inhabitants of Paso de la Amada in the Cherla phase (following Clark 1997, 2007; Clark and Pye 2000). The concept seems entirely absent in the Barra through Ocós phases. The intent here is not to dismiss Grove's (1987b:273–74) point that seals and stamps are often too casually referred to as "Olmec." The numbers of cylinder seals actually reported from Early–Middle Formative Gulf Coast sites are small (Coe and Diehl 1980:289; Drucker 1952:141–42). The specific suggestion here is that the inhabitants of Paso de la Amada adopted the cylinder seal on inspiration from the Gulf Coast immigrants at Cantón Corralito, where a considerable quantity of objects actually made at San Lorenzo is documented (Cheetham 2012:Figure 113). Just because the inhabitants of Paso de la Amada adopted the cylinder seal on inspiration from the Gulf Coast does not mean that all cylinder seals in Mesoamerica came from there.

Like other Early–Middle Formative assemblages from across Mesoamerica, including those of San Lorenzo and

La Venta, the imagery of the stamps and seals of Paso de la Amada does *not* look particularly "Olmec," if we take that to mean the schematized supernatural imagery present, for instance, on Calzadas Carved and Limón Incised pottery from San Lorenzo (Coe and Diehl 1980:Figures 138–45). Still, there are some intriguing resemblances between a few of the juxtapositions of elements and the designs reported by Coe and Diehl (1980:Figures 144–45), in particular: diagonal band with a band recurved at the end; diagonal band with vertical band; horizontal with vertical bands. More to the point chronologically, this same subset includes combinations present in Chicharras-phase motifs illustrated by Cyphers and Di Castro (2009:Figure 11). For instance, 307005 (Figure 18.3g) could be a fragment of a flame eyebrow or a paw-wing motif. The interesting implication is that Olmec-style motifs may have first appeared in the Soconusco on cylinder seals rather than on pottery, a point already made by Cheetham (2012:217–18).

Spatulas

Sixty-two fragments of ceramic spatulas (or possible fragments thereof) were recovered (Figure 18.4a–o). All were fragmentary, but it was readily apparent from early in the analysis (Lesure 1998b:77–79) that they matched in detail those described by Coe and Diehl (1980:Figure 399) from San Lorenzo. Handle, join, and head or blade fragments were identified (Table 18.3). Cheetham (2010a, 2012) has since discovered many more from Cantón Corralito, including at least one fully reconstructable specimen (Cheetham 2012:Figure 114).

The paste is similar to that of Michis tecomates. Surface treatment on most of the collection is well scraped but not slipped or burnished. There are four specimens identified as "possible" spatulas because they have divergent surface treatments. All are cylindrical handle fragments, and it cannot be proven that they actually are from implements like the others. One of those is slipped gray. The others are burnished but unslipped.

The overall shape is spoon-like, but the head or "blade" is flat rather than bowl-shaped, leading to the purely descriptive designation "spatula." Handles are round in cross section and thick compared to the blade. The transition from handle to blade has a characteristic form when the blade is viewed from the side. On the "bottom," the transition from handle to blade is a straight line, while "on top" there is a shoulder in which the line of the handle descends to the flat part of the blade. (The actual top and bottom of the implement when in use are uncertain.) Handle fragments are well-formed cylinders, generally tapering toward the end.

Cheetham's (2012:Figure 114) complete specimen from Cantón Corralito is 22 cm long, which seems about right for the assemblage from Paso de la Amada. At Cantón Corralito, the ends of many of the handles are perforated, apparently for suspension of an implement when it was not in use. This is an attribute not present on the two handle ends illustrated by Coe and Diehl (1980:Figure 399). At Paso de la Amada, we had evidence of three perforated ends and one unperforated one.

The spatulas in their characteristic form described here date to the Cherla phase. Fifty-five of the identified specimens are from the Cherla-phase platform in Mound 1, with 33 of those from screened units of Zone IV. Others are from the ground surface under the Mound 1 platform (Md. 1 G10/25), from the ground surface under the Mound 12 platform (Md. 12 T1E/6), from the uppermost level at Mound 13 (P2/1) and thus possibly from the Cherla pit identified in the following level, from Cherla-phase platform fill in Mound 14 (P1/2), and from the Locona-Cherla ground surface at Mound 15 (P2/2). Two other specimens are from Mound 12 G6/29 and Mound 1 Feature 15. The former is an unscreened lot immediately beneath a unit of the Ocós-Cherla ground surface that was screened and did contain Cherla sherds (G6/28). The specimen from Mound 1 Feature 15 is from a well-dated pre-Cherla context, a late Locona trash pit at Mound 1. This is one of the "possible" handle fragments; it is highly polished and thus diverges from most of the collection in surface treatment. It cannot be proven that it is indeed the handle of a spatula.

The collection of spatulas from Cantón Corralito is larger than that from Paso de la Amada. There were 78 in the Cherla-phase midden deposits alone (Cheetham 2010a:Table 9.7), yielding a frequency of 3.3 specimens per cubic meter. This compares to 0.68 per cubic meter in Zone IV of the Mound 1 platform (the redeposited status midden) and 0.56 per cubic meter in the full Cherla refuse sample from Paso de la Amada. Very similar spatulas were used at the two sites, but the Cherla-phase inhabitants of Paso de la Amada used fewer spatulas and/or used them less often than their contemporaries at Cantón Corralito.

The adoption of this element of material culture in Cherla-phase Soconusco is another instance of emulation of Gulf Coast practices. Cheetham (2010a:434) reports fewer spatulas in Cuadros-phase deposits than in Cherla. He also observes that the Cuadros specimens may be from early in that phase. If the same pattern held at San Lorenzo, then spatulas at that site would date basically to the Chicharras phase. The limited exposures dating to that phase might explain why there are actually fewer spatulas reported from San Lorenzo (29) than from either Paso de la Amada or Cantón Corralito. That point may also help account for why ceramic spatulas of the form described here are not reported from other Early Formative sites, even those with significant Early Olmec stylistic influence. The issue is one of chronology. Exchanges between the Soconusco and the Gulf Coast were initiated early enough to capture this item of material culture, which had faded in use even at San Lorenzo by the San Lorenzo phase proper.

The purpose of the spatulas remains unknown. Coe and Diehl (1980:284) suggest food preparation of some

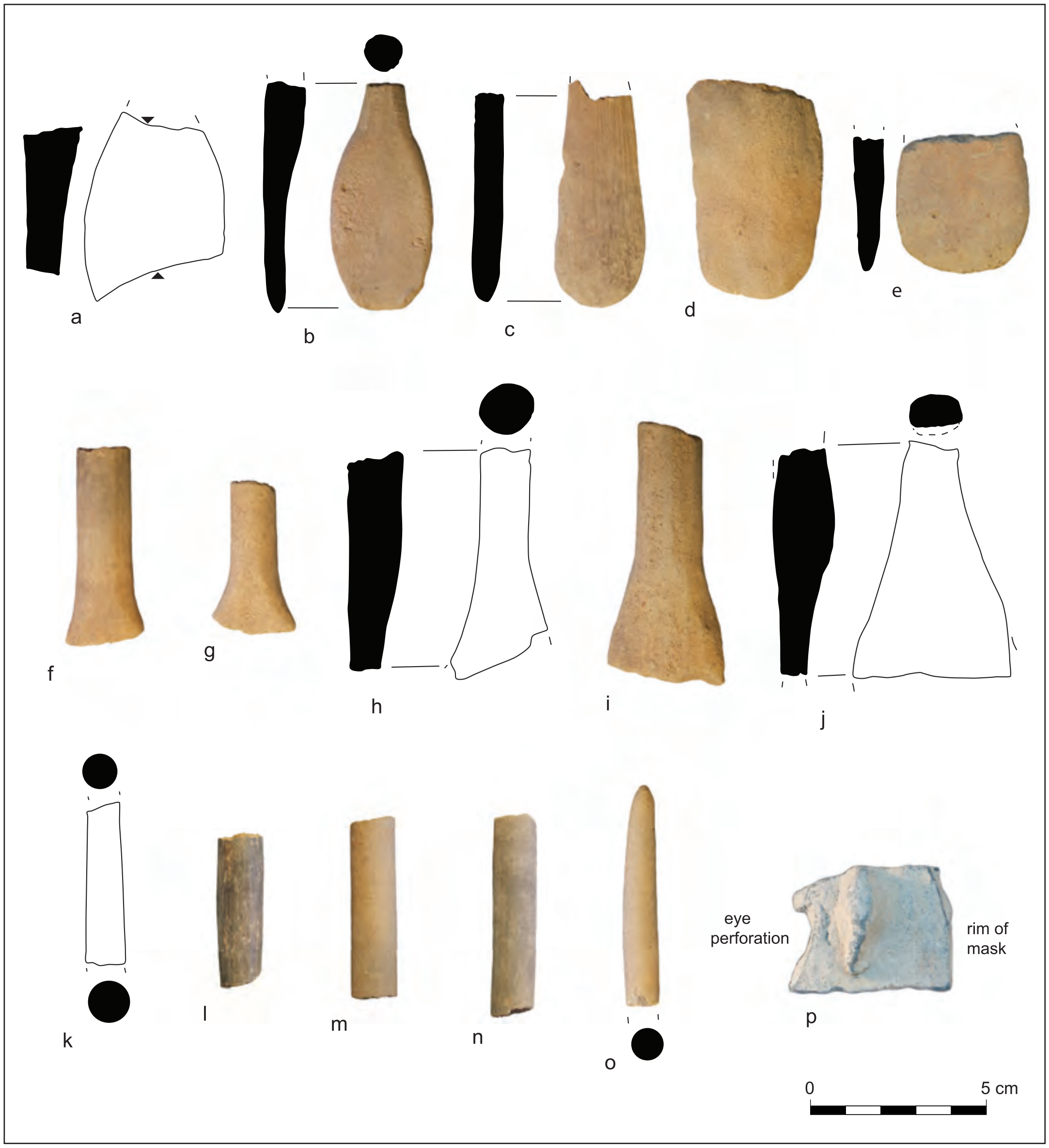


Figure 18.4. Ceramic spatulas and masks: (a–e) spatula blade fragments; (f–j) spatula blade–handle join fragments; (k–o) spatula handle fragments; (p) mask fragment. Proveniences: (a) Md. 1 I6/1; (b) Md. 1 I7/8; (c) Md. 1 Structure 1 fill; (d) Md. 1 G10/25; (e) Md. 1 I6/11; (f) Md. 1 G10/8; (g) Md. 1 I7/9–10; (h) Md. 1 Structure 1 fill; (i) Md. 1 H8/2; (j) Md. 1 H7/5; (k) Md. 1 J7/9; (l) Md. 1 Feature 15; (m) Md. 1 J9/8; (n) Md. 1 L9/10; (o) Md. 13 P2/1; (p) Md. 1 Structure 1 fill.

kind. Cheetham (2012:218) cites John Clark as suggesting stirring of chocolate, but he himself raises the possibility that they were used to stir coals on domed censers characteristic of the Cherla phase. The spatula blades in the collection from Paso de la Amada do not exhibit the use wear that one might expect of vigorous stirring in a ceramic pot. There are no traces of burning on the blades.

Mask

From an unscreened unit of platform fill in Mound 1 there is a small fragment of a ceramic mask (Figure 18.4p). The specimen (302495) is flat, and both surfaces are scraped; they are neither burnished nor slipped. Part of an eye perforation and part of the rim are preserved. A projection beside the eye could represent an ear. The preserved rim segment is not even, making it hard to determine size and shape. No suspension hole is preserved on this small fragment. The only other mask known from Paso de la Amada is from an Ocós context in Mound 6. Specimen 302495 is most likely Cherla. Ceramic masks became more common in the Mazatán region beginning in the Cuadros phase.

Table 18.3. Fragments of ceramic spatulas and possible spatulas

Provenience	Handles	Joins	Heads	Unspecified	Comments
Md. 1 I11/1			1		
Md. 1 I6/1		1			
Md. 1 I8/1				1	
Md. 1 I9/1		1			
Md. 1 H10/2			1		
Md. 1 H8/2	1	1			
Md. 1 I11/2	1				
Md. 1 J7/2		1			
Md. 1 L9/3		1			
Md. 1 H7/5		1			
Md. 1 J9/5	2				
Md. 1 G10/7	1				
Md. 1 G10/8		1			
Md. 1 I7/8		1			
Md. 1 I9/8		1			
Md. 1 J7/8	1				polished
Md. 1 J9/8	2				
Md. 1 K8/8		1	1		
Md. 1 J11/9	1				
Md. 1 J7/9	1				
Md. 1 J9/9	1				polished
Md. 1 K9/9-10	1				
Md. 1 K10/9		1			
Md. 1 G11/9-10	1				
Md. 1 H10/9-10	1				
Md. 1 H11/9-10	2				one is an end with hole
Md. 1 I7/9-10		1			
Md. 1 J8/9-10	1				
Md. 1 J9/10				2	one is crudely fashioned
Md. 1 K10/10	1				
Md. 1 K8/10	2				one has a hole at end
Md. 1 L10/10	1				
Md. 1 L9/10	1				
Md. 1 E10/11	1				
Md. 1 G11/11			1		
Md. 1 G9/11	1	1	1		
Md. 1 H8/11	1				
Md. 1 H9/11			1		
Md. 1 I6/11			1		
Md. 1 G10/25			1		
Md. 1 F.15	1				highly polished
Md. 1 Str1 fill	3	2	2		one of handles had hole at end
Md. 12 G6/29	1				
Md. 12 T1E/6	1				polished gray
Md. 13 P2/1	1				
Md. 14 Unit 1/2				1	
Md. 15 P2/2				1	

PERSONAL ORNAMENTS

Twelve modeled ceramic beads and two pendants were recovered; see also the discussion of spindle whorls (below) for an additional 10 bead-like objects that were probably tools rather than ornaments. The ornaments reported in this section fall into five classes, four consisting of beads of different shapes. The fifth consists of pendants.

Tubular Ceramic Beads

Two beads in the form of thin ceramic tubes are both from the fill of the Cherla platform in Mound 1 (Figure 18.5a–b). From J9/10 is a complete specimen 2.9 cm long, with a diameter of 9 mm and a longitudinal hole with a diameter of 2.0–2.3 mm. From H11/9–10 is a broken fragment of a similar bead; 1.3 cm of its length remains. Its diameter is 8 mm with a hole of 1.9–2.1 mm. The paste is finer than that used for ceramic vessels, and the surfaces are slightly burnished (brown, 7.5YR5/4).

Spherical Ceramic Beads

Two beads are relatively large, solid spheres of soft-paste, temperless clay (Figure 18.5c). One is 2.3 cm in diameter (Md. 12 F3–4/19), the other 2.0 (Md. 1 I9/5). The perforations are relatively narrow (2 mm). Surfaces are smoothed only, not burnished or slipped.

Sub-spherical Ceramic Beads

Four sub-spherical beads (Figure 18.5d–f) are rather similar in size to greenstone beads. The diameters vary from 7.5 to 10.5 mm, length/thickness from 3.3 to 9.0 mm. Hole diameters are 1.5 to 2.4 mm. There is one from an Ocós layer

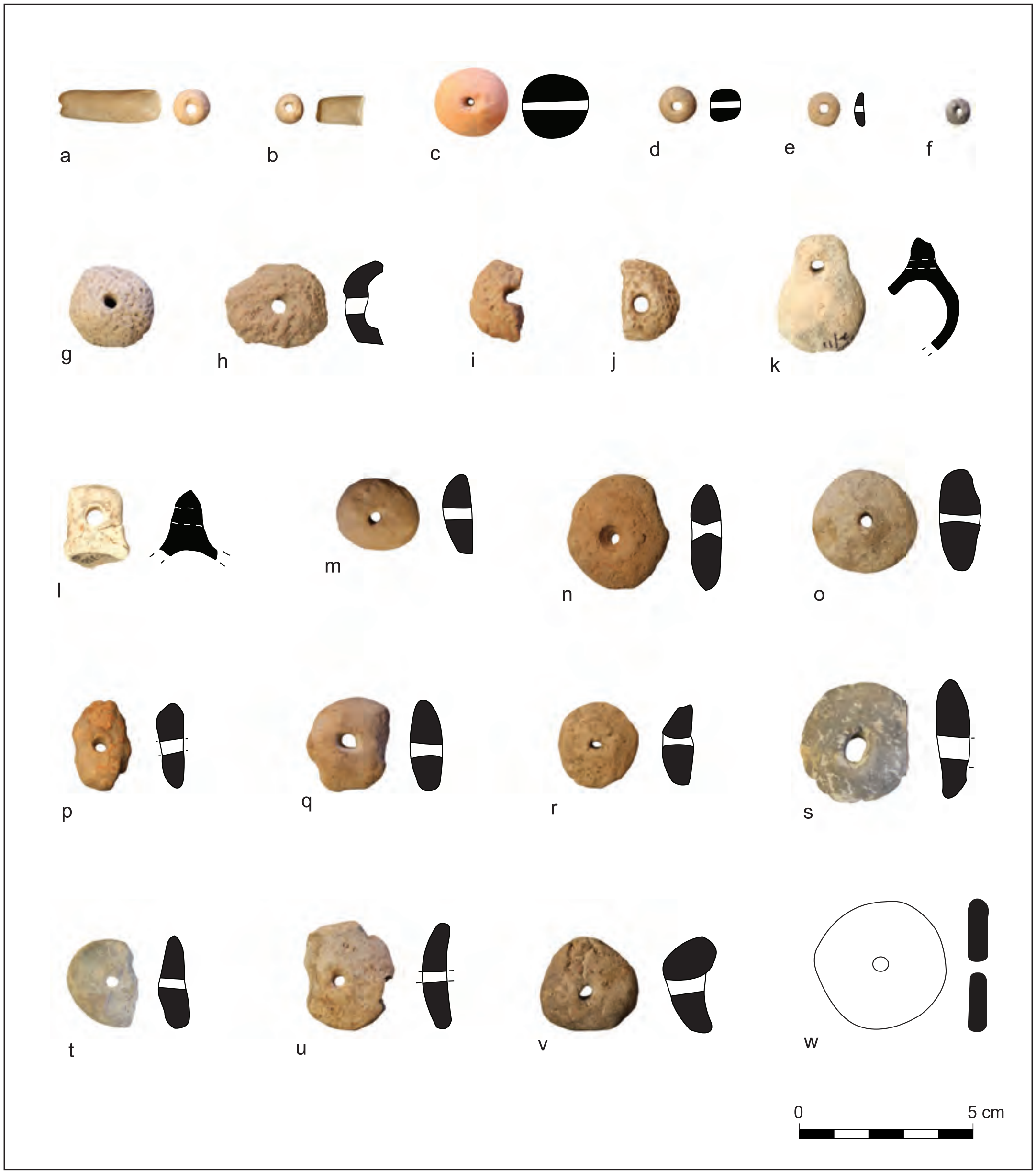


Figure 18.5. Ceramic beads and spindle whorls: (a–b) tubular ceramic beads; (c) spherical ceramic bead; (d–f) sub-spherical ceramic beads; (g–j) convex beads with stamped surfaces; (k–l) hollow ceramic pendants; (m–v) modeled spindle whorls; (w) centrally perforated sherd disk. Proveniences: (a) Md. 1 H11/9–10; (b) Md. 1 J9/10; (c) Md. 1 I9/5; (d) Md. 1 H10/9–10; (e) Md. 1 I9/9–10; (f) Md. 12 T1E/7; (g) Md. 1 J9/5; (h) Md. 1 Feature 8; (i) Md. 1 F11/25; (j) Md. 32 Pit 2/2; (k) Mz 250 2/11; (l) Mz 250 3/26; (m) Md. 1 Structure 1 fill; (n) Md. 1 M10/11; (o) Md. 12 Pit 5/6; (p) Md. 1 G12/19; (q) Md. 12 T1E/8; (r) Md. 1 K8/8; (s) Md. 12 T1E/9; (t) Md. 1 L10/8; (u) Md. 12 T1E/3; (v) Md. 12 T1E/12; (w) P32E 2/2.

in Mound 12 (T1E/7), one from the Ocós-Cherla occupation surface under the platform in Mound 1 (F10/25), and two from Zone IV of the Mound 1 platform fill (H10/9–10, I9/9–10). Paste is generally finer than that used for ceramic vessels. Surfaces are burnished or merely smoothed, and colors are brown or gray (10YR4/2, 7.5YR5/3).

Convex Beads with Stamped Surfaces

Four beads, 2.4–2.7 cm in diameter, have convex upper surfaces that have been stamped to give a rough texture (Figure 18.5g–j). They have something of the appearance of small shells and may be imitations of shell beads. Note that the lack of any comparable beads in shell from the assemblage does not tell us much because conditions for shell preservation at the site were terrible. One of these beads is from the Locona pit Feature 8 at Mound 1 and another from slope wash off the platform at Mound 32 (P2/2). There is a broken fragment from the Ocós-Cherla ground surface at Mound 1 (F11/25), which did include Locona materials, and a complete specimen from Zone III of the Mound 1 fill (J9/5). All of those could be Locona in date.

Hollow Ceramic Pendants

Two fragments of hollow ceramic pendants were recovered at Mz-250 (2/11 and 3/26). Each consisted of a small hollow sphere with a solid, perforated tab; the result is reminiscent of a small Christmas tree bulb (Figure 18.5k–l). The more intact specimen appears to have been about 2.5 cm in diameter when complete. Both are smoothed (not burnished), and the more complete piece has traces of a thin Papaya Orange slip. They are from the Locona phase.

NET WEIGHTS

Two classes of ceramic artifacts from Paso de la Amada are conventionally labeled net weights. In my opinion, those conventional interpretations are correct. Both may have been used for small throw nets. (see, for example, Lesure 2009b:Figure 14.8.) The earlier of the two, dating to the Locona phase, is the double-notched worked sherd. Tending to replace that in Ocós through Cherla is the modeled clay cylinder with a longitudinal hole. The modeled cylinders are somewhat heavier than the notched sherds (median 16.2 g versus 10.4), and the distribution is narrower (an interquartile range of 5.3 compared to 9.1).

Double-Notched Sherds

Double-notched sherds vary considerably in the care used to work the sherd into a vaguely oval or rectangular form (Figure 18.6a–m). They also vary in size. In a sample of 58 complete or nearly complete specimens, the median weight was 10.4 g, with a range of 4.0 to 38.5 g (average 13.3 ± 8.2; interquartile range from 7.4 to 16.5). In total, 91 double-notched sherd net weights were recovered. Those in Table 18.4 are from well-dated deposits. The transition between notched sherds and modeled cylinders (from Locona to Late Locona) comes out clearly when counts are standardized by weight of sherds. Particularly in the case of notched sherds, the transition is less apparent in the volumetric densities. Net weights in general declined in frequency in the Cherla phase.

Very similar objects, often referred to as *mariposas*, are reported from sites in the Maya lowlands, including K'axob (Bartlett 2004:269–68) and Cerros (Garber 1989:77–83); both of those publications report numerous other cases. The net weights of Paso de la Amada are distinctly heavier than in the Postclassic collection from Cerros (average 6.7 g with the mode between 3 and 4 g) (Garber 1989:81, Figure 30A). The Late Preclassic and Classic net weights at Cerros are closer to but still lighter than those of Paso de la Amada (estimating from Garber's [1989:Figure 30B] histogram: median 8 g, interquartile range 4 to 11 g).

Cylindrical Net Weights

These have the form of crude cylindrical beads 3 to 5 cm in length and about 2.0 to 2.5 cm in diameter (Figure 18.6n–u), with a fairly wide longitudinal hole measuring 0.5–1.0 cm in diameter. Weights were slightly heavier than the worked-sherd net weights, with a somewhat narrower distribution. Weight ranged from 8.5 to 28.9 g in a sample of 66 complete specimens (mean 17.1 ± 4.6 g; median 16.2; interquartile range 13.8–19.1). The objects are modeled from a wide variety of pastes, generally tan, brown, or gray in color. The most common is soft and fine-grained, similar to that used for Muscu-type figurines. Medium and coarse paste, the latter sometimes quite friable, also occur. Some are well fired in the same paste used in the production of pottery, but those are in a minority. The objects were formed by molding the clay around a stick or reed. Surfaces are roughly wiped. In terms of selection and preparation of paste, fashioning of the objects, and surface finish, these appear to be expediently made, a point consistent with the idea that they are net weights. These modeled ceramic cylinders were relatively common at Paso de la Amada, particularly in Ocós and Cherla deposits (Table 18.4).

Effigy Net Weight

A remarkable object from the platform fill at Mound 1 (I9/2) has the form of a modeled cylindrical net weight, but a masked, anthropomorphic face has been modeled on one side of the cylinder (Figure 18.6v).

The paste is the soft temperless paste commonly used for the net weights (7.5YR6/4, light brown). The length of 3.4 cm, approximate diameter without face of 2.2 cm, and weight of 19.3 g would all be typical for cylindrical net weights. Still, it is unclear whether this was actually intended to be a net weight. It is certainly more carefully made than other such artifacts.

The face is oriented along the longitudinal axis. The style of the representation is unlike anything among contemporaneous figurines. The eyes were formed with centrally punched, disk-shaped appliqués. The nose is a spherical appliqué. An appliqué across the forehead and sides of the face was smoothed in to create raised bumps suggesting ears (one is broken off) and a raised strip across the forehead. The forehead is furrowed with three deep grooves.

No mouth is represented. Instead, another appliqué covers the lower part of the face. The impression conveyed is that the mouth is covered in a fashion resembling a surgical mask. The mouth area is a smooth, raised tab. A pair of short grooves across each cheek area suggest the sort of

Figure 18.6. Ceramic net weights: (a–m) notched sherd weights; (n–u) modeled, cylindrical net weights; (v) cylindrical net weight with effigy. Proveniences: (a) Md. 1 Structure 1 fill; (b) Md. 1 I11/7; (c) Md. 1 H9/11; (d) Md. 12 P5/9; (e) Md. 12 G5/34; (f) Md. 32 2/243; (g) Md. 12 T1E/10; (h) Md. 1 16/7; (i) Md. 1 J7/1; (j) Md. 21 P2/4 or 5; (k) Md. 1 I10/11; (l) Md. 1 K10/9; (m) Md. 1 J9/1; (n) Md. 21 P1/6; (o) Md. 1 F11/5; (p) Md. 1 G11/9–10; (q) Md. 1 K10/10; (r) Md. 1 L9/8; (s) Md. 1 L9/8; (t) Md. 32 1/206; (u) Md. 32 T1L/78; (v) Md. 1 I9/2. *Drawings by R. Lesure and Alana Purcell.*

string that holds a surgical mask in place.

The longitudinal hole of the cylinder is not completely straight, as if the piece was molded around a somewhat bent twig. Just above the bottom opening of the central hole are three small perforations that penetrate through to the central hole. They could have been used to tie feathers or other objects below the face.

POSSIBLE SPINDLE WHORLS

Impressions of fine, spun threads on Amada Black-to-Brown pottery (see Figure 15.3e) suggest production of cotton textiles at Paso de la Amada. Sewing and weaving tools in bone are documented in Chapter 15. What about spindle whorls? There are three possible candidates. The

Table 18.4. Notched-sherd and cylindrical net weights over time

	Double-Notched Sherd Net Weights			Cylindrical Net Weights		
Phase	Count	Volumetric Density (per m^3)	Frequency per 100 kg Sherds	Count	Volumetric Density (per m^3)	Frequency per 100 kg Sherds
Early Locona	1	0.46	7.90	0	0	0
Locona	14	0.48	7.83	2	0.05	1.03
Late Locona	3	0.17	0.88	45	2.40	12.56
Ocós	11	0.36	1.68	95	2.87	13.59
Md12-IV	4	0.26	1.69	27	2.22	14.53
Md1-IV	2	0.11	1.80	20	1.14	17.14
Cherla	15	0.29	0.67	89	1.71	3.99

Table 18.5. Modeled spindle whorls

Provenience	Dimensions of Disk	Weight (g)	Hole Size (mm)	Condition
Md. 12 T1E/12	2.6 x 2.7 cm	8.9	3.9	complete
Md. 12 P5/6	2.9 x 3.0 cm	11.3	3.3	complete
Md. 12 T1E/8	2.8 x 2.4 cm	5.3	3.9–4.5	chips broken from edge
Md. 12 T1E/9	3.5 x 3.0 cm	10.7	4.9–7.0	chips broken from edge
Md. 1 K8/8	2.5 x 2.3 cm	3.1	2.2–3.3	complete
Md. 1 L10/8	2.6 x ? cm	3.0	3.1	broken
Md. 1 M10/11	3.3 x 2.9 cm	8.8	2.5	chips broken from edge
Md. 1 platform	2.4 x 2.0 cm	4.4	3.0	complete
Md. 1 G12/19	2.6 x 1.5 cm	2.9	3.4	chips broken from edge
Md. 12 T1E/3	3.1 x ? cm	5.7	3.1	chips broken from edge

two presented here are the most likely: (1) modeled ceramic disks with central perforations and (2) rounded worked sherds with central perforations. The third artifact class is the soapstone disk bead; those were probably ornaments rather than spindle whorls (see Chapter 11).

Modeled Spindle Whorls

Modeled, fired-clay disks with central holes (Figure 18.5m–v) were probably spindle whorls. (The other possibility is that these were beads.) Ten were recovered. Most are only approximately round, with "diameters" between 20 and 30 mm. Thickness is between 8 and 14 mm and the hole diameter 2.5–7.0 mm, most commonly 3–4 mm. Weights range from 2.9 to 11.3 g. Paste varies considerably, from soft and untempered (similar to that of Muscu figurines) to tempered and relatively well fired (similar to the paste of pottery). Surfaces are roughly finished. Perforations are not always in the exact center of the disk. Most examples have some damage around the edges, not necessarily through use given their general fragility. Statistics on the individual pieces are provided in Table 18.5.

Parsons (1972) found a clear bimodal distribution in whorl diameter, hole diameter, and weight of Postclassic spindle whorls from the Teotihuacan Valley. She identified the larger whorls as appropriate for spinning maguey fibers and the smaller ones—her Type III—as appropriate for cotton. Type III whorls were 15–31 mm in diameter, with holes 2–5 mm and weights mostly less than 10 g. From the likely cotton-growing region of Morelos, Smith and Hirth (1988:Figure 3) report whorls less than 18 g. The artifacts under consideration from Paso de la Amada match the characteristics of cotton spindle whorls from Postclassic Central Mexico quite well, with the most obvious point of disquietude being that the hole is not always precisely centered. It should also be pointed out that there is a considerable difference in time (2,500 years) and space between the proposed modeled whorls from Paso de la Amada and the Postclassic cotton-spinning whorls from Central Mexico. Metric characteristics of whorls from other areas and regions of Mesoamerica do not always match the clarity of the divisions found by Parsons (for example, Chase et al. 2008:131). In south-central Veracruz, Stark et al. (1998:17–19) find that specially manufactured whorls date to the Terminal Preclassic. In the preceding Late Preclassic, centrally perforated sherd disks were used. At Cholula, Puebla, McCafferty and McCafferty (2000:42) posit a shift to baked clay whorls in the Early Postclassic; unbaked clay or perishable materials were used before that. The interpretation proposed here for Paso de la Amada is that both sherd disks and modeled spindle whorls in fired clay—the latter quite crude by later Mesoamerican standards—were in use for spinning threads that most likely included cotton.

There are two modeled whorls from late Locona contexts (Md. 12 T1E/12, Md. 12 P5/6), two from Ocós contexts (Md. 12 T1E/8 and T1E/9), and four from Cherla-phase platform fill at Mound 1 (K8/8, L10/8, M10/11, and one from an unscreened unit). There is another from Zone V at Mound 1, beneath the platform (G12/19), and one from platform fill at Mound 12 (T1E/3).

Centrally Perforated Sherd Disks

Round worked-sherd disks with a central perforation are also candidates for spindle whorls (Figure 18.5w). Sixteen were recorded in the initial review of artifacts and separated for further study. Unfortunately, that bag is now missing from the rest of the worked sherds. A review of all extant bags of ceramic artifacts revealed a single perforated sherd disk that had not originally been separated out for further study (P32E2/2). It is 3.6 cm in diameter, with a hole of 5 mm, and weighs 9.9 g.

It is interesting that a quarter of the perforated sherd disks were recovered in the Pit 32 excavations, since that locale contributed just 4 percent of all sherds excavated. Two of these perforated disks were in the late Locona Feature 1 (P32A/4), another was in mixed deposits above that feature (P32/2), and a fourth was from mixed deposits not far away (P32E2/2). There is a perforated disk from an Ocós midden in Mound 12 (F1/10), one from the pre-platform ground surface at Mound 1 (T2/6), and seven from Cherla deposits, all Zone IV of the Mound 1 platform (I11/7, J12/7, I6/8, J12/8, I7/8, F10/9–10, and H8/11). Others from mixed deposits are Md. 1 G10/1, Md. 1 H10/5, and Md. 12 K5/29.

Perforated sherd disks are identified as likely spindle whorls at sites in Veracruz, in the Maya lowlands, and in Nicaragua, all considerably later than Paso de la Amada (Halperin 2008; McCafferty and McCafferty 2008; Stark et al. 1998). In all those cases, sizes and weights are more diverse than the modeled cotton whorls studied by Parsons (1972), even where cotton is thought to have been the fiber spun.

MISCELLANEOUS MOLDED CERAMIC ARTIFACTS

Miniature Vessels and Crude Receptacles

Rare finds in the sherd collection included fragments of miniature vessels in the same paste as standard-size pots and small, crudely fashioned receptacles in a soft, untempered paste similar to that of Muscu-type figurines (see Chapter 16). The miniature vessels were generally fragmentary and analyzed together with the sherds. A complete, unslipped miniature tecomate was found in P32/4 (Figure 18.7a). It has five bulbous projections around its body.

Ten fragments of small, crude receptacles all derive from the platform fill in Mound 1. Although not standardized in form or size, they generally appear to be bowls with rounded (convex) walls and flat or rounded bases. The proveniences, all at Mound 1, are as follows: I6/7, I7/7, I8/7, J7/8, J7/8, F9/11, G9/11, H8/11, H8/11, and an additional piece from an unscreened unit of the fill.

Palettes for Pigment

A small, slightly concave fired-clay receptacle from Mound 1 J9/7 has traces of red paint (2.5YR5/8) in its central concavity and appears to been used as a paint palette (Figure 18.7b). The amount of pigment involved seems too small for use in the decoration of pottery; painting of figurines seems more likely. Another piece very similar in form from Mound 1 K8/8 does not bear any identifiable trace of pigment.

Ceramic Spheres

Ten solid, fired-clay spheres were recovered. They are relatively small (1.1–2.4 cm in diameter) and lightweight (1.6–7.7 g). Proveniences: P32/3, Md. 12 F3/10, Md. 1 I9/1, Md. 1 L8/1, Md. 1 H8/5, Md. 1 H8/5, Md. 1 L19/9, Md. 1 L9/9, and two from unscreened units of platform fill in Mound 1. In addition, from Mound 1 I8/8 there was what would have been a somewhat larger sphere that appears to have been accidentally squashed before it was fired.

Other Fragments of Molded Ceramic

From Mound 12 F3/17 there is what appears to have been a small, modeled, four-legged stool, perhaps for use with a seated figurine (Figure 18.7e). An unidentified modeled fragment from Mound 12 T1C/6 may have been the foot of something (Figure 18.7d). A fragment of a black/

Figure 18.7. Miscellaneous ceramic artifacts: (a) miniature vessel; (b) palette for pigment; (c) fragment of a ceramic ring with red pigment; (d) unidentified molded fragment; (e) miniature modeled stool; (f) unfired figurine head, Nicotaca type; (g–j) molded objects in unbaked clay; (k–o) worked sherd pendants. Proveniences: (a) P32/4; (b) Md. 1 J9/7; (c) Md. 1 Structure 1 fill; (d) Md. 12 T1C/6; (e) Md. 12 F3/17; (f) Md. 12 T1D/10A F.3; (g) Md. 1 L10/9; (h) Md. 1 I8/9–10; (i) Md. 1 G12/1; (j) Md. 1 G9/1; (k) Md. 12 H5/28; (l) Md. 1 G11/11; (m) Md. 1 Structure 1 fill; (n) Md. 1 I8/11; (o) Md. 1 Structure 1 fill.

gray-slipped solid ceramic cylinder, broken at one end and slightly hooked and perforated at the other end, may have been a handle to something; it is from Mound 32 T5B/191. The handle seems too thick to be from a spatula, and none of the definite spatulas are slipped. From an unscreened unit of platform fill in Mound 1 there is a fragment of a ceramic ring with red pigment on one face (Figure 18.7c).

EVIDENCE OF PRODUCTION OF FIRED CLAY OBJECTS

Accidentally Fired Coils and Tabs of Clay

Accidentally fired bits of clay from ceramic production were identified, including seven fired coils (most likely from manufacture of ceramic vessels) and 50 more amorphous tabs (from manufacture of vessels, figurines, or other objects). Specimens from the Extended Refuse Sample include one coil from a Locona context at Mound 1; three tabs from late Locona contexts at P32; two tabs from late Locona at Mound 12; five tabs from Ocós contexts at Mound 12; two tabs from Md12-IV; and 27 tabs and five coils from Cherla deposits at Mound 1.

Unfired Figurine Head

A fragment of an unfired figurine was recovered from Md. 12 T1D/10A Elem. 3. It is the head of a Nicotaca figurine (Figure 18.7f).

Molded Objects in Unbaked Clay

Eleven other solid, fragile objects in various shapes also appear to be unfinished clay artifacts that were never baked (Figure 18.7g–j). All except one have a particular appearance that does not immediately suggest unbaked clay. The interiors are greenish (5Y6/3), and the well-smoothed or burnished exteriors are very dark gray (N3/0). However, they are clearly modeled rather than carved. The circumstances in which such objects would be preserved are not clear. From Mound 1 G12/1 is a well-made sphere 3.8 cm in diameter (Figure 18.7i). From Mound 1 J9/1 is what appears to be a Nicotaca-type figurine leg.

WORKED SHERDS

In total, 472 worked sherds from screened units were registered during analysis of materials from the excavations. Further inspection of the sherd bags would likely reveal more such artifacts. In terms of the levels of ceramic analysis described in Chapter 2 (see Table 2.2), recovery of worked sherds was highest in units analyzed to Level A (1.2 per kilogram of sherds) and less in Levels B (0.8) and C–D (both 0.7). Considering just units analyzed to Level A, there is perhaps a gradual decline in the prevalence of worked sherds during occupation of the site (0.13 per kilogram of sherds in Locona, 0.11 in Ocós, and 0.09 and Cherla).

The category "worked sherd" is functionally heterogeneous. The original purpose of several types described here is uncertain. Distribution by type in the Extended Study Sample is provided in Table 18.6, and a comparison of the types from Paso de la Amada to those of other Mesoamerican sites is in Table 18.7. Note that double-notched sherd net weights are described above under "Net Weights." Likewise, perforated sherd disks are described above under "Possible Spindle Whorls." The most common category of worked sherd at Paso de la Amada is the rounded worked sherd disk. Sherd scraper/smoothers are also relatively common. Of the remaining categories described in this section, the Cherla-phase practice of selecting sherds from imported vessels (the various Extranjero types) for working into triangular pendants, possible pendants, a zoomorphic form, and a bottle neck tube is particularly interesting.

Round Worked-Sherd Disks

Sherds shaped into round or roughly round disks are the most common category of worked sherd, constituting 39.2 percent of the collection (Figure 18.8a–h). They seem to have been preferentially made from tecomate body sherds (often red-slipped), less often from bowl body sherds. A sample of 117 removed from the ceramics bags for further study was intuitively classified into six size categories: tiny (about 2 cm diameter, n = 4); small (2.3–2.4 cm diameter, n = 15); medium (3.1–3.4 cm diameter, n = 41); medium–large (3.9–4.4 cm diameter, n = 35); large (5.0–5.5 cm diameter, n = 20); and very large (around 7 cm diameter, n = 2).

Many are not perfectly round. The degree of edge work ranges considerably, from roughly shaped to well smoothed. Round worked-sherd disks were manufactured throughout the sequence.

The sherd disks recovered are broken down by phase in Table 18.6. The Early Locona sample is from Mound 1. The Locona sample is from Mound 1 (1), Mound 12 (1), Mound 14 (3), Mound 32 (3), and Mz-250 (3). The Late Locona sample is from Mound 12 (4) and the Pit 32 excavations (1). The Ocós sample is from Mound 12 (14) and Mound 32 (14). The Cherla sample is from Mound 1 (42), Mound 11 (2), and Mound 13 (1).

Similar objects are regularly reported from Mesoamerican sites of all periods. The most common suggestion is that they were gaming pieces. Grove (1987b:287) cites a personal communication from Robert Santley concerning discovery of stacks of ceramic *patolli* markers at Teotihuacan that were consistent in size with sherd disks from Late Formative Loma Terremote. The observed range of diameters at Paso de la Amada (1.9–7.4 cm) is basically identical to that at Chalcatzingo (2–8 cm; Grove 1987b:286). Sherd disks from Chiapa de Corzo range to larger diameters, but there may be two modes, one 2.0–4.5 cm and the other 5.0–10 cm (Lee 1969:Table 4); the smaller of those would be consistent with the central tendency at Paso de la Amada. Willey (1978:40–41) divides sherd disks from Ceibal into large (6.7–13.0 cm) and small (3.0–5.7 cm), with the smaller variety again overlapping with the central tendency at Paso de la Amada. At K'axob, Bartlett (2004:271) distinguished a small category (< 2.1 cm diameter) that is essentially absent at Paso de la Amada and a larger category (2.6–4.2 cm diameter). At Chalchuapa, unperforated potsherd disks ranged larger (Sheets 1978:66).

Worked-Sherd Lids

Another set of rounded worked sherds consists of objects generally larger than the preceding that probably served

Table 18.6. Distribution of worked sherds by temporal divisions in the Extended Study Sample

Type of Worked Sherd	Early Locona	Locona	Md. 32 Surface and Platform	Late Locona	Ocós	Md12-IV	Md1-IV	Cherla	Other	Total
sherd pot scraper				3	5	3		11	5	27
sherd scraper, perpendicular				1				1	3	5
sherd fine polisher					1				1	2
sherd smoother					1	1				2
sherd shaft smoother					2			3	1	6
sherd reamer (including preforms)				1	1	1		1	2	6
sherd whetstone					1					1
double-notched sherd net weight	1	14	2	3	11	4	2	15	41	93
notched sherd, miscellaneous					1		1			2
sherd spindle whorl (round, perforated)		1		3	1		1	7	5	18
round, incompletely perforated			1		1				4	6
worked sherd pot lid		1		5	2	1	1	7	6	23
round worked sherd	2	11	6	5	28	6	8	45	76	187
triangular pendant or repaired vessel						1		6		7
zoomorphic worked sherd (fish)								1		1
bottle neck worked into tube								1		1
shaped sherd, not round		2						4	5	11
unidentified worked sherd		3		3	12	6	3	20	27	74
Totals	3	32	9	24	67	23	16	122	176	472

as pot lids (Figure 18.8q). Worked-sherd lids were often made from the flat bases of open bowls rather than from tecomate body sherds. Overall average diameter is 9.7 cm. The lids made from bowl bases range from 8 to 18 cm in diameter (average 11.4, standard deviation 3.0 cm, n = 12). Those made from tecomate body sherds range from 6 to 18 cm in diameter (average 8.2, standard deviation 3.1 cm, n = 15). Those made from bowl bases tend to be perfectly round and carefully finished along the edges, while the ones made from tecomates are sometimes less round and the degree of working of the edges is variable.

The Locona lid is from *Mz-250*. The late Locona and Ocós specimens are all from Mound 12, the Cherla specimens all from Mound 1.

Probable Pot Scrapers

Broken pottery provided a source of expedient tools for what was likely a variety of tasks involving light scraping or smoothing. Worked-sherd scrapers are identifiable by wear that is unevenly distributed around the edge. The tools are usually approximately round or rectangular and usually made from tecomate body sherds. Prolonged or repeated use resulted in one or more broad, polished working edges, often slightly concave (Figure 18.8i–p). The use edge itself is often rounded in profile. Use in the production of ceramic vessels seems likely.

Twenty-seven pot scrapers are identified with confidence, constituting 5.7 percent of worked sherds (see Table 18.6). The late Locona and Ocós specimens are from Mound 12, the Cherla specimens all from Mound 1.

Table 18.7. The percent distribution of types of worked sherds in the assemblage from Paso de la Amada, compared to the assemblages of other Formative and Classic sites[a]

Worked Sherd Type	Paso de la Amada	Chalcatzingo	Chiapa de Corzo	Cerros (Late Preclassic)	Ceibal	Chalchuapa	Tikal
Shaped Sherds							
disk, circular (including pot lids)	*44.5	*68.8	*41.6	*70.2	*25.3	*81.4	*20.8
oval, oblong, or elongate		*9.6					3.3
other shapes	2.3	4.9		1.3	2.8	*4.0	1.6
Sherds with Perforations							
round, perforated	3.8	*8.6	8.7		*54.9	*11.3	*43.0
square, perforated			1.2		4.9		
perforated, miscellaneous shape							
oval/round sherd pendant			0.7				
pendant or repaired vessel	1.5			1.3			7.5
Sherds with Incomplete Perforations							
round, incompletely perforated	1.3	7.0	*9.4	1.3		2.2	5.7
pendant blanks, various shapes			8.4				
Notched Sherds							
double notched (net weight, mariposa)	*19.7			*21.7	*7.7		0.3
miscellaneous notched sherd	0.4		5.2				
complexly cut and shaped sherd						1.1	
Scrapers and Similar Tools							
sherd scraper/polisher/smoother	*8.7		7.3				1.5
sherd reamer	1.5						
Miscellaneous							
spear point made from sherd			*16.8				
jar neck cord holder							*9.9
whetstone	0.2						
effigy worked sherd	0.2						0.3
bottle neck worked into tube	0.2						
sherds with graffiti					1.4		
solid sherd cylinder			0.3				
miscellaneous worked sherd	15.7		0.3	3.9	2.8		6.1
Total n	*472*	*301*	*248*	*309*	*142*	*177*	*668*

[a] The three most common types in each assemblage are marked with asterisks (with the category "miscellaneous worked sherd" left out in the case of Paso de la Amada). Values are percentages, with total assemblage size noted in the last row. No attempt has been made to divide samples by period. Data from Garber 1989:73–86; Grove 1987b:285–89; Lee 1969:97–104; Moholy-Nagy 2003:75–80; Sheets 1978:66–68; Willey 1978:40–47.

Ceja Tenorio (1985:103) reported similar tools, described as sherd abraders; they formed a higher percentage of his worked sherds (31 percent) than those identified here. Those from Tikal (Moholy-Nagy 2003:79, Figure 138f–h) seem like expedient tools along the lines suggested here for Paso de la Amada. The oval scrapers from Chiapa de Corzo (Lee 1969:97, Figure 52a–e) appear to have been more formally conceived tools.

Sherd Smoothers

Two scrapers were used at an angle very close to the surface being worked, resulting in rubbing damage both to the sherd edge and to the flat surface of the sherd (the former exterior or interior of the pot) near the working edge. Both are from Mound 12 (F3/10 and E3/6).

Sherd Scrapers, Perpendicular Use

Five scrapers were used with the tool perpendicular to the object being worked, resulting in a flat use edge perpendicular to the flat sides of the sherd. The only ones from the Extended Study Sample are a late Locona specimen from Mound 12 and a Cherla specimen from Mound 1.

Sherd Shaft Smoothers

Six worked-sherd scraping tools have distinctly concave working edges, with polishing evident along much of the curve (Figure 18.8r–t). The tools are expedient, not evidently shaped. They appear to have been used as shaft smoothers, on shafts with variable diameters from 0.9 to 3 cm. There are two from Ocós deposits at Mound 12 (E4/10C, T1E/8), three from Cherla deposits at Mound 1 (F9/11, I7/11, J12/8), and one from mixed fill at Mound 1 (I13/5).

Sherd Reamers

A few sherds seem to have been used as reamers to widen or smooth holes, most likely in perishable materials such as hides or wood (Figure 18.8u–y). The holes were relatively large (1–1.5 cm). One is from an Ocós context (Md. 12 G6/33), another is Cherla (Md. 1 I7/8), and one is from the pre-platform surface at Mound 12 (T1E/6); other specimens are Md. 12 J6/26 and Md. 12 F3/4. Two shaped, triangular sherds appear to be reamer preforms (Md. 12 G6/33, Md. 13 P2/5).

Worked Sherds Used for Fine Polishing

More narrow than the reamers, with more extensive polishing along the worked edge, are two small, long specimens used for some sort of fine polishing (Figure 18.8z). One is from an Ocós context (Md. 12 G6/33, from which there was also a reamer). The other is from a mixed fill pit in Mound 1 (F12 F.14). The one from Feature 14 has a squarish cross section and tapers slightly from 7 mm wide at one end to 5 mm at the other.

Sherd Whetstone

A large, heavy sherd from Mound 12 F12/17 was probably a tool similar to the sandstone abraders described in Chapter 12. It has two deep sharpening grooves, one on each of its faces.

Miscellaneous Notched Sherds

Double-notched sherds are fairly common in the collection and are described above under "Net Weights." Two notched sherds are in some way aberrant and were probably not net weights. They are broken, so their full original form is unknown.

Zoomorphic Worked Sherd

A sherd from Zone IV of the platform fill in Mound 1 (M10/11) was given an eye and a mouth to suggest a fish (Figure 18.8bb). It is a piece of a flat base of an Extranjero Black and White bowl, likely Form B1. The features were carved into the sherd with a stone tool. The mouth is a V-shaped notch executed on both front and back. The eye appears on one side only. It was formed with a carved circle and central dot. The edges were roughly shaped (rather than carefully ground smooth). The piece appears to have been broken. Thus it is impossible to know if the whole creature was originally represented or only the face.

Sherd Tube Made from Bottle Neck

Bottles (with tall, narrow, cylindrical necks) are rare and mainly from imported vessels in Cherla-phase contexts, the various Extranjero types described in Chapter 8. A worked sherd from Md. 1 G9/11 is a fragment of the neck of an Extranjero Glossy Gray bottle neck (Figure 18.8aa). The neck was originally 3.8 cm in diameter at the lip and 4.8 cm near its join with the vessel walls. The broken edge has been well smoothed and painted red. Although what survives is only a fragment of the original neck, the care of treatment of the broken edge suggests that the sherd originally worked consisted of the entire bottle neck.

Originally, the specimen was classified as an earspool. Only during detailed analysis of the earspools was it recognized as a fragment of a reworked bottle neck. Use as an ear ornament still seems likely, though obviously the user would have had to find a second bottle neck to complete the pair. The specimen was similar to clay ear ornaments in form, although the walls were thicker.

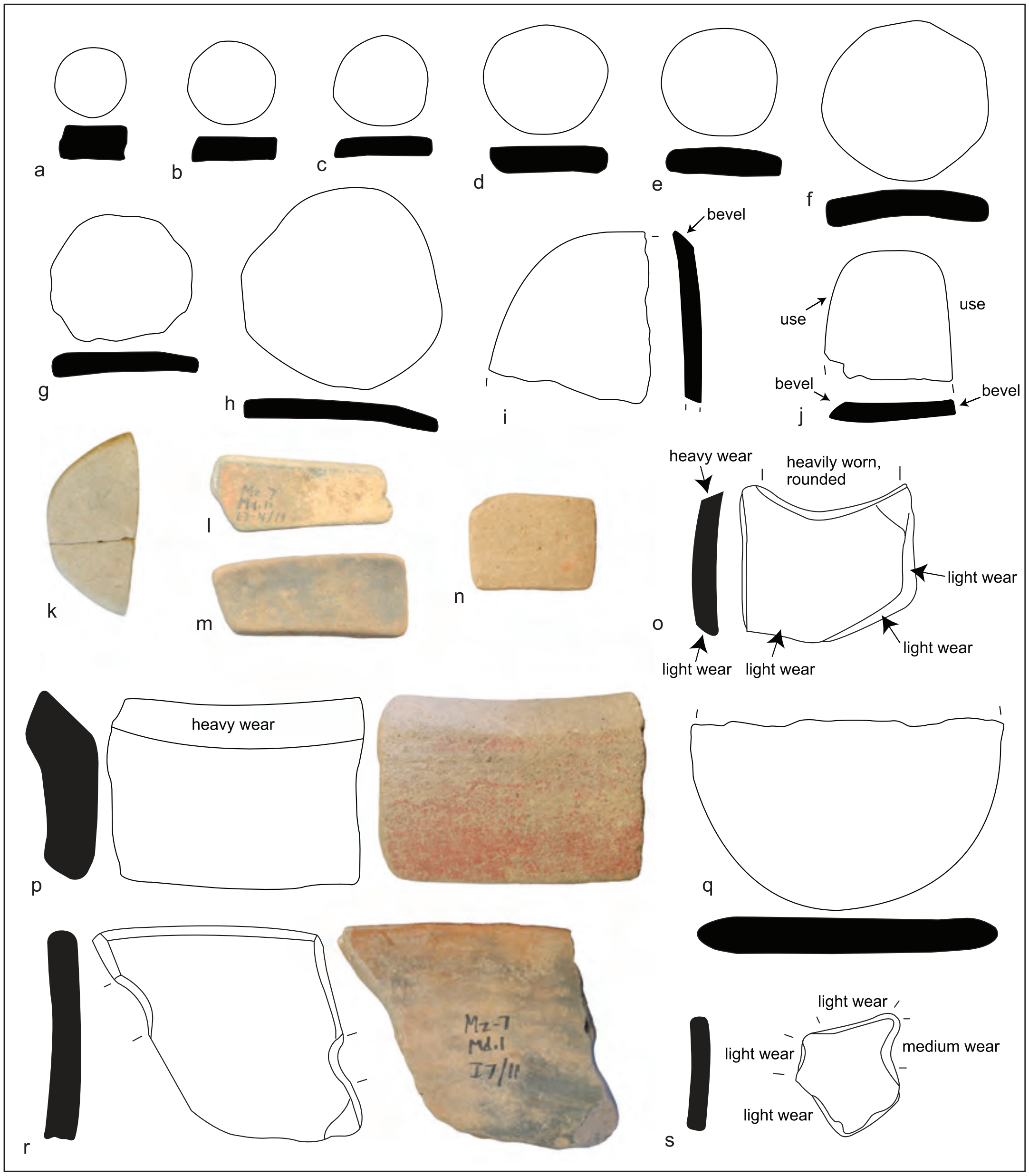


Figure 18.8. Worked sherds: (a–h) round worked sherd disks, arranged by size; (a) tiny; (b–c) small; (d–e) medium; (f–g) medium–large; (h) large; (i–p) sherd pot scrapers; (q) worked sherd pot lid made from base of red-slipped bowl; (r–t) worked sherd shaft smoothers; (u–w, y) worked sherd reamers; (x) unfinished worked sherd reamer; (z) worked sherd used for fine polishing; (aa) worked bottle neck; (bb) zoomorphic worked sherd; (cc–ff) incompletely perforated sherd disks; (gg–hh) imported sherds with likely repair holes. Proveniences: (a) Mz-250 10/79; (b) Md. 1 G10/1; (c) Md. 1 T3/7; (d) Md. 1 F11/11; (e) Md. 12 I6/28; (f) Md. 32 U1/202; (g) Md. 1 J12/8; (h) Md. 12 T1E/15; (i) Md. 12 G5/29A; (j) Md. 1 H10/5; (k) Md. 12 T1E/2; (l) Md. 12 E3–4/19; (m) Md. 1 H10/9–10; (n) Md. 1 K10/2; (o) Md. 1 I13/7; (p) Md. 1 L10/3; (q) Md. 12 T1C/10; (r) Md. 1 I7/11; (s) Md. 12 T1E/8; (t) Md. 12 E4/10C; (u) Md. 12 T1E/6; (v) Md. 1 I7/8; (w) Md. 12 J6/26; (x) Md. 12 G6/33; (y) Md. 12 F3/4; (z) Md. 1 F12 Feature 14; (aa) Md. 1 G9/11; (bb) Md. 1 M10/11; (cc) Md. 32 TIF/28; (dd) Md. 12 P2/3; (ee) Md. 32 Trench 4D/183; (ff) Md. 12 T1E/11; (gg) Md. 1 I11/7; (hh) Md. 1 G9/11.

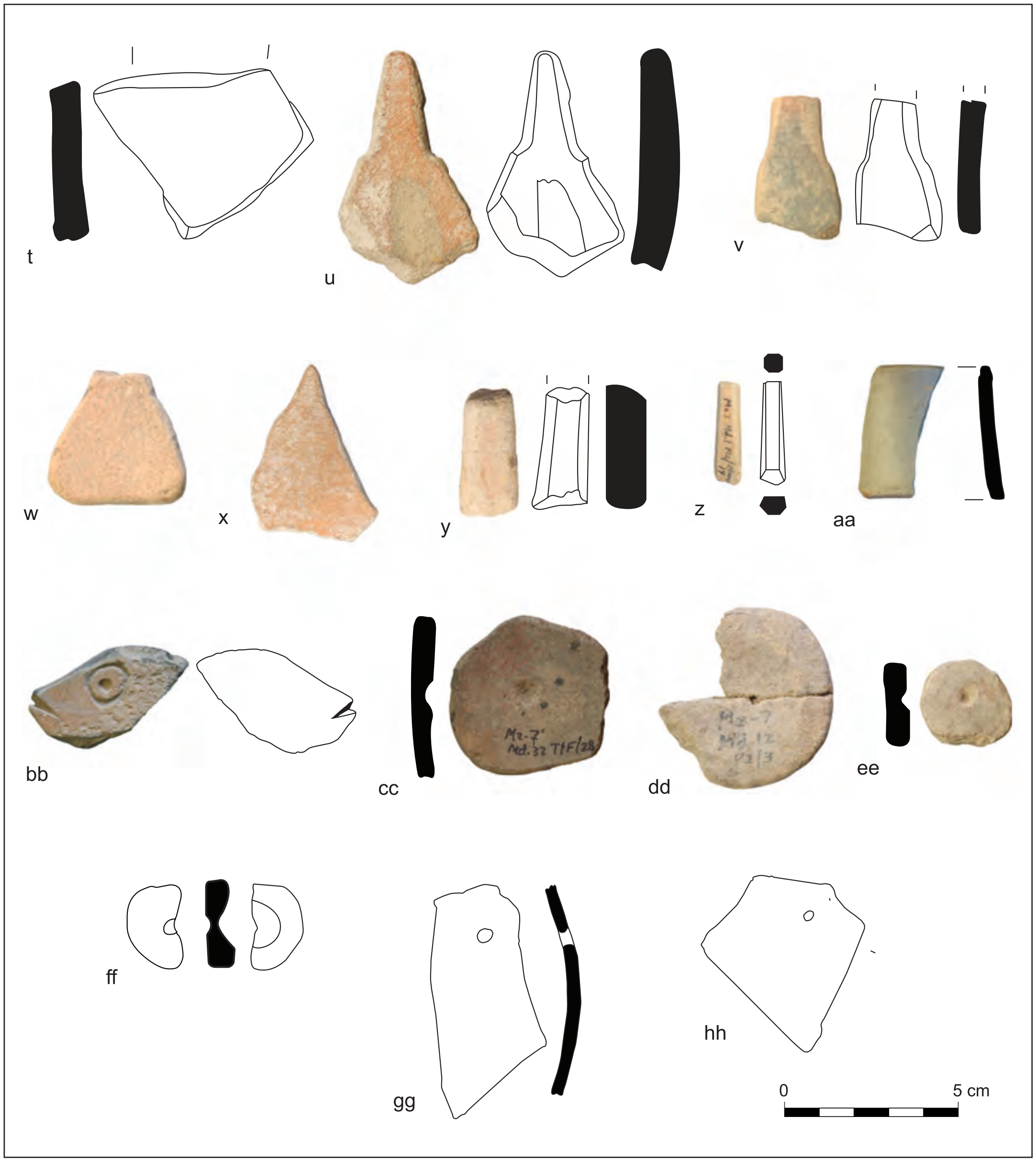


Figure 18.8. *continued.*

Round Sherd Disks with Incomplete Perforations

Perforated sherd disks are described above under "Possible Spindle Whorls." Six specimens had incomplete perforations (Figure 18.8cc–ff). There appear to be two sizes, one 1.5–2.5 cm in diameter, the other 4–5 cm. From Md. 12 P2/3 was a disk 5.2 cm across with an incomplete hole 3.5 mm in diameter. The disk from Md. 32 T4D/185 was 2.6 x 2.4 cm, with a hole of 6.7 mm. The disk from Md. 32 T1F/28 was 4.6 cm in diameter with a hole of 7.1 mm. There are two from Md. 1 H9/1, one 2.0 cm and the other 1.8–1.9 cm in diameter. One from Md. 12 T1E/11 was 5.2 cm in diameter. Another was previously identified at Paso de la Amada by Ceja Tenorio (1985:103).

Sherd disks with incomplete perforations are regularly reported from other sites (e.g., Grove 1987b:287; Lee 1969:99, 102; Moholy-Nagy 2003:77; Sheets 1978:67–68), raising the possibility that they had a distinct function or functions. In other words, they may not have been simply perforated disks abandoned during manufacture. In describing a Locona–Ocós specimen from La Victoria, Coe (1961:101) suggests that it was a rest for a spindle shaft; he provides an ethnographic precedent from the U.S. Southwest (Kent 1957:475). The smaller pieces from Paso de la Amada seem too insubstantial to have provided a stable rest for a spindle whorl. One of the larger specimens has a narrow, shallow, off-center hole that could not plausibly have been produced by a twirling spindle shaft.

Sherd Pendants and Fragments of Repaired Vessels

Nine sherds (seven from screened deposits) have drilled, usually biconical holes that appear to be either mend holes or perforations to allow use of the sherd as a pendant (Figures 18.7k–o, 18.8gg–hh). Five of the sherds with holes are from imported vessels (Extranjero Black and White or Extranjero Grayish White), and another two are from possible imports. All except one are from the Cherla platform in Mound 1; the remaining specimen is from the mixed Ocós-Cherla ground surface beneath the Mound 12 Cherla platform. All are thus likely Cherla in date.

Two pieces bear what are most likely repair holes meant to prolong the life of a pot after cracking or partial breakage: from Md. 1 I11/7 an Extranjero Grayish White tecomate or small jar sherd and from Md. 1 G9/11 an Extranjero Black and White jar or bottle sherd (with one short edge representing part of the join with the neck). All edges of these pieces appear unworked. The holes do not seem positioned in a way that would make a pendant with any logical or semi-symmetrical shape.

Three sherds are roughly worked into triangles with the perforation at one point. These were likely pendants rather than fragments from mended vessels, though in no case are the edges more than roughly worked. From Md. 12 H5/28 there is one made of a local, unslipped tecomate body sherd (Michis or Mavi). From Md. 1 G11/11 there is one made from the flat base of a Pino Black and White or Bala White bowl. The third, from an unscreened unit in the Mound 1 platform, is made of the flat base of an Extranjero Black and White open bowl.

Another piece, vaguely triangular but not evidently worked as such, comes from Md. 1 I8/11. It is from the flat base of an Extranjero Black and White or Pino Black and White open bowl. One edge represents the join with the vessel wall. The hole seems well positioned for this to be a pendant, but then why wasn't the edge worked more aesthetically?

Finally, there are three small fragments bearing perforations that might be either from pendants or repaired vessels: from Md. 1 J12/7 an Extranjero Black and White sherd; from Md. 1 J12/8 a thin, tan, burnished-exterior sherd that might be either local or imported; and an Extranjero Black and White sherd from an unscreened unit in the Mound 1 platform fill.

Cheetham (2010a, 2010b) has established the most likely source of imported vessels during the Cherla phase as the Gulf Coast site of San Lorenzo. Similar imported vessels are also present at Paso de la Amada, though in smaller numbers than at Cantón Corralito. It is interesting that those vessels seem to have been singled out for treatment that prolonged their use lives. (Mend holes are extraordinarily rare among the ceramics of Paso de la Amada.) Sherds from imported vessels were also made into triangular pendants, a new class of artifact of the Cherla phase. In one case described above, a broken bottle neck may have been reworked into an earspool. Another imported sherd, also described above, was reworked into the image of a fish. These various specimens suggest a continued symbolic importance of imported vessels even after they were broken.

Other Categories

Eleven sherds seem shaped but are not round. Use as tools is possible but not clear. A considerable number of worked sherds were unidentified, either because they were too small and damaged or because they were left in the sherd bags during the original analysis, with nothing recorded about them beyond their presence.

FRAGMENTS OF BURNT EARTH

In all, 9,555 fragments of burnt earth (weighing 67.1 kg) were recovered. The distribution in the Extended Study Sample, broken down by excavation locale, is provided in Table 18.8. The table includes the average weight of individual fragments (calculated as the total weight divided by the count) as well as volumetric density and the usual alternative standardization against sherd weight.

It is likely that the fragments of burnt earth (in all cases fired to a light reddish color) derive from a variety of activities. Blake (1991:39–40, Figure 10) discovered an Ocós-phase oven at Mound 6 containing a series of fired-red floors and fist-size fired-earth "bricks" used instead of rocks to retain heat. No such well-preserved feature was discovered in the excavations reported here, but patches of in situ burning were occasionally identified. Most of the burnt earth reported in Table 18.8 was in the form of fairly small fragments (overall average was 7.3 g per fragment). Much of the burnt earth seems to derive from hearths, ovens, or other fired features that were dismantled and discarded. However, there may also have been fragments of burnt daub deriving from buildings. A formal, piece-by-piece study of the collection has not been conducted. The following analysis is based on the count and weight data.

A review of the data in Table 18.8 did not reveal any believable general pattern across time in the discard of burnt earth. The *possible* decline observed when weights are standardized against sherds (36.4 g burnt earth per 1 kg sherds in Locona, 5.8 in Ocós, and 13.9 in Cherla) seems more like oscillation when volumetric density is considered (421.1 g/m^3 in Locona, 124.7 in Ocós, and 549.7 in Cherla). But it appears that those values are produced by characteristics of the particular deposits considered: the great overall density of artifacts in the Cherla platform at Mound 1 and a couple of Locona deposits with unusually large amounts specifically of burnt earth.

Indeed, when the data are examined in greater detail, the outstanding feature of the distribution of burnt earth is the extraordinary variability in frequency from one deposit to another. Table 18.9 is an attempt to assess that observation.

Table 18.8. Fragments of burnt earth by phase and location

Phase and Location	Count of Daub Fragments	Total Weight of Daub Fragments (g)	Average Weight of Daub Fragment (g)	Volumetric Density (g/m^3)	Daub Standardized by Sherd Weight (g/kg of sherds)
Early Locona					
Md. 1	72	855	11.9	637.1	77.1
Md. 12	14	65	4.6	77.8	41.4
Locona					
Pit 32	58	1419	24.5	2467.8	63.1
Md. 1	28	186	6.6	133.6	22.0
Md. 12	92	473	5.1	78.4	18.1
Md. 14	65	232.54	3.6	181.7	6.6
Md. 21	26	125.5	4.8	35.5	10.7
Md. 32	44	159.7	3.6	63.5	6.5
Mz-250	1190	11,616.4	9.8	1116.6	268.7
Md. 32 surface					
Md. 32	23	41.1	1.8	5.3	11.9
Md. 32 platform					
Md. 32	50	288.2	5.8	32.9	18.0
Late Locona					
Pit 32	147	1440	9.8	649.5	20.7
Md. 1	48	515	10.7	939.8	19.3
Md. 12	231	2014.9	8.7	141.1	8.4
Md. 13	12	70.5	5.9	122.4	10.9
Ocós					
Md. 12	378	2982.9	7.9	126.1	5.9
Md. 32	168	737	4.4	119.4	5.4
Md12-IV					
Md. 12	261	1671.3	6.4	113.5	7.5
Md1-IV					
Md. 1	506	3169	6.3	184.7	28.5
Cherla					
Md. 1	2829	17,761	6.3	589.4	14.4
Md. 13	130	499.3	3.8	509.0	32.8
Md. 32	5	10.1	2.0	23.2	0.9
Trench 1T	0	0		0.0	0.0
Trench 1B	52	320	6.2	1185.2	7.7
Totals	**6429**	**46,652.44**	**7.3**	**296.1**	**16.3**

Table 18.9. Interquartile ratios[a] for volumetric densities of sherds, obsidian, fire-cracked rock, and burnt earth, split by deposit type[b]

Type of Deposit	Range of N[c]	Sherds	Obsidian	FCR	Burnt Earth	Average of the Four Ratios[d]
occupation surface	9	2.54	0.78	1.99	*4.27	2.40
trash-filled pit	14–16	0.96	1.42	1.71	*1.80	1.47
ditch	14	1.00	0.58	0.72	*1.15	0.86
deep pit or well	11–13	0.45	1.20	*3.07	0.99	1.43
toss midden	14	0.74	0.54	1.08	*3.06	1.36
uncertain midden	9–10	1.30	0.91	0.79	*2.42	1.36
ancient ground surface	57–59	*1.11	0.70	1.06	0.85	0.93
platform fill (Md. 1 Zone IV)	51–66	0.41	0.30	*0.99	0.80	0.63
Overall	*189–233*	*1.58*	*1.30*	*1.52*	*2.01*	

[a] Interquartile ratio calculated as the 75 percent quartile minus the 25 percent quartile divided by the median. These dimensionless values allow comparison of the dispersions of the distributions of the different materials.

[b] Asterisks mark the highest of the four values in each row, identifying the distribution with the largest spread.

[c] The number of samples differs somewhat between the four columns due to missing data, usually for fire-cracked rock and burnt earth.

[d] This column is calculated as the average of the values in the preceding four columns.

The statistical tool used is the interquartile ratio, calculated as noted in the table. This somewhat exotic measure was chosen because of the skewed distributions, each with a few large outliers that have significant impacts on the standard deviations. The interquartile ratio is a dimensionless measure of dispersion that allows the distribution of volumetric densities of burnt earth to be compared to those of sherds, obsidian, and fire-cracked rock.

The bottom row in the table is an overall comparison of the interquartile ratios of volumetric densities of sherds (kg/m^3), obsidian (g/m^3), fire-cracked rock (kg/m^3), and burnt earth (g/m^3) in the Extended Study Sample. Of the four, the distribution for burnt earth is the most dispersed. One possible explanation for that finding is that the discard of burnt earth was a relatively rare event compared to discard of the other materials. Occasionally, burnt features (hearths, ovens) or even burnt structures were dismantled and the debris discarded, leading to the rare occurrence of dense deposits of burnt earth.

The main part of the table evaluates that hypothesis. The samples are split by deposit type (see Chapter 2), arranged as in Tables 2.5 and 2.6, with the quasi-primary deposit (occupation surface) at the top, followed by secondary deposits from least to most mixed (trash-filled pit through uncertain midden) and, finally, tertiary deposits at the bottom (ancient ground surface and Zone IV of the Mound 1 platform fill). The expectation, given the hypothesis of more pronouncedly episodic dumping of burnt earth, is that the interquartile ratios for that material would be particularly high for secondary contexts but not for more mixed, tertiary deposits. The rightmost column of the table, which is simply the average of the interquartile ratios of the preceding four columns, demonstrates how promising this expectation is: the average dispersion decreases, as expected, as one moves down the table to increasingly more mixed contexts. (The exception is the low average for ditch deposits; the deposits involved all derive from two adjacent ditches in Mound 12, Features 2 and 10, and they may have been fairly homogeneous in terms of fill and depositional history.)

In the central part of the table, the expectations may be evaluated by observing the starred values, which identify the highest interquartile ratio for each deposit type. Expectations are met to an impressive degree. Among tertiary deposits (ancient ground surface, platform fill), the distribution of densities of burnt earth is *not* extraordinary compared to those of sherds, obsidian, and fire-cracked rock. Among secondary and quasi-primary deposits (occupation surface through uncertain midden), burnt earth deposits are more dispersed in five out of six cases, the only exception being the deep pits or wells at Mound 12 and Mz-250.

CHAPTER 19

The Material Culture of Paso de la Amada: A Look at the Assemblage as a Whole, the Distribution of Craft Activities, and the Frequency of Ritual

Richard G. Lesure

THIS CHAPTER considers three aspects of the function and spatiotemporal distribution of the artifacts described in Chapters 8 through 18. I first examine the artifact collection as a whole, with particular attention to the function of the artifacts. I then look in greater detail at the subset of the assemblage related to craft activities. The specific question there is whether residential groups were differentially involved in craft activities (such as one might expect in a system of patronized craft specialization). The third topic concerns the ritual assemblage, the focus there being on changes in the nature and frequency of ritual activities from the Locona through Cherla phases.

THE ARTIFACT ASSEMBLAGE AS A WHOLE

Nearly 1.1 million artifacts were recovered in the excavations. The assemblage appears to be overwhelmingly the material outcome of domestic activities. Broken pieces of pottery were by far the most common find (75.3 percent of the total), followed by obsidian flakes (19.5 percent).

An overview of the assemblage classified according to function is provided in Table 19.1. A few broad classes of activities are distinguished. *Subsistence* is conceived broadly as comprising procurement, production, processing, storage, and consumption of foods. *Craft* identifies artifacts used or generated in the making of other artifacts. *Personal adornment* is evidenced primarily through ornaments of various kinds. *Ritual* artifacts are envisioned as having been used in interactions between people and the supernatural. *Indeterminate* includes artifacts that do not fit readily into any of the above, either because of issues of equifinality (different processes leading to the same material outcome) or because the original intended functions are unknown.

Commentary on Functional Classification of Artifacts

The following paragraphs review the artifact types assigned to the general classes of activity. Some artifacts are specifically noted in the second column of Table 19.1, whereas others are grouped into functionally related sets of artifacts. Justifications of the functional assignments for most artifacts are discussed in Chapters 8 to 18 and are not repeated here. The goal at the moment is to look briefly at the full range of items assigned to each functional class.

Subsistence

This general class of activity has left by far the greatest quantity of material traces, including particularly broken pieces of pottery, animal bones, and fire-cracked rock.

The most abundantly represented specific subsistence pursuit is the procurement and consumption of fish. There are nearly 25,000 fish bones (an estimate; see note 1) and an array of fishing implements, including ceramic net weights (notched sherds and molded cylinders), a few notched pebble net weights, and perforated/grooved pumice floats that would have been appropriate for either hook-and-line or net fishing. Ten bone fishhooks were recovered.

Projectile points are generally lacking in the Early Formative artifact record of the Soconusco. Aside from a single possible projectile point tang, the only hunting imple-

Table 19.1. Artifact assemblage of Paso de la Amada, organized by class of activity

Class of Activity	Artifact or Functionally Related Set	Comments on Artifact Classes Included	Count
Subsistence	sherds from ceramic vessels		818,931
	fish bones	estimated total	24,498
	animal bone other than fish	actual count	7495
	fire-cracked rock		5506
	maize grinding equipment	metates and manos	589
	fishing implements	ceramic and pebble net weights, fishhooks, pumice floats	550
	miscellaneous grinding equipment	mortars, pestles, handstones	175
	hunting implements	slingshot projectiles	38
	food preparation and service, miscellaneous	stone bowls, worked sherd lids	37
Craft	obsidian		212,597
	multipurpose tools	most pumice artifacts, flaked stone other than obsidian, miniature vessels, miscellaneous notched sherds, sherd reamers	406
	lapidary/bone working	sandstone grinding tools, highly polished worked stone, fragments of worked greenstone, worked-sherd whetstone, string-cut and flake-cut bone debitage	149
	ceramic production	pebble polishers (faceted, light-wear, and light-colored stone varieties), sherd pot scrapers, objects in unbaked clay, fired tabs and coils of clay, stone and ceramic paint palettes	147
	production/maintenance of grinding stones	pecking stones (metamorphic), pecking-polishing stones	115
	weaving and basketry	bone needles, bone pins, battens, awls, awl-spatula, centrally perforated sherd disks, modeled spindle whorls	96
	woodworking	axes, celtiform tools, small chisel, stone saw, pumice shaft straighteners, pumice handstone, sherd shaft smoother, giant pocket gopher tooth cutter/graver	62
	tools for knapping obsidian	small hammerstones, hammerstone-anvils, hammerstone-pestles, utilized antler	60
	uncertain craft activities	pebble smoother, pebble disks, slate chisels or hammerstones, pebble polisher with triangular cross sections, highly polished stone artifacts, notched pebble, sherd scrapers used perpendicularly, sherd fine polisher, sherd smoother	32
	miscellaneous grinding equipment	lapstones, netherstones	8
	production of bark paper or cloth	bark beaters	4
Personal Adornment	clay ear ornaments		3473
	bone ornaments		129
	miscellaneous stone ornaments		47
	greenstone ornaments		44
	clay finger rings		29
	mirrors (iron ore or mica)		25
	miscellaneous ceramic ornaments		23

Table 19.1. *continued*

Class of Activity	Artifact or Functionally Related Set	Comments on Artifact Classes Included	Count
Ritual	solid figurines		1809
	rattles		465
	censers[a]		327
	hollow figurines		184
	spatulas		58
	whistles		28
	ground stone spheres		14
	fetish/divination		10
	stamps and cylinder seals		10
	miscellaneous ritual objects		7
	bloodletting		2
	obsidian object: eye of statuette or ornament?		1
	mask		1
Indeterminate	fragments of burnt earth		9555
	miscellaneous worked sherds		279
	multipurpose artifacts?	artifacts classified as ground stone	140
	incomplete or of uncertain function		47
Total artifacts			**1,088,202**

[a] Based on rim sherds of forms C1 through C4; P1 not included here.

ments identified were the pebbles interpreted in Chapter 12 as slingshot projectiles. Notwithstanding the relative scarcity of identifiable hunting implements, the faunal record indicates that the inhabitants of Paso de la Amada were successful hunters of a wide variety of terrestrial animals, from small rodents to deer and crocodiles.

The preservation of carbonized botanical remains in flotation samples from the excavations reported here was exceedingly poor (Chapter 13). The meager results are not included in Table 19.1. In a previous study from Early Formative Soconusco, maize was the most common plant represented in the carbonized macrobotanical assemblage (Feddema 1993). Sinensky interprets most metates and manos as evidence of maize grinding, while mortars, pestles, and handstones are designated "miscellaneous grinding" (Chapter 9).

Crafts

The evidence of craft activities is dominated by obsidian flakes and chunks. Those, like sherds, are not differentiated here because only a sample of the full collection was analyzed.

Ceramic production is considered to include the manufacture of both pots and fired-clay objects other than vessels. A spectrum of tools is included, though there are alternative potential uses for several of those. A set of worked sherds was identified as pot scrapers in Chapter 18. Those are included here. The other worked-sherd scrapers and smoothers are classified as "uncertain craft." Also included as tools of pottery production are pebble polishers (both faceted and those with light wear) and small paint palettes in stone and ceramic. There are also a few objects in unfired clay. Accidentally fired bits of production debris include fragments of coils and small tabs of clay.

Battered fragments of heavy metamorphic stone appear to be tools for the production and maintenance of grinding stones and less common objects, including stone bowls and miscellaneous sculpture.

The study of craft activities that yielded perishable products is a perennial challenge. In the case of thread and cloth production at Paso de la Amada, we are lucky to have impressions of spun thread and possibly woven cloth on sherds from the pottery type Amada Black-to-Brown. (See Figures 8.26f, 8.27c, and 15.3e.) The fine thread involved appears likely to have been cotton. Although we did not recover any impressions, we strongly suspect that baskets were common household objects. In terms of production, lumping weaving and basketry together helps to gloss over some lack of certainty about the exact use of awls and the different varieties of pins. (See Chapter 15 for discussion.) The following are identified as weaving/basketry tools: needles, awls, all of the pins, the awl-spatula, the battens (Chapter 15), the molded spindle whorls, and the centrally perforated sherd disks (Chapter 18).

Obsidian flakes were produced through both direct and bipolar percussion (Chapter 10). Characteristic wear traces are generated on anvils, hammerstone-anvils, and hammerstone-pestles. As noted in Chapters 9 and 12, most formally shaped pestles show secondary use as hammerstones for bipolar percussion; those pestle-hammerstones are counted only as pestles in Table 19.1. Other likely tools for working obsidian are utilized antler tines and small hammerstones of dense rock, though both of those may have had other uses as well.

Lapidary work is considered to involve the shaping and polishing of stone artifacts. The corresponding finished products at Paso de la Amada include both greenstone ornaments (Chapter 11) and the polished stone tools described in Chapter 12. Partially worked bead blanks document the manufacture of ornaments at the site; there is also a larger chunk of greenstone with one flat and polished face that suggests production of larger ornaments. Most of the axes have had long use lives involving extensive reworking and repolishing. The primary appropriate tools are the sandstone saws, drills, and other abrading tools. Yet those same tools were also likely used for polishing bone and perhaps also shell or very hard wood (Clark 1988:166). For that reason a combined category of implements for lapidary and bone working is identified in Table 19.1. Debitage from two distinct techniques of bone working, string-cut and flake-saw, is identifiable (Chapter 15).

Woodworking of various sorts is evidenced by the axes, the celtiform tools, the small chisel, the pumice and worked-sherd shaft straighteners, and the utilized giant pocket gopher incisors. The bark beaters (Chapter 12) are evidence of papermaking.

Craft tools or probable craft tools of uncertain function include the slate chisel/hammerstones, the pebble polishers with triangular cross sections, the pebble smoothers, the notched pebble, and the three highly polished stone artifacts described toward the end of Chapter 12.

The "multipurpose" category includes most of the pumice artifacts, the non-obsidian flakes and flake tools (Chapter 12), the miniature clay vessels, the worked-sherd reamers, and the miscellaneous notched sherds (Chapter 18). Pumice grinding tools range from expedient objects with multiple small use surfaces to formally shaped handstones (Chapter 12). It is possible that the latter had some distinct use, but it is not clear what that was. Light woodworking and work with gourds are possibilities.

Adornment

The artifacts in this class have already been discussed in Chapters 11, 15, 17, and 18. The number of fragments of clay ear ornaments is extraordinary. Bone was also a an important medium for ornament production.

Ritual

The designation "ritual" for any object without an obvious function is a standard archaeological joke. Arguments for identifying artifacts from Paso de la Amada as ritual in their intended function are generally better than that, but they vary in strength. For discussion of rattles, whistles, and spatulas, see Chapter 18; for bloodletting, see the discussion of polished stone perforators in Chapter 12.

The stamps and cylinder seals bear complex designs that at least in some cases may have referenced supernatural entities. They could have been used to apply body paint or to apply designs to paper. In either case, whether the stamped designs were used in "ritual" contexts or in contexts better understood as "social" is not known.

The identification of the ground stone spheres as "ritual" in function is speculative, but we do have the case of Feature 24 from Mound 12, in which three stone spheres were buried together, apparently as an offering.

The category "fetish/divination" in Table 19.1 includes the quartz crystals, the chunk of arsenopyrite, and the chunk of pyrite or iron ore. A speculative addition here are the two tiny ground stone cylinders noted in Chapter 12. They are similar in size to the other proposed fetish/divination objects, are carefully worked, and bear no traces of use as tools. The category "Ritual, miscellaneous" includes the ground stone rings, the fragment of a polished stone plaque, the minor sculpture, and the effigy net weight. Those are all speculatively assigned a ritual function.

Small, generally solid figurines of the Formative era typically seem to depict people rather than deities. They are conventionally understood to have been used in household rituals, a designation that is accepted here. Larger, generally hollow figurines of the later Early Formative are often not so clearly people—there is, for instance, baby imagery and the theme of human–supernatural transformation. Compared to their small, solid counterparts, the hollow figurines of Paso de la Amada seem more appropriate for use in more public ritual contexts. Many of our hollow figurines are somewhat older than those reviewed by Blomster (1998, 2002), but a generally similar functional assessment seems reasonable, especially given the hollow ceramic statuette from Mound 32 (Figure 16.8). The statuette stood 60–70 cm tall. Unlike most figurines, numerous broken pieces of the same object were deposited together, perhaps because this object was powerful or ritually important. The hollow figurines are often difficult to distinguish from the more elaborately sculpted effigy pots, especially those of the Locona-Ocós Hapac type. For the purposes of

Table 19.1, effigies are considered to be pieces of pots and included in the count of sherds.

For the "ritual" class, lines in the table preserve most of the individual artifact types. Note that figurine values are total counts without any attempt to identify minimum numbers; the hollow figurine count therefore includes all 73 pieces of the statuette from Mound 32.

Indeterminate

The "indeterminate" class is dominated by fragments of burnt earth. These are mostly small chunks and are probably mainly the result of fires for cooking. (See discussion in Chapter 18.) They are not classed as subsistence-related because other activities might have generated fragments of burnt earth. For instance, some pieces may be architectural debris. Also classed as indeterminate are several types of worked sherds, including all the round ones of various sizes. Grinding stones identified simply as "ground stone" were classed as indeterminate, as were miscellaneous worked teeth, miscellaneous worked bone (Chapter 15), the ground stone rings/handles, the perforated ground stone fragment, the possible metate foot, a miniature ground stone receptacle, the triangular-shaped stone (Chapter 12), and the ceramic spheres (Chapter 18). Miscellaneous molded fragments of ceramic mentioned in Chapter 18 are considered here as having been counted with the sherds.

The Assemblage as a Whole

Some of the structure of the artifact assemblage is highlighted by sorting the rows of Table 19.1 by frequency, as shown in Table 19.2. The column on the far right shows, for the count in each row, that value as a percentage of the count in the row above. Particularly low values thus signal a precipitous drop from the preceding row, whereas high values indicate greater stability between rows.

The exercise of calculating percentage change between rows suggests a grouping of the assemblage into rough sets by frequency. First, the counts of sherds and obsidian flakes stand apart from the frequencies of all other artifacts, indicated by the dip in "percentage of previous row" at fish bones. There is a second such dip in percentage values at solid figurines. Thereafter, the decline in frequencies between rows stabilizes. Obviously, this is a heuristic exercise, since some artifacts have already been lumped together. It seems possible to identify three basic groups among the artifacts: very common (sherds and obsidian), common (animal bone, fragments of burnt earth, fire-cracked rock, ear ornament fragments, and solid figurines), and comparatively rare (everything else).

Debris from subsistence activities dominates the very common and common groups (broken pottery, animal bones, fire-cracked rock, and probably most of the fragments of burnt earth). The biggest surprise for presence among common artifacts is clay ear ornaments, a rather bizarre aspect of the assemblage that has been exhaustively discussed in Chapter 17.

In the ranked list of Table 19.2, the traces of typical household activities tend to be higher on the list and the ornaments lower, with ritual objects ranging from top to bottom. The high frequency of solid figurine fragments suggests that these were quite common objects. It is worth observing that individual solid figurines generated multiple pieces, about six to eight pieces for a standing Nicotaca figurine. Individual hollow figurines would have generated more pieces, but on the other hand, it is unlikely that all of those would have been identified and separated from the sherds.

Generally, the ranking of household productive activities by frequencies of associated artifacts corresponds to what one might expect, with maize grinding and fishing high on the list, lapidary and bone working lower, and papermaking near the bottom. Hunting equipment has a modest presence among the artifacts due to the absence of projectile points mentioned above, but that is a well-known aspect of the archaeological record of early Soconusco. The biggest surprise in the spectrum of frequencies of artifacts related to household activities is the low profile of obsidian working. One wonders if we have failed to identify some of the associated hammerstones. Notable among the full spectrum of ornaments is that they are mainly quite small. Only a single fragment of a larger greenstone ornament was recovered.

The next few tables divide different parts of the assemblage by phase or subphase. The great disparities in frequencies mean that abundant artifact classes swamp patterns in others. It proves helpful to divide "very common" and "common" from "rare," though in a departure from the division of Table 19.2, solid figurines were considered with the latter set.

Table 19.3 traces changes in the relative percentages of the most abundant artifacts. The relative change between sherds and obsidian flakes and debitage is driven mainly by a decline in the frequency of obsidian from Tajumulco, the closest source (Chapter 10), but some of the rise in sherd frequency is probably related to an increasing rate of discard of pots, particularly plain-bodied tecomates (Table 2.8). The decline in fire-cracked rock is a pattern that has been noted by other researchers (Clark and Gosser 1995; Rosenswig 2006) in the Initial and Early Formative of the Soconusco and is probably related to changing cooking practices (see Chapter 26). The apparent decline in fragments of burnt earth instead may be related to formation processes in the particular set of contexts sampled. Animal bone has been subject to variable preservation, but some trace of the rising prominence of fish (Chapter 14) appears here.

All the artifact classes in Table 19.3 are removed from consideration in the next two tables. Table 19.4 looks at the relative percentages of artifacts in three basic functional classes. The most notable pattern is the rising frequency

Table 19.2. Artifact assemblage, with categories ordered in descending frequency

Class of Activity	Type of Artifact or Specific Activity	Count	Percent of Previous Row
Subsistence	sherds from ceramic vessels	818,931	
Craft	obsidian	212,597	26.0
Subsistence	animal bone (fish) estimated NISP	24,498	11.5
Indeterminate	fragments of burnt earth	9555	39.0
Subsistence	animal bone (other than fish) actual NISP	7495	78.4
Subsistence	fire-cracked rock	5506	57.6
Ornament	clay ear ornaments	3473	63.1
Ritual	solid figurines	1809	52.1
Subsistence	maize grinding equipment	589	32.6
Subsistence	fishing implements	550	93.4
Ritual	rattles	465	84.5
Craft	multipurpose tools	406	87.3
Ritual	censer rims	327	80.5
Indeterminate	miscellaneous worked sherds	279	85.3
Ritual	hollow figurines	184	65.9
Subsistence	miscellaneous grinding equipment	175	95.1
Craft	lapidary/bone working	149	85.1
Craft	ceramic production	147	98.7
Indeterminate	multipurpose artifacts?	140	95.2
Ornament	bone ornaments	129	92.1
Craft	production/maintenance of grinding stone	115	89.1
Craft	weaving and basketry	96	83.5
Craft	woodworking	62	64.6
Craft	tools for knapping obsidian	60	96.8
Ritual	spatulas	58	96.7
Ornament	miscellaneous stone ornaments	47	81.0
Indeterminate	incomplete or of uncertain function	47	100.0
Ornament	greenstone ornaments	44	93.6
Subsistence	hunting implements	38	86.4
Subsistence	food preparation and service, miscellaneous	37	97.4
Craft	uncertain craft activities	32	86.5
Ornament	clay finger rings	29	90.6
Ritual	whistles	28	96.6
Ornament	mirrors (iron ore or mica)	25	89.3
Ornament	miscellaneous ceramic ornaments	23	92.0
Ritual	ground stone spheres	14	60.9
Ritual	fetish/divination	10	71.4
Ritual	stamps and cylinder seals	10	100.0
Craft	miscellaneous grinding equipment	8	80.0
Ritual	miscellaneous ritual objects	7	87.5
Craft	papermaking	4	57.1
Ritual	bloodletting	2	50.0
Ritual	obsidian object: eye of statuette?	1	50.0
Ritual	mask	1	100.0
Total		**1,088,202**	

of ornaments even after removal of the clay ear ornaments (and finger rings), overwhelmingly from the Cherla assemblage. The decline in ritual artifacts is discussed in the last section of this chapter. Table 19.5 examines the changing distribution of artifacts related to various craft activities. I am not sure why the data register a proportional decline in tools related to the production and maintenance of grinding stones, a pattern that also appears in analyses of the next section. Weaving/basketry and lapidary/bone working both increase over time, a pattern we will also see in the next section when the data are standardized against weight of associated sherds.

SPATIOTEMPORAL DISTRIBUTION OF CRAFT ACTIVITIES

Patronized craft specialization has been suggested as one of the mechanisms involved in the emergence of hereditary chiefs from ephemeral aggrandizers (Clark 1991:22; Clark and Blake 1994:22; Clark and Parry 1990:322). Any specialization would most likely have been part-time. Here, at the dawn of settled village life, we hardly expect developed occupational specialization. A wide spectrum of craft activities was probably under way in most residential groups (see Chapter 7) and even in individual residences. A pattern of homogeneity in distribution of these activities thus provides a null hypothesis. Any deviations from that pattern would be of great interest. In particular, a system of patronized craft specialization should result in distinct differences between households in artifacts related to the specialized activities.

Table 19.3. Relative percentages of the most common artifacts, by phase

Artifact	Early Locona	Locona	Late Locona	Ocós	Cherla
sherds from ceramic vessels	52.32	59.92	72.91	71.17	74.66
obsidian	41.48	30.70	23.27	24.04	20.86
animal bone (fish) estimated NISP[a]		0.90	1.41	2.89	2.31
fragments of burnt earth	2.36	5.16	0.85	0.48	0.76
animal bone (other than fish) actual NISP[a]		1.52	0.70	1.06	0.49
fire-cracked rock	3.81	1.80	0.86	0.35	0.22
clay ear ornaments	0.03	0.00	0.00	0.00	0.70
	100.00	100.00	100.00	100.00	100.00

[a] Bone from Early Locona contexts was not analyzed.

Table 19.4. Relative percentages of basic classes of activities represented in artifact assemblage[a]

Class of Activity	Early Locona	Locona	Late Locona	Ocós	Md.12-IV	Md.1-V	Cherla
Craft	17.9	21.1	23.3	14.9	25.3	32.0	27.9
Ornament	0.0	1.1	5.2	5.8	6.5	7.2	8.7
Ritual	82.1	77.8	71.5	79.3	68.2	60.8	63.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] The most common artifacts (listed in Table 19.3) are excluded here.

The results described in the following paragraphs suggest considerable homogeneity. Most residential groups were likely engaged in most of the activities considered. Still, the final analysis of this section suggests that high-status groups may have been unusually active in certain crafts.

The Available Assemblage

A broad array of craft activities is considered. Unfortunately, investigation is hampered by lack of fully comparable data from Mound 6, the high-status residence of the Locona and Ocós phases. A more narrow analysis using the available Mound 6 data is described in Chapter 25.

Considerations of spatial distribution here involve comparing the Mound 12 non-elite refuse samples (Locona and Ocós phases) to the elite Cherla-phase samples from the Mound 1 platform. The overlap or divergence of those two relatively large sets of samples is of interest, as is the degree to which samples from other locations fall within or outside the domain of overlap between Mound 12 and Mound 1.

Change over Time

There is reason to be skeptical about how reliably the volume of discard of craft-related artifacts serves as a proxy for the original prevalence of the corresponding activities. The artifacts considered do include bone debitage and accidentally fired clay tabs and coils, but mostly we are looking at the tools used in production. Those are rare in the deposits, and many of them had lengthy use lives—in other words, many occasions of use did not lead to discard of the tool. Behind observed patterns, there may well be poorly understood factors besides distribution of activities among residential groups.

That point is made clear in the pattern of equipment for fishing provided in Table 19.6. These data are provided specifically to make the point in the present paragraph. (Fishing is *not* being considered a craft.) The standardized frequencies of fishing equipment decline in the Cherla phase, the era in which we have strong evidence based on analysis of faunal remains for a greater focus on fishing than previously (see Chapter 14). The reason for the observed decline is uncertain. It may be that there was a shift from small throw-nets to larger nets or weirs. The basic message for study of craft-related artifacts—which are generally even rarer than fishing equipment—is to interpret the evidence with caution.

Indeed, I am not inclined to make anything of the observed decline from Locona to Cherla in three categories of craft-related items, those involved in knapping, producing/maintaining grinding stones, and ceramic manufac-

Table 19.5. Relative percentages of artifacts associated with various craft activities, split by phase[a]

Activity	Locona	Late Locona	Ocós	Cherla
Obsidian Working	9.1	14.3	9.2	6.1
Production/Maintenance of grinding stones	36.4	24.5	16.9	10.4
Ceramic Production	22.7	26.5	20.0	23.8
Miscellaneous Grinding	4.5	2.0	0	1.3
Woodworking	4.5	8.2	12.3	8.7
Weaving and Basketry	9.1	10.2	20.0	18.6
Lapidary or Bone Working	13.6	14.3	20.0	30.7
Production of bark paper or cloth	0	0	1.5	0.4
Total %	100.0	100.0	100.0	100.0

[a] The most common artifacts (listed in Table 19.3) are excluded here, as are the multipurpose and uncertain designations in the craft category.

ture (Table 19.6). It seems likely that most households engaged in those basic activities. It is worth noting that five out of six clay coils and 27 out of 38 tabs of clay are from the Mound 1 Cherla deposit. Upon standardization against sherd weight, those high frequencies nevertheless yield an apparently low involvement in ceramics manufacture. The pattern I find noteworthy in the table is the distinction between knapping, grinding stone manufacture/maintenance, and ceramics manufacture (on the one hand), in which there is an observed pattern of decline, and (on the other hand) weaving/basketry, lapidary/bone working, and woodworking, where stability or increase over time is observed. I return to these two sets of crafts in the final analysis of this section.

Spatial Distribution I: Principal Components Analysis

Shifting now to the issue of spatial distribution, the basic question is whether the multifamily residential groups were differentially involved in craft activities, a situation that could be manifested archaeologically particularly by negative correlations among evidence of the different crafts.

Because of the general rarity of the objects involved, the Lumped Refuse Samples (see Chapter 2) were chosen for analysis. Even in that set of samples, it is clear that the smaller samples tend to yield either zeros or artificially high standardized frequencies. The pattern begins with samples representing less than 100 kg of sherds and becomes severe below 40 kg. Analysis therefore focused on the 37 samples for which total sherd weight was 40 kg or more. In an effort to not throw out potentially divergent samples, two additional samples were created by pooling small Locona samples (M1-L, M14-L, M32-L, P32-L) and small Mound 12 samples (M12-O-f19, M12-L, M12-LL-srf). Four small Cherla-phase samples were not pooled for inclusion because of missing stone tool data and incomplete faunal analysis. For each sample, the raw frequencies (of total knapping tools, total grinding stone of production/manufacture tools, and so forth) were standardized per 10 kg of sherds.

The correlation matrix for the six craft variables is shown in Table 19.7. Neither the negative nor the positive correlations are particularly strong. A principal components analysis on the correlations was performed in JMP Pro version 12. Results for the first two components (which explain 23.9 percent and 22.4 percent of the variation, respectively) are plotted in Figure 19.1. The points are classified by location and/or phase. For the two large sets of samples (Mound 12 Locona-Ocós and Mound 1 Cherla), 90 percent confidence ellipses generated by the Graph Builder feature in JMP are shown. To simplify the chart, individual samples of those two sets are shown only if they fall outside the corresponding ellipse. (As it turns out, only a single sample does so: M1-i13, a Mound 1 Cherla sample, in the upper left of the chart.) The loadings of the six craft variables are shown superimposed over the plot of sample scores.

The results appear consistent with the null hypothesis of homogeneous involvement in craft activities. The confidence ellipse for Mound 12 (non-elite, Locona–Ocós) largely overlaps with that for Mound 1 (elite, Cherla). Four of the nine other samples fall in the zone of overlap. One of the Mound 32 Ocós samples falls in the part of the Mound 1 ellipse that diverges from Mound 12. The Mound 13 elite/Cherla sample falls outside the Mound 1 ellipse but inside that for Mound 12. The three samples in the upper right, well outside the ellipses, include the mixed Locona-Cherla ground surface under the Cherla platform at

Table 19.6. Frequencies of artifacts associated with fishing and crafts per 100 kg of sherds[a]

Phase	Tools for Fishing	Tools for Knapping Obsidian	Tools for Production and Maintenance of Grinding Stones	Tools and Debris from Production of Ceramics (vessels and other objects)	Tools for Woodworking	Tools for Weaving and Basketry	Tools for Lapidary Work or Production of Bone Artifacts
Locona	12.4	2.1	4.0	3.6	1.1	1.1	1.5
Ocós	16.7	1.8	1.9	1.9	1.0	2.1	1.8
Cherla	5.2	0.8	1.2	2.6	0.8	2.1	2.7

[a] Does not include Mound 6 samples or the three Cherla samples for which stone artifact data are not available (Md. 11, P29, T1T). Differential bone preservation has not been taken into account.

Table 19.7. Correlations among the six craft variables[a]

Craft	Knapping	Grinding Stones	Ceramic	Wood	Weaving or Basketry	Lapidary or Bone
Knapping	1					
Grinding Stones	0.37	1				
Ceramic	0.07	-0.12	1			
Wood	-0.25	0.19	-0.17	1		
Weaving or Basketry	0.15	-0.01	-0.21	0.01	1	
Lapidary or Bone	0.01	-0.01	-0.09	-0.04	0.11	1

[a] Performed on 39 refuse samples, with frequencies standardized per 10 kg of sherds.

Mound 1 (Md. 1-V). The P32 and Mz-250 samples are relatively small (67.2 and 43.2 kg of sherds, respectively), so modest abundances (for example, four and two knapping tools, respectively) yield high standardized values.

It is worth noting that Mz-250, from a location farther removed from "downtown" Paso de la Amada than any other sample, yielded no evidence of weaving/basketry, lapidary/bone working, or woodworking. Those three crafts were distinguished from the other three in Table 19.6, as observed above. Their loadings are in a similar sector of Figure 19.1. Finally, they seem more likely domains for patronized specialization than knapping, grinding stone production/maintenance, and general ceramics manufacture (though manufacture of sculpted effigy pots and hollow figurines may have been another matter). A final analysis examines these two sets of activities.

Spatial Distribution II: A Hint of Differentiation in Craft Activities

Pooling knapping, grinding stone production, and ceramics manufacture, on the one hand, and, on the other hand, weaving/basketry, lapidary/bone working, and woodworking yields two variables. The standardized frequencies can be plotted directly against each other. Results are shown in Figure 19.2. As in the previous figure, 90 percent confidence ellipses are shown for the Mound 12 non-elite and Mound 1 elite samples, only this time the individual sample points are also plotted.

It needs to be emphasized that, once again, there is very substantial overlap, indicating that most residential groups engaged in activities from both of the two sets. However, when the data are presented in this way, an interesting pattern emerges. Apart from Mound 1 Cherla, most of the samples fall within the Mound 12 ellipse. Those that do not (on the lower right) all have low standardized frequencies of the weaving/lapidary/bone/woodworking set. In contrast, six Cherla samples from Mound 1 fall outside the Mound 12 ellipse because they are high in that set of activities. Two other Mound 1 Cherla samples within the Mound 12 ellipse also yield high values in that activity set, as does the elite Cherla refuse sample from Mound 13 and the mixed Locona-Cherla occupation surface under the Mound 1 platform (Md. 1-V).

My suggestion is that, at least during the Cherla phase, high-status groups may have pursued certain crafts more energetically than typical residential groups.

Conclusions

This section has considered spatial differentiation at Paso de la Amada in six sets of craft activities: knapping of ob-

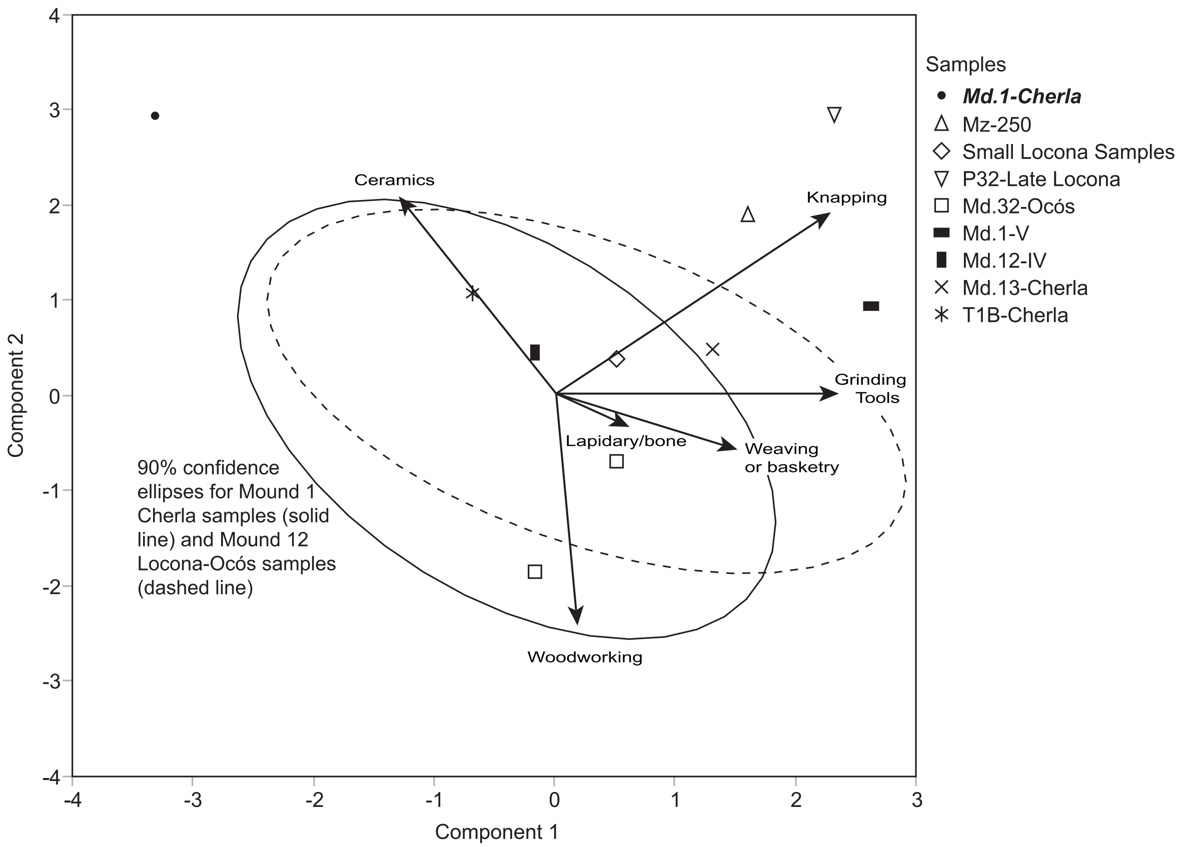


Figure 19.1. Principal components analysis of 39 refuse samples for correlations among craft variables. See text for further description. *Illustrations in this chapter by R. Lesure.*

sidian, production and maintenance of grinding stones, production of ceramic vessels and/or objects, woodworking, weaving and basketry, and lapidary and bone working. Most residential groups appear to have been engaged in most of those activities, with no evidence of specialization. In the Cherla phase, however, elite households may have been more involved than typical households in woodworking, basketry, lapidary work, and bone artifact manufacture. That tentative suggestion needs to be evaluated with a larger dataset and the analysis expanded to consider also Mound 6.

RITUAL ACTIVITY THROUGH TIME

More than 3000 fragments of artifacts considered to have been primarily ritual in function were recovered in the excavations, including 2379 in the Expanded Study Sample. The primary context of use of these objects appears to have been in and around residences. This section considers evidence of changes in ritual activities during the 400 years of the Locona, Ocós, and Cherla phases. Of particular interest is change in ritual density, or the overall frequency of ritual activity (Bell 1997:173–209).

Difficulties Posed by the Assemblage

The assemblage poses various challenges. One problem is significant variation in the frequencies of different ritual implements (see Table 19.1). An even bigger problem is that although most of the implements concerned were ceramic, they were variable in size and form. As a result, they fragmented in different ways, and the resulting pieces vary in recognizability.

Hollow figurines were distinctly larger than solid ones, and individual artifacts broke into numerous pieces. Yet many fragments of hollow figurines were not recognized as such; identified fragments are predominantly diagnostic elements such as eyes, mouths, ears, hands, and joins between leg and torso.

Censers varied considerably in size, and the resulting fragments differ in terms of recognizability. Types C1 and C2 are small in comparison to C3 and C4 and therefore yield fewer pieces (see Figures 8.1 and 8.28). Yet rim fragments of C1 and C2 are highly diagnostic; even tiny fragments can be identified with confidence. C3 and C4 censers were open at both top and bottom. They therefore yielded numerous "rim" sherds; however, most of those are

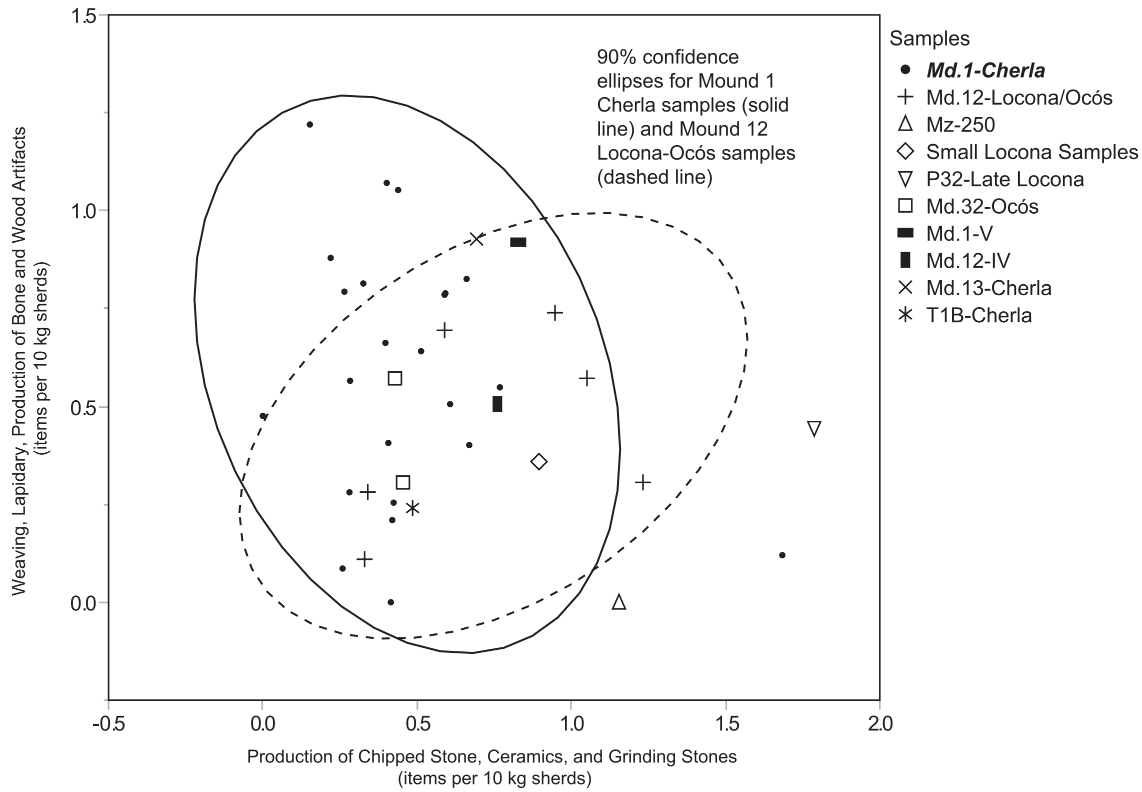


Figure 19.2. Plot of standardized frequencies of two sets of craft activities with the same 39 samples as the previous figure. Knapping, grinding stone manufacture, and ceramics manufacture on X-axis; weaving, basketry, lapidary, bone artifact manufacture, and woodworking on Y-axis.

only identifiable as censer fragments based on surface finish (wiped or roughly scraped on both sides). The most diagnostic parts of C3 and C4 censers are the perforation and join fragments (Figures 8.28j–m, 8.28o). Included with censers here are the crude plates, P1 and P2 (Figure 8.28a–e). The rims of those, like the rims of C1 and C2, are highly diagnostic even in small fragments.

The spherical profile and fine, shell-edge stamping on rattles make those artifacts also highly identifiable even in tiny fragments. Yet the objects had no openings. One cannot, therefore, count rim fragments to estimate the number of original objects. The small perforations provide some basis for making such estimates, but it appears that there was variation in the number of perforations on individual rattles. A complete rattle from Aquiles Serdán in the collections of the New World Archaeological Foundation has six perforations. In the typical Ocós decorative scheme, perforations were usually located at the points of Element 3, the triangular filler (Figure 18.1b–d). Yet not all of those points are perforated in several extant examples. A fragment from Mound 12, representing about a third of a complete rattle (reconstructed in Figure 18.1a), has no extant perforations and appears likely to have had no more than two when complete.

Methods

An important goal of the analysis was to assess the viability of an analysis based on *total counts* of fragments of ritual objects. The use of total counts would be preferable as enabling use of the maximum possible sample size. Also, those are the only available data from Mound 6, an important case for the study of residential differentiation in Chapter 25.

Yet, as the preceding discussion has made clear, there are legitimate concerns about the use of total counts, particularly for comparing the relative frequencies of, say, solid figurines, hollow figurines, and rattles. To address such concerns, several measures are introduced. For figurines and sculpted effigies, a straightforward approach would be to count heads. That does not fully solve the problem, because hollow figurine heads broke into multiple fragments (probably six to 10 or even more), whereas most solid figurines broke into no more than two or three pieces and many of them have remained basically a single recoverable piece. The solution introduced here is to count figurine *eyes*. That tally can be divided by two for an estimate of a minimum number of figurines for comparison with other objects.

Whistles are counted by mouthpieces (the most diagnostic part) and ceramic spatulas by fragments of the join between handle and blade. In the case of rattles, a tabulation was made of perforations. However, that does not solve the matter because there was variability in the number of perforations per rattle (perhaps two to six).

Tabulating a minimum number of censers is particularly difficult. The frequency data from Mound 6 include rim, tube, and perforation fragments, as well as forms P1 and P2, but apparently not C3/4 join fragments (Figure 8.28j–m) or dome fragments from C4 (Figure 8.28n). The most comparable tabulations presented in this chapter are the rim/tube counts; complete counts of identifiable censer fragments include also the join and dome counts. The only means developed here to introduce a more strict tabulation of the original number of censers is to sum rim proportions. That is not a perfect solution for several reasons. Rim proportions were not measurable in the case of the rectangular C2. There are only five C2 censers in the Restricted Study Sample; those are each assumed to constitute 5 percent of the full rim in analyses in this chapter, probably an underestimate. P1 and P2 vessels were often only approximately round, though whenever possible a value for rim proportion was estimated even when the diameter was recorded as unknown. There is also the issue of the vessels C3 and C4 having two mouths; no solution to that was adopted for the analyses. Finally, there is the issue of identifying open bowl rims as censers. In a 2017 restudy, I produced data specifically for the Expanded Study Sample that I believe to be comparable to Clark's (1994a:Appendix 1) data for Mound 6, in which most roughly finished (unslipped and either scraped or roughly wiped) rim fragments of outsloping to nearly vertical-walled bowls (with direct rims, sometimes with beveled lips) were identified as censer fragments.

For comparison between phases, the counts are standardized by either weight of associated sherds or by summed rim proportions of some set of vessels (all vessels other than censers or open bowls other than those identified as censer fragments). In analyses standardized by summed rim proportions, the overall sample is reduced to the Restricted Study Sample; see Chapter 2 for discussion.

As noted in Chapter 2, one of the drawbacks of standardization by weight of sherds is that there appears to have been a rising rate of discard of plain tecomates during the sequence. In other words, whereas standardization by weight of sherds assumes stability in household patterns of pottery discard, there are indications that this was not entirely true at Paso de la Amada from Locona to Cherla phases. For that reason, standardization against the *summed rim proportions of open bowls* is particularly important; see Table 2.8B and associated discussion. Because I will be reporting decreased frequencies of ritual objects during the sequence based on standardized values, one might worry that these results are an outcome of the method of standardization, since more pots were being discarded over time. Because the increase was specifically in plain tecomates, the basic idea is this: if standardization against open bowls yields the same pattern as the other methods of standardization, the pattern is less likely to be a result of the method of standardization.

Initial analyses involved pooling all the samples for each phase (with Early Locona and Late Locona considered "Locona"). Also included is an analysis of the samples considered individually (based on the Lumped Refuse Samples; see Chapter 2). In that case, it is possible to assess significance of the observed patterning.

Results

Raw counts of ritual objects and several standardized versions split by phase are presented in Table 19.8. The artifact classes are first reviewed individually, with discussion focusing on the results for total counts compared to various alternative analyses. Then, more general patterns among the classes are discussed, including a suggestion that there was a decrease in ritual density—the overall frequency of household ritual activity—from Locona to Cherla phases.

In the case of solid figurines, standardizations by weight of sherds (fragments per 100 kg of sherds and pairs of eyes per 1000 kg of sherds) and by summed rim proportions (pairs of eyes per 100 pots and per 10 open bowls) all yield the same pattern of decreasing frequencies of figurines over time, with measures based on pairs of eyes registering more marked declines than those based on all fragments. Solid figurines were relatively common household objects throughout the sequence, but they did decline in frequency between the Locona and Cherla phases.

Hollow figurines and sculpted effigies are both rare, which makes sampling error more likely. Standardization by summed rim proportions, which requires restricting the overall sample to units with ceramics analyzed to Level A (see Chapter 2), is not of much use for these classes. For both classes, there appears to be some decline in frequency in Cherla compared to either Locona or Ocós. Although the frequency of hollow figurines in Ocós samples is low, most of the 12 Ocós-Cherla hollow figurines (from the occupation surfaces under the platforms in Mounds 1 and 12) are probably Ocós (Naca group, Sasa type). Also, I am not convinced by the apparently low frequency of sculpted effigies in Locona deposits; information from other excavations suggests that that phase was likely the heyday of the sculpted effigy. Given the small samples, the data indicate that hollow figurines and sculpted effigies were more common in the Locona and Ocós phases than they were in Cherla.

Standardized values for total counts of censers decline steadily from Locona through Cherla. In the standardizations based on summed rim proportions, Ocós values are higher than Locona. However, these measures are complicated by the rectangular form C2—all examples of which are Locona—for which rim proportions are unknown.

Table 19.8. Ritual artifacts with various experiments for standardization

Ritual Artifact	Locona	Ocós	Ocós-Cherla	Cherla
Solid Figurines				
n (all fragments)	193	162	100	623
n (head fragments)	25	25	9	61
n (eyes)	40	37	14	97
fragments per 100 kg sherds	36.4	25.8	29.0	28.0
pairs of eyes per 1000 kg sherds	37.7	29.4	20.3	21.8
pairs of eyes per 100 pots[a]	9.7	4.8		2.8
pairs of eyes per 10 open bowls[a]	2.5	1.2		0.4
Hollow Figurines and Statuettes				
n (all fragments)	18 (91)	5	12	34
n (head fragments)	7	1	2	9
n (eyes)	3	1	1	5
fragments per 100 kg sherds	3.4	0.8	3.5	1.5
pairs of eyes per 1000 kg sherds	2.8	0.8	1.4	1.1
pairs of eyes per 100 pots[a]	0.6	0	0	1.5
Sculpted Effigies				
n (head fragments)	4	11	4	16
n (number of eyes)	1	4	2	12
head fragments per 100 kg sherds	0.8	1.8	1.2	0.7
pairs of eyes per 100 pots[a]	0.3	1.4	0	0
Censers				
n (rim and tube fragments)	158	146	50	274
n (join and dome fragments)	6	20	3	60
rim/tube fragments per 100 kg sherds	29.8	23.2	14.5	12.3
all identified fragments per 100 kg sherds	30.9	26.4	15.4	15.0
censers per 100 pots[a]	5.1	7.3		3.6
censers per 10 open bowls[a]	1.3	1.9		0.8
Rattles				
n (all fragments)	92	175	33	121
n (perforations)	14	25	8	18
fragments per 100 kg sherds	17.3	27.8	9.6	5.4
perforations per 1000 kg sherds	26.4	39.8	23.2	8.1
rattles per 100 pots (two perforations each)[a]	3.8	3.8		0
rattles per 100 pots (six perforations each)[a]	1.3	1.3		0
Whistles				
n (all fragments)	1	4	5	8
n (mouthpiece fragments)	0	2	3	6
fragments per 100 kg sherds	0.2	0.6	1.4	0.4
mouthpieces per 1000 kg sherds	0	3.2	8.7	2.7
Ceramic Spatulas				
n (all fragments)	1	0	2	32
n (number of join fragments)	0	0	0	7
fragments per 100 kg sherds	0.2	0	0.6	1.4
joins per 1000 kg sherds	0	0	0	3.2
Stamps and Seals				
n (all fragments)	0	0	1	7
fragments per 100 kg sherds	0	0	0.3	0.3
Fetishes or Divinatory Objects (n)	0	1	2	2
Ground Stone Spheres (n)	1	0	0	3
Miscellaneous Ritual Objects (n)	1	1	2	0
Total Weight of Sherds (kg)	530.9	628.9	344.9	2224.7
Total Volume of Earth Excavated (cubic meters)	47.7	29.6	32.2	51.7

[a] Based only on units with ceramics analyzed to Level A, as described in Chapter 2.

Both rattles and whistles probably reached peak frequency in the Ocós phase, as the data generally show. The decline in frequency of rattles in the Cherla phase was probably more dramatic than indicated in our data; many of those identified in Cherla deposits in Mound 1 were tiny fragments with the Locona-style decorative scheme—in other words, likely carry-ups. Ceramic spatulas and stamps/seals are instead Cherla-phase artifacts. One handle fragment from the late Locona Feature 15 at Mound 1 is classified as a spatula. It was slipped and polished, unlike the Cherla versions, and we don't actually know what was at either end of the straight, cylindrical shaft, since it is broken at both ends. The other ritual objects in Table 19.8 are rare in household refuse, and no temporal pattern can be discerned.

A glance at the full ritual assemblage across the three phases under consideration reveals complex patterns of continuity and change. Use of several basic categories of ritual implement—small solid figurines, larger hollow figurines, and incense burners—continued throughout the sequence, though of course with continually changing styles and, in the case of figurines, subject matter.

Changes from Locona to Ocós phases appear to have been gradual and not coordinated, in the sense that different objects changed at their own paces. Censer form C2 appeared fairly early in the Locona phase (from Structure 6-4 in the Mound 6 sequence if not earlier) and persisted through Late Locona. The small plate censers P1 and P2 appeared partway through the Locona phase (apparently later than the occupation of Structure 6-4). Censer form C1 appeared in late Locona and persisted throughout the Ocós phase. Whistles appeared early in the Locona phase but were quite rare; their frequency had increased somewhat by Ocós. Rattles were also present from early in the Locona phase and generally increased in frequency. Hollow figurines and sculpted effigies probably decreased in frequency from Locona to Ocós, though the data assembled for this volume do not clearly show that.

The shift from Ocós to Cherla has a different character than that from Locona to Ocós. There were some continuities, noted below, but there appears to have been coordinated change in a diverse set of ritual objects. Cylinder seals and stamps appeared for the first time in the sequence. The domed censer form C4 appeared, as did ceramic spatulas; Cheetham (2012:218) suggests that those last two went together, the spatulas being used to stir coals in the censers. A distinct, new style of figurines appeared (Eyah group). Surfaces were slipped (white-gray-black) and/or burnished. At least some of the corresponding heads were in recognizably "Olmec" style: elongated oval in form, with slit eyes and trapezoidal mouths with flaring upper lips. It appears that both men and women were represented, though differentiating genders was not a significant emphasis in the iconographic program of the new style. Further, there appear to have been closer links than previously in subject matter between small, solid figurines (Poposac and Yacsac types) and large, hollow figurines (Zanga type). Interestingly, the hollow figurines of the Zanga type seem to have been more common than the solid figurines.

This set of ritual implements is identifiable as Initial Olmec in style, following Cheetham (2012). The objects and associated ritual practices were most likely developed at San Lorenzo on the Gulf Coast (400 km away). They were adopted at Paso de la Amada probably as the result of contacts with the inhabitants of Canton Corralito.

Although there appear to have been coordinated shifts in a whole set of ritual objects and associated activities between Ocós and Cherla phases, there were also continuities. It should be noted that the sample under consideration here is far from ideal for addressing this particular problem because of Locona–Ocós admixture in the Mound 1 deposits. Still, it appears that solid figurines of the Nicotaca group (with smoothed rather than slipped/burnished surfaces) continued in use. The use of rattles declined significantly, but whistles most likely continued. The small plate censers (P1 and P2) seem to have continued; there were several in the unmixed Cherla refuse pit in Trench 1 Unit B. Effigies, including sculpted versions, definitely continued; there are identifiable Cherla styles (Chapter 16).

Another topic of interest is the relative frequencies of the different ritual objects. One would hope that the frequencies of the objects might give some idea of the frequencies of the corresponding ritual activities, but of course we are really observing the frequencies of discard rather than the frequencies of use. Comparing discard frequencies of the ritual objects to those of pots (based on summed rim proportions) I think provides some intuitive sense of the general frequency in household artifact assemblages. Solid figurines were most common, though declining over the sequence, from 10 to 11 per 100 pots in the Locona phase to five to eight in Ocós and one to five in Cherla. Censers were discarded at a rate of five to seven per 100 pots during Locona and Ocós, perhaps falling to three to four in Cherla. For rattles, the statistics are one to four per 100 pots; for whistles, around one per 100 pots at their peak of frequency in the Ocós phase. During their time of use in the Cherla phase, seals and stamps were quite rare, probably less than one per 100 pots. Spatulas were probably discarded at a rate of two to four per 100 pots—in other words, similar to the rate of censers during that phase and thus arguably consistent with the suggestion that the two were used together. For hollow figurines and sculpted effigies, the data are noisy and the estimates correspondingly uncertain. For hollow figurines, let us say between one and eight per 100 pots in Locona and Ocós, 1.5 to five in Cherla. For sculpted effigies, probably a little more than one per 100 pots in Locona and Ocós. (For effigies generally, the statistics are nine to 10 per 100 pots in Locona and Ocós, declining somewhat to six to seven per 100 pots in Cherla.)

Ritual Density

The final topic is evidence of decline in ritual density during the occupation. Bell's (1997) discussion of ritual density is noted above. I should reiterate that of course what we are really comparing are rates of discard of ritual objects. The data are from middens; no offerings are being considered here. My thought is that an overall decline in the rate of discard of all ritual objects suggests a declining frequency in the associated activities. There seems to have been a decline in the *ritualization* of daily life.

Figure 19.3 compares four different standardized totals of ritual objects from Locona, Ocós, and Cherla refuse samples. All show a decline over time, though to different degrees. Measures of total fragments per 10 kg of sherds exhibit a steady and dramatic decline, though in terms of *percentage*, the decline in estimated complete (ritual) objects standardized against the summed rim proportions of open bowls from Locona-Ocós to Cherla is higher (48 percent decline Locona to Cherla compared to 41 percent). The complete object estimate (based on pairs of eyes for figurines and so on) per 100 kg of sherds exhibits the most

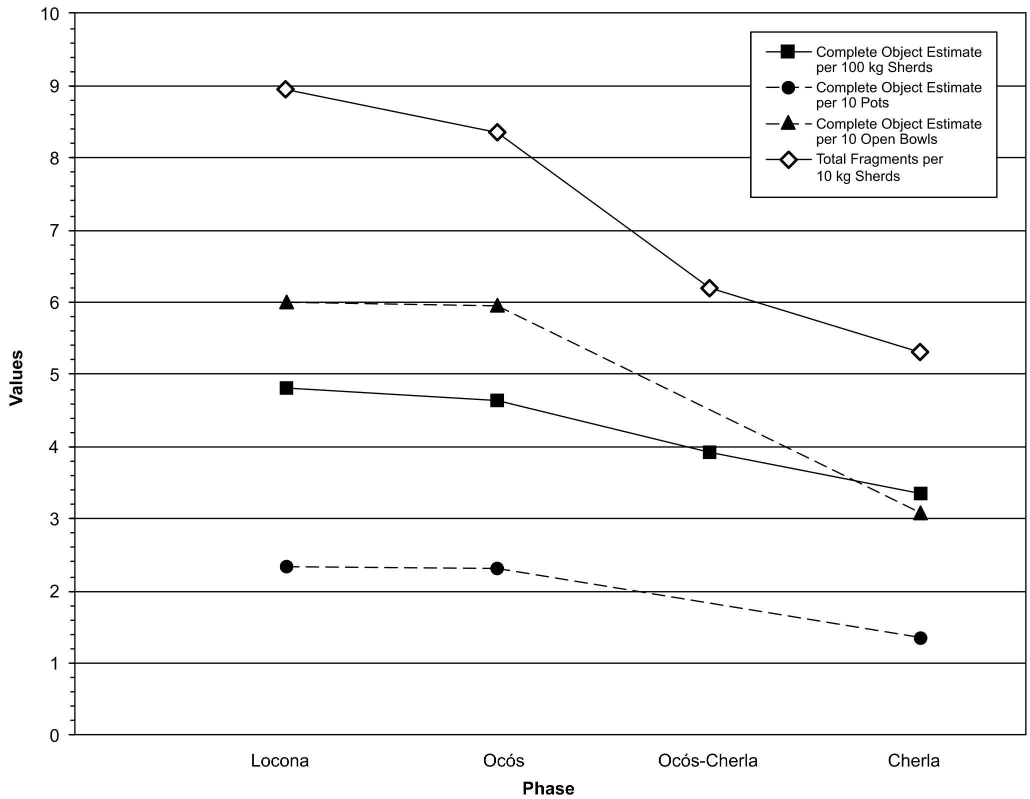


Figure 19.3. Decline registered in four different standardized counts of ritual objects.

gentle decline (30 percent from Locona to Cherla); note that this calculation does not include censers since there was no available method to estimate complete numbers of censers in the full Expanded Study Sample. Complete ritual objects per 10 pots represents a higher percentage decline than it may appear at first glance in the figure (42 percent from Locona to Cherla). The other noteworthy pattern is that Locona and Ocós are virtually identical, especially in the versions involving complete object estimates rather than total counts.

It is certainly encouraging that the different methods of standardization in Figure 19.3 yield the same basic pattern. Yet in these pooled samples, there is no way to assess the significance of the patterns.

That issue can be addressed by shifting to an analysis of the samples, in this case the Lumped Refuse Samples described in Chapter 2. Figure 19.4A shows box plots of all fragments of ritual objects per 10 kg of sherds for Locona, Ocós, and Cherla phases. The values descend slightly between Locona and Ocós (8.6 to 8.1 fragments per 10 kg) and then more dramatically from Ocós to Cherla (8.1 to 4.6). A Wilcoxon rank sum test indicates that the Ocós–Cherla shift is significant (p = 0.0054, Z = -2.78129, score mean difference -13.4274). The Locona–Ocós shift is not (p = 0.7261).

Figure 19.4B shows the results for estimated original number of ritual objects per 100 kg of sherds. (Remember that censers are not included here.) The median number of ritual objects per 100 kg of sherds declines slightly between Locona and Ocós, from 0.52 to 0.48, then falls to 0.30 in Cherla. The shift to Cherla is at the level referred to in Chapter 25 as "weakly significant": Ocós–Cherla, p = 0.1427; Locona–Cherla, p = 0.1046; compare to Locona–Ocós, p = 0.9069; Wilcoxon rank sum test).

I think there was a decline in ritual density—in the overall frequency of ritualized acts—between the Locona and Cherla phases at Paso de la Amada. That theme is discussed further in Chapter 27. Still, one potential complicating factor bears mention. If I am correct in proposing public/ritual rather than residential functions for the Cherla-phase platforms in Mounds 1 and 12 (as discussed in Chapter 7), it could be that the frequency of ritualized acts declined in Cherla-phase *residences* because some of those activities were shifted to *temples*, the first such structures ever built at the site.

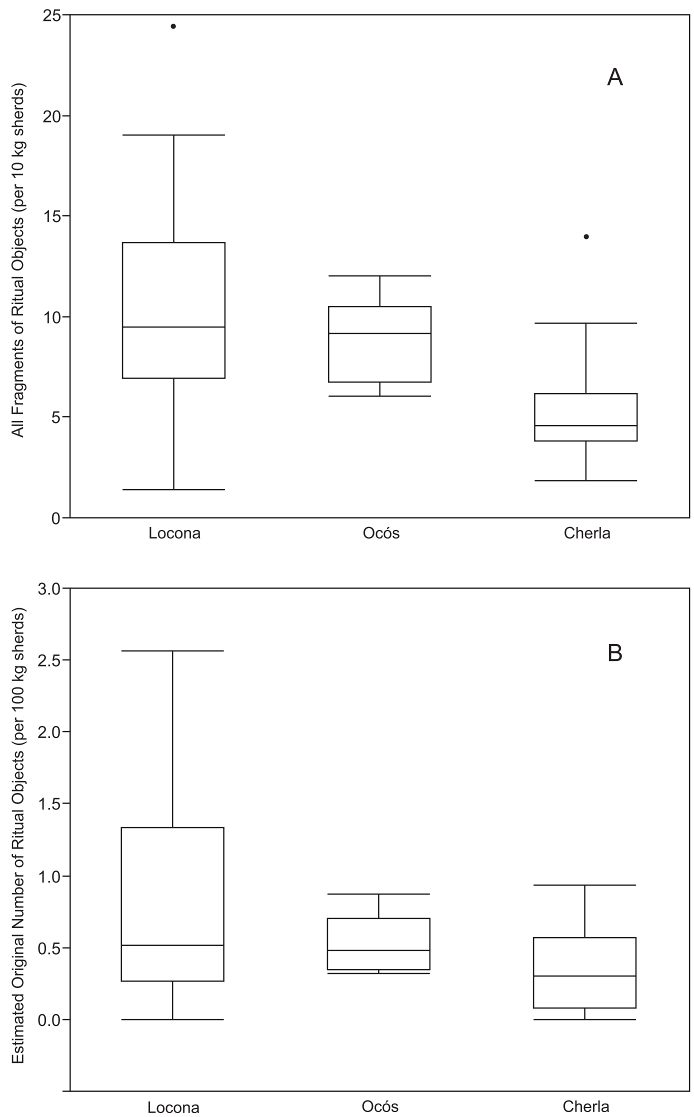


Figure 19.4. Decline in frequencies of ritual objects in analyses by sample: (A) all fragments of ritual objects; (B) estimated number of original ritual objects.

Note

1. The figure 1,088,202 for the total artifact count is less than the actual number recovered. The count of animal bones used here is incomplete. A box of more mixed contexts (including particularly upper layers of the Mound 1 platform) was never transported to UCLA for analysis. Further, certain less interesting contexts in the collection in Los Angeles were also never analyzed or counted. As noted in Chapter 15, the fish remains from certain units in Mound 1 (mainly Lots 9–10) were not analyzed. For those lots, estimates are included in the figures presented in Tables 19.1 and 19.2. Estimates for the unanalyzed fish in those units were calculated based on the relative frequencies of mammals to fish and reptiles to fish in the fully analyzed units from that same deposit. Calculation based on mammals yielded an estimate of 7902 unanalyzed fish bones; a similar calculation based on reptiles yielded an estimate of 9240. Those values were averaged for a final estimate of 8571 fish bones in the partially analyzed units. (An inspection of the bags of unanalyzed bones suggests that there must be several thousand specimens.) Another issue is the counting of sherds. As noted in Chapter 2, the sherds in some screened units of the Mound 1 platform fill were weighed but not counted. Estimates of the total number of sherds in those units are based on the ratio of the number of sherds to the weight of sherds in fully counted and weighed units of the same deposit. The counts in Tables 19.1 and 19.2, from solid figurines down, include all artifacts recovered, not simply those from screened deposits. Thus stray surface finds and artifacts from unscreened units of platform fill or profile cleaning are included; those constitute a miniscule percentage of the total count. One final point: the totals from solid figurines down include some artifacts identified in and removed from sherd bags subsequent to the initial sorting and counting of sherds. Because the total sherd counts have not been adjusted downward, some objects counted as artifacts are also included in the sherd totals. Again, those constitute a tiny percentage of the total.

PART IV
SPECIALIZED STUDIES OF POTTERY

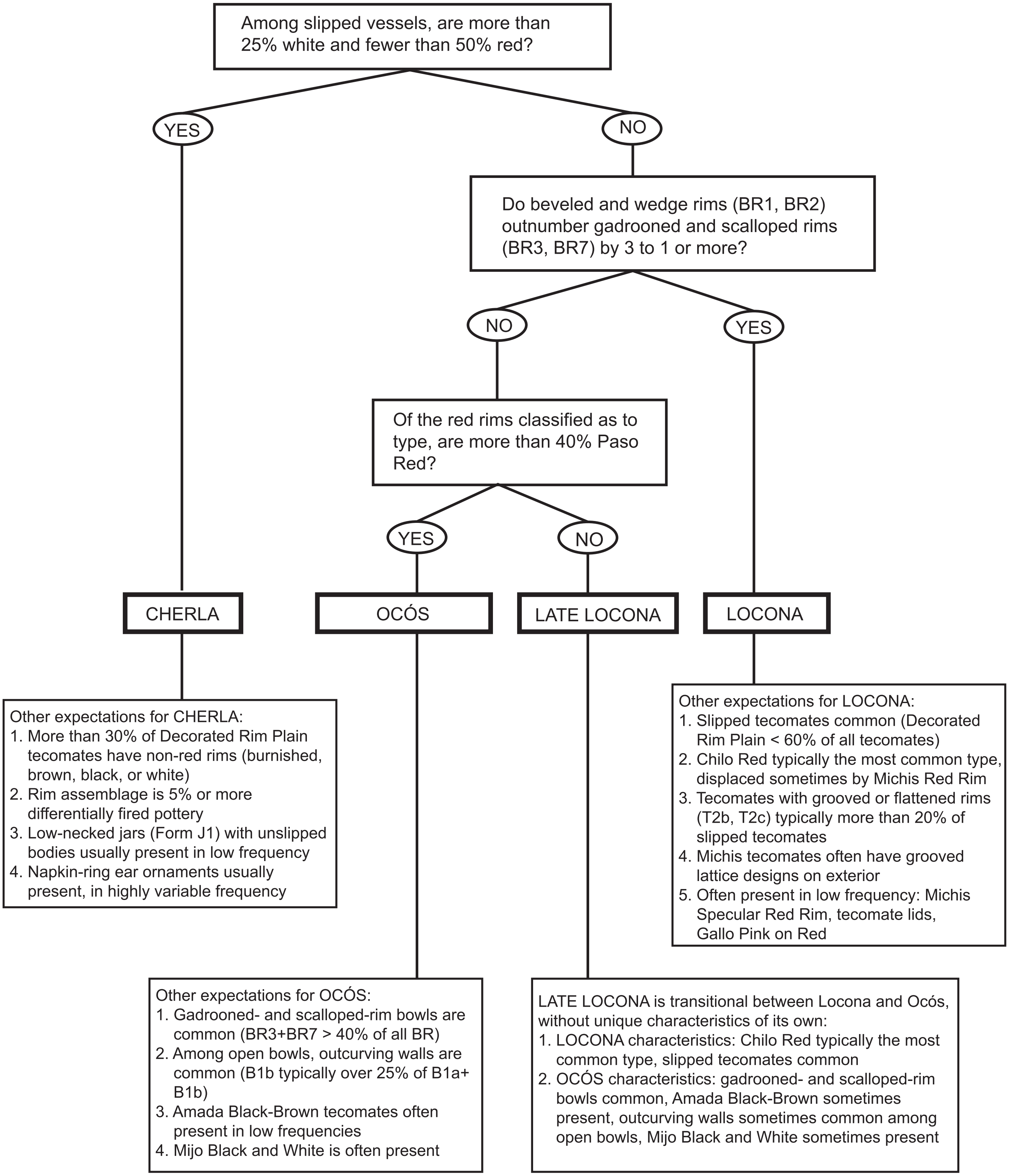


Figure 20.1. Key for classification of refuse units to ceramic complex/phase.
Illustration by R. Lesure.

CHAPTER 20

Seriation of the Refuse Deposits

Richard G. Lesure

The initial and Early Formative sequence of the Soconusco region comprises six phases between 1900 and 1000 BC (calibrated): Barra, Locona, Ocós, Cherla, Cuadros, and Jocotal. For date ranges, see Figure 1.4. The work of Coe (1961) and Coe and Flannery (1967) along the Naranjo River in Guatemala led to identification of the Ocós, Cuadros, and Jocotal phases. Work on the Chiapas coast by the New World Archaeological Foundation identified those same phases, as well as the earlier Barra phase (Ceja 1985; Green and Lowe 1967; Lowe 1975). Clark and his colleagues split Ocós into three phases: Locona, Ocós, and Cherla (Blake et al. 1995; Clark and Cheetham 2005). I previously distinguished an Early Ocós based on materials excavated for my dissertation (Lesure 1995, 1998a, 1998b) but have changed that to Late Locona in this volume to better accord with Clark's usage.

Contexts excavated date to the Locona through Cherla phases, with some Barra admixture and occasional evidence of light Jocotal occupation in disturbed upper layers, particularly at Mounds 12 and 32. The problem for chronological research was thus basically to distinguish Locona, Ocós, and Cherla from each other and from chronologically mixed deposits.

This chapter consists of four basic sections. The first describes the intuitive classification of refuse samples to ceramic complex and therefore to phase. The second section presents two multivariate analyses designed to assess the reliability of the intuitive analysis. The third is a contribution to the stratigraphic justification of the phases. The final section reviews patterns among type classes, types, and vessel forms by phase. Note that, given the division of the original Ocós phase into three, it is important that comparison with other sites be based on specific characteristics of the complexes rather than name alone. For instance, what Coe (1961) refers to as Ocós is now Locona, and what Ceja (1985) calls Ocós comprises Locona, Ocós, and Cherla.

PHASE ASSIGNMENT BY INTUITIVE PROCEDURES

Units were classified by intuitive assessment in relation to established characteristics of the Locona, Ocós, and Cherla ceramic complexes. The units were those of the Restricted Study Sample (n = 50), to which were added two provenience units from the ground surface under the Cherla-phase platform in Mound 12 (phase designation Md12-IV) and five units of refuse from Mound 6 (0601A through 0605A from Lesure 1995). The ceramics of these 57 samples were analyzed to Level A. (See Chapter 2 for an explanation of refuse units and levels of ceramic analysis. See Chapter 8 for descriptions of types and forms, including alphanumeric codes for vessel forms used throughout this chapter.) Analysis focused on rim sherds (totaling 8,951 in the 57 samples). Most units could be readily assigned to a particular ceramic complex through evaluation of the rims in terms of slip colors, kind of red slip predominating (Chilo or Paso Red), and the presence or absence of particular vessel forms. Complicating factors included the possibility of synchronic variation in such aspects as choice of minor surface colors (Lesure 1995:172–73). Another complication is the identification of transitional deposits, especially between the Locona and Ocós phases (Late Locona) but including also an Early Locona sample. What was originally identified as Late Ocós (Lesure 1995:173, 1998b:71) looks in hindsight more like a mixture of Ocós and Cherla with, as originally noted, some likely transitional sherds.

Characteristics of Locona, Ocós, and Cherla complexes are listed in Table 20.1 (based on Blake et al. 1995; Clark 1994a:180–82; Clark and Cheetham 2005). As the frequencies of attributes among different units were compared, it became clear that some of the distinguishing features exhibit rather weak patterning, or they were too rare to be of much use in dating the units generally (helpful as they might be in certain cases). Specular red rim bands on plain-bodied tecomates are largely confined to the Locona complex (Michis Specular Red Rim), but they are outnumbered by non-specular red rims (Michis Red Rim) in all but the earliest Locona sample (0101A). Solid tecomate supports are more common in Locona deposits, but hollow tecomate supports appeared in most deposits, including both Locona and Cherla. As expected, stamping was rare in Cherla deposits, but shell stamping appeared in both Locona and Ocós deposits. Fabric- or cord-stamped tecomates of the type Amada Black-to-Brown, however, are diagnostic of Late Locona and Ocós. Iridescent painting over specular red (Gallo Pink on Red) and red-on-buff bowls of the type Mavi Red Rim were diagnostic of the Locona and Cherla phases, respectively, but not common. The Cherla bowl form B2b, common at Aquiles Serdán (Clark 1994a:180), is rare at Paso de la Amada.

The following attributes from Table 20.1 were relatively abundant and appeared to be reliable for making chronological distinctions. Plain-bodied tecomates of the types Michis Burnished Rim, Mavi Red Rim, and Mavi Buff are good Cherla-phase markers. Another distinguishing attribute of Cherla deposits is the predominance of brown, black, gray, white, and orange slips instead of the red slips that predominated in the previous phases. This pattern is evident even though there was some admixture of Locona and Ocós material in most of the excavated Cherla deposits. Also diagnostic of the Cherla phase is differentially fired black-and-white pottery. Every Cherla deposit had a few white-rim-black bowls (Figures 8.22f, 8.22n), an easily identifiable mode of differentially fired pottery that continued into the subsequent Cuadros phase (Coe and Flannery 1967:33) but is completely unknown in Locona and Ocós. Ceramic ear ornaments are also diagnostic of the Cherla phase.

The Locona and Ocós complexes are more similar to each other than either is to Cherla, and the transition between them appears to have been one of gradual stylistic change rather than the more abrupt shift observed between Ocós to Cherla. An important distinction is the predominance of somewhat darker, specular red slips in Locona (Chilo Red) and of more orange, non-specular red slips in Ocós (Paso Red). The transition from specular to non-specular slips can be monitored in two stratigraphic columns in Mound 12 (Unit E4 and Trench 1E). There are also changes in the rim modification of serving bowls. Beveled rims (BR1) and wedge rims (BR2) predominated in Locona. Gadrooned rims (BR3) and scalloped rims (BR7) were more common in Ocós.

These preliminary analyses indicated the presence of synchronic variation among ceramic assemblages, both within Paso de la Amada and between it and other sites. At Paso de la Amada, synchronic variation is identifiable in the distribution of brown, orange, black, and white (the minority colors) during the Ocós phase. A long tradition maintained in Mound 6 favored brown and orange slips from the Locona phase into the Ocós phase, while a shift away from brown and orange to white and black slips began in the Locona phase at Mound 12 (see Lesure 1995:172–73). A more striking instance of synchronic variation can be identified between Ocós and Cherla deposits at Paso de la Amada and contemporaneous deposits at Aquiles Serdán, some 8 km away. At Aquiles Serdán, low vertical-walled dishes, often with circumferential, horizontal grooves or gadrooning on the exterior (Forms B2a, B2b), were common, and they became the predominant bowl form by the Cherla phase (Clark 1994a:180). These forms were abundant in the NWAF type collections, and I anticipated finding many of these at Paso de la Amada; however, only 15 examples were found in the sample of 8,951 rims.

Another complicating factor in these preliminary analyses was the presence of deposits with features transitional between complexes. A single sample (0101A) appears to be Early Locona. It includes various Barra diagnostics, including a strong presence of Cotan Red. There are few Michis tecomates, and Chilo Red predominates. The idea that this is an Early Locona deposit rather than a mixture of Barra and Locona is supported by the low occurrence of modified rim bowls (no BR1, no BR2), usually abundant enough to be present in a Locona unit of this size.

More numerous are units transitional between Locona and Ocós. Feature 11 in Mound 12 was a deep pit with stratified layers of trash, descending from mixed Ocós/Cherla just beneath the Cherla-phase platform to clear Ocós (with the non-specular, orange-red slips of Paso Red) to ceramics with the specular red slips of Chilo Red (a Locona characteristic) and yet with Ocós bowl forms. Gadrooned rims (BR3) and scalloped rims (BR7) predominate over wedge rims (BR2) and beveled rims (BR1). Simply mixing Locona and Ocós materials would not produce characteristic Ocós bowl forms bearing Locona slips. That observation and the stratigraphic position of the deposit directly under a clear Ocós midden suggest that Ocós bowl forms with Locona slips were a transitional Locona-Ocós trait. Two observations support the contention that this is not another case of synchronic differences within the site. First, characteristically Locona deposits were also identified at Mound 12. While none were identified in Feature 11, Locona deposits underlying transitional Locona-Ocós materials were found in Test Pit 1 and Unit H6. Second, Late Locona deposits with the same combination of Locona and Ocós characteristics were identified in other excavation locales, notably Mound 1 and the Pit 32 excavation. In this volume, these

Table 20.1. Characteristics of Locona, Ocós, and Cherla ceramic complexes

	Locona	Ocós	Cherla
Plain-bodied tecomates	thin-walled with red rims	thin-walled with red rims	forms transitional between Ocós and Cuadros tecomates
	specular red rim bands	non-specular red rim bands	alternative rim band treatments, including unslipped/burnished and non-red slips such as black, white, or brown
Tecomate supports	solid	hollow	absent
Predominant color(s)	specular red	non-specular red	brown, black, gray, and white
Bowl forms	beveled rims and wedge rims (BR1 and BR2)	gadrooned rims (BR3)	dishes with low vertical walls and horizontal exterior gadrooning (B2b)
Stamping	shell-edge and shell-back	fabric or cord stamping	stamping rare
Other features	iridescent pink paint in bands over specular red slips		distinctive red-on-buff type (Mavi)
			differentially fired black-and-white type (Pino)

deposits are designated Late Locona, whereas in earlier publications they were referred to as Early Ocós (Lesure 1995, 1998a, 1998b).

The key presented in Figure 20.1 (see page 438) identifies Locona, Late Locona, Ocós, and Cherla deposits from Paso de la Amada; it may work also at other temporally equivalent Formative sites of the Soconusco region. Early Locona is not included because one sample is not a sufficient basis to identify recurring rather than idiosyncratic patterns. The units classified here are samples of refuse, not individual sherds. Deposits must be relatively unmixed, though the decision tree is robust enough that some admixture of earlier materials will not usually lead to misclassification. The rules have the advantage of extreme simplicity. Where possible, criteria that are likely to be more stable between different investigators (or under variable states of preservation) have been chosen—for instance, vessel form or type class rather than type. (For a discussion of type class, see Chapter 8.) The decision points in the key are the same as originally presented by Lesure (1995:Figure 4.21, 1998b:Figure 6), the only differences here being that Late Ocós has been dropped, Early Ocós has been changed to Late Locona, and the wording has been updated. The key works for the nine units added to the original set of samples since 1995. The characteristics that structure the key are to be used in conjunction with the other criteria provided. While the latter are less reliable than the decision criteria (thus the inclusion of qualifiers such as *usually*), any substantial mismatch would mean that the sample in question has not been successfully identified.

The first step is to separate Cherla samples from earlier ones. This is accomplished by selecting all monochrome slipped rim sherds of the type classes Red, Black-White-Gray, and Brown-Orange-Pink. One calculates the relative percentages of those three type classes (other type classes excluded) for each refuse sample. Deposits with less than 50 percent Red and more than 25 percent Black-White-Gray are Cherla. A variety of other criteria characterize Cherla units. A significant proportion of unslipped tecomates have non-red (brown, black, white, or plain/burnished) rims, though unslipped tecomates with red rims are still present. Specifically, Mavi Buff, Michis Burnished Rim, and other minor Modified Michis variants make up more than 30 percent of the Decorated Rim Plain type class. Plain-bodied tecomates in earlier deposits nearly always have red-slipped rims (typically more than 80 percent). Other Cherla diagnostics are the presence of differentially fired pottery (Pino Black and White), the presence of low-necked jars (Form J1) in the Coarse or Decorated Rim Plain type classes, and the presence of fine-paste ceramic napkin-ring ear ornaments.

The next step is to separate Locona proper from Late Locona and Ocós. This is achieved by adding up the number of beveled-rim bowls and wedge-rim bowls (BR1a + BR1b + BR1c + BR2), adding up the number of gadrooned-rim and scalloped-rim bowls (BR3a + BR3b + BR3c + BR3d + BR7), and calculating the relative percentages of these two sets. If there are more than 75 percent beveled-rim and wedge-rim bowls, then the deposit is Locona. The predominant red slip for Locona deposits should be the dark-hued, specular red of Chilo Red, often the most common type (displaced occasionally to second place by Michis Red Rim). Slipped tecomates are more common in relation to plain-bodied tecomates than in Ocós or Cherla. (Plain-bodied are usually less than 60 percent of all tecomates.) Also, among slipped tecomates, grooved or beveled rims (Forms T2b and T2c) are common, typically constituting more than 20 percent of slipped tecomates. The classification can be further checked by looking at a number of features that generally characterize Locona samples but are rare enough that they do not appear in all units. These include tecomate lids (average 2 percent of rims), plain-bodied tecomates with grooved or burnished lattice designs (average 17 percent of plain tecomate rims), plain-bodied tecomates with specular red rims (Michis Specular Red Rim, average 8.5 percent of plain tecomate rims), and iridescent pink paint over red slip (Gallo Pink on Red, rare and hard to identify in eroded collections). In contrast, in Late Locona and Ocós units, tecomate lids are very rare (0.5 percent and 0.2 percent, respectively). Less than 2 percent of plain-bodied tecomates are grooved, and less than 1 percent have specular red rims. Among slipped tecomates, grooved and beveled rims appear on an average of 8.9 percent, but there is considerable variation in this feature. Plain-bodied tecomates as a whole are less common in the Locona phase (average 15.2 percent of rims) than in Late Locona and Ocós deposits (average 21.9 percent and 28.2 percent, respectively), but variation is considerable.

Finally, Late Locona is separated from Ocós by looking at the relative frequencies of Chilo Specular Red and Paso Polished Red. Only rim sherds that can be assigned to one of these two types on the basis of both color and the presence or absence of specular hematite are considered for the analysis, and percentages are calculated for these types only. If more than 40 percent of classified red rim sherds are Paso Polished Red, then the deposit is Ocós; if more than 60 percent are Chilo Specular Red, then it is Late Locona. In well-preserved collections, the distinction is generally rather easy to make simply on this basis. In other respects the two are very similar. As a check on the classification, however, two observations can be made. Open bowls with scalloped rims (BR7) are more common in Ocós deposits (average 2.2 percent of rims) than in Late Locona (average 1.2 percent of rims). In addition, plain-bodied tecomates with non-red rims (black, brown, white, or plain/burnished) are more common in Ocós (average 10.6 percent of plain tecomate rims) than in Late Locona (average 6.7 percent).

The results of classification for 55 samples of pottery studied to Level A are provided in Table 20.2. These units—plus two samples from the mixed Ocós-Cherla ground surface under the platform in Mound 12 (1214A, 1225A), designated Md12-IV as discussed in Chapter 2—are subjected to multivariate analysis in the next section.

SERIATION BY MULTIVARIATE ANALYSIS

Assignment of units to phase was through the intuitive procedures described in the last section. The multivariate analyses were intended to evaluate procedures about which we were already quite confident. It was hoped that computer analysis would separate clusters of units corresponding to Locona, Late Locona, Ocós, and Cherla. Also of interest was whether stratigraphic sequences would be correctly ordered. For my dissertation, I chose nonmetric multidimensional scaling, based on Drennan (1976b). That analysis is updated here. Also included is a new analysis by correspondence analysis, inspired by the seriation Jennifer Carballo did for our work in Tlaxcala (Lesure et al. 2014d). The two seriations involved quite different input, yet they produced compatible results in terms of the clustering of units by phase or subphase, results that validate the intuitive procedures. Consideration of the two multivariate analyses together suggests that grouping by phase/subphase is the finest chronological division that can be achieved among the refuse samples. In other words, the samples cannot be reliably lined up in a temporal series.

Multidimensional Scaling of the Refuse Samples

Davison (1983:2) defines multidimensional scaling as "a set of multivariate statistical methods for estimating the parameters in and assessing the fit of various spatial distance models for proximity data." The proximity data used here consist of measures of dissimilarity between pairs of midden deposits (units). The basis for multidimensional scaling is an analogy between the idea of dissimilarity between objects and the geometric concept of distance. Nonmetric multidimensional scaling algorithms "compute stimulus coordinate estimates . . . in a prespecified number of dimensions *K* so that when distance estimates . . . are computed from those coordinate estimates, the rank order of the distance estimates agrees with the rank order of the original data . . . as closely as possible" (Davison 1983:82). Since the problem in archaeological seriation is to determine the rank order of archaeological units in time, nonmetric multidimensional scaling has proven useful for constructing archaeological chronologies (Drennan 1976b; Marquardt 1978; Stark and Curet 1994).

A crucial step in the seriation is choosing temporally sensitive dimensions along which to measure dissimilarity between units. Since extensive intuitive analyses of Paso de la Amada ceramics had already identified chronologically sensitive attributes, those were chosen as the basis for computing dissimilarities between units. The attributes were essentially those relied on in Figure 20.1. The dissimilarity measure chosen was that used by Drennan (1976b) for analyzing Middle Formative ceramics from Oaxaca. With Drennan's procedure it was possible to combine three separate measures of dissimilarity into a single matrix for seriation. I originally did the analysis using SPSS (Lesure 1995); the version presented here was redone on a modestly expanded set of samples by Katelyn J. Bishop and Alan Farahani, using the statistical package R.

Archaeologists have long considered ceramic *types* as fundamental units of analysis in seriation. Robinson (1951) used tables of the relative percentages of ceramic types in different stratigraphic units to construct dissimilarity matrices, as have many others since. The problem here cannot be solved this way because the attributes that show significant temporal patterns crosscut types. Thus beveled- and wedge-rim bowls (of whatever color or type) characterize the Locona phase, while gadrooned- and scalloped-rim bowls (again crosscutting types) appear with the Ocós phase. By contrast, the best way to distinguish Cherla from Ocós is to look at attributes *more* inclusive than specific types: relative proportions of the type classes Red, Brown-Orange-Pink, or Black-White-Gray. Finally, the relative proportions of two specific types (Chilo Red and Paso Red) are crucial for distinguishing Late Locona from Ocós. To adequately represent ceramic change at Paso de la Amada, we needed a dissimilarity measure that could incorporate each of these three separate observations into a single summary estimate of the differences between units.

Drennan (1976b:291–92) faced just this problem in his seriation of Middle Formative materials from Oaxaca. Successful seriation of that material required consideration of not only changing proportions of different ceramic wares and forms but also sets of attributes (primarily decoration and details of form) that appeared on only specific combinations of ware and vessel forms. Drennan used a modification of Robinson's (1951) coefficient as a measure of dissimilarity. The measure is calculated according to the following formula:

$$D_{ij} = \frac{\sum_{a} | P_{ia} - P_{ja} |}{200},$$

where D_{ij} represents the dissimilarity between the *i*th and *j*th proveniences, P_{ia} is the percentage of occurrence of the *a*th category of an attribute in provenience *i*, and P_{ja} is the percentage of occurrence of the *a*th category of the same attribute in provenience *j*.

In other words, the coefficient of dissimilarity between any two units is calculated by computing the percentage occurrence (by unit) of each attribute; computing, for each attribute, the difference between the percentages in the two units; taking the absolute values of these percentage differences determined for each attribute; adding up these values for all attributes; and dividing the total by 200. The total is divided by 200 to create a measure that varies from 0 to 1, representing complete equivalence and complete nonequivalence, respectively.

Because Drennan's analysis required consideration of both the overall frequencies of different wares/forms and the appearance of specific attributes on specific ware and form combinations, he could not simply calculate the dissimilarity coefficients for all attributes taken together. Drennan's solution was to calculate the dissimilarity coefficient independently for each attribute, and for the combination of wares and vessel forms taken as a whole, and to *average* the results of these 15 independent calculations to derive a final measure of dissimilarity between each unit (1976b:292). This aspect of Drennan's procedure seems arbitrary: why are the different sources of data averaged rather than given different weights? It is dissatisfaction with that aspect of multidimensional scaling that prompts the alternative of correspondence analysis presented below. As will be seen, correspondence analysis turns out to have problems of its own.

Table 20.2. Classification of samples of pottery studied to Level A

Locona	Late Locona	Ocós	Md12-IV	Cherla
0003A	0001A	0603A	1225A	0004A
0008A	0002A	0604A	1214A	0005A
0009A	0103A	0605A		0006A
0102A	1204A	1209A		0104A
0601A	1205A	1210A		0105A
0602A	1206A	1211A		0106A
1201A	1207A	1212A		0107A
1202A	1208A	1213A		0108A
1203A	1218A	1215A		0109A
1401A	1219A	1216A		1101A
2101A	1220A	1222A		1302A
2102A	1221A	1223A		3206A
3203A	1301A	1224A		
		3201A		
		3204A		
		3205A		

The approach of my dissertation, redone here on a larger sample of units with identical procedures, followed Drennan (1976b). I used the same coefficient to measure differences between units. The final coefficient of dissimilarity between each unit was the average of the dissimilarity measures obtained in three independent analyses: (1) slip color, (2) predominant form of red slip, and (3) diagnostic rim form. Data Record 20.1 shows the percentages of each attribute in each of the units used in the analyses, as well as the total number of relevant cases (n) for every unit. A total of 57 stratigraphic units were considered for analysis, but some of these had very low numbers of relevant cases for one or more of the three analyses to be performed. The following was the logic used to eliminate small samples in my dissertation; the same rules are adopted here. All units that had *fewer than nine* relevant cases for at least one of the three analyses to be performed were eliminated. A cutoff of nine was chosen because this appeared to be a natural cutoff point in terms of unit size. Units with fewer than nine relevant cases for one analysis had rather few (less than 15) cases relevant to at least one other analysis as well. The units with more than nine cases for at least one unit all had more than 15 relevant cases for both other analyses and were judged to be of sufficient size to include in the analyses.

The first analysis was drawn directly from the key of Figure 20.1 and consisted of calculating the relative percentages of rims of the type classes Red, Brown-Orange-Pink, and Black-White-Gray in each unit. Vessels with unslipped bodies were not considered. The second analysis, a measure of the relative percentages of rim sherds identified as Chilo Specular Red and Paso Polished Red, was also drawn directly from the key. The third analysis was a modification of the procedures used in the key. The different rim forms characteristic of the Locona and Ocós phases (beveled, wedge, gadrooned, and scalloped) are much less common in the Cherla phase—so infrequent, in fact, that "noise" from Locona admixture in Cherla deposits becomes a significant factor, with several Cherla deposits having more Locona forms than Ocós forms. In the original key (Figure 20.1), Cherla samples are already separated out at the stage when bowl rim forms are considered, so this is not a problem. However, some other solution was necessary in designing the input for multidimensional scaling. After some experimentation, it was decided that white-rim-black bowls, a particular mode of differentially fired black-and-white pottery, could appropriately be considered a diagnostic Cherla rim form. While such vessels did not display the plastic modification of the rims represented by the Locona and Ocós forms, white-rim-black bowls represented (like the earlier forms) a particular style of rim decoration on serving vessels, and as a relative proportion of Cherla assemblages they seemed to be analogous to the place of those earlier forms in their respective phases. In sum, percentages of beveled- and wedge-rim bowls (BR1a + BR1b + BR1c + BR2), gadrooned- and scalloped-rim bowls (BR3a-d + BR7), and white-rim-black open bowls were calculated for each unit.

The data provided in Data Record 20.1 were used to calculate three separate 38 x 38 dissimilarity matrices, one for each analysis, using Drennan's formula for D_{ij}. A final dissimilarity matrix was generated by averaging the three dissimilarity measures.

Output of the scaling consisted of stimulus coordinates in two dimensions and a measure of fit for assessing the degree to which the stimulus coordinate estimates reproduced the rank order of the original data (Davison 1983:85–86). Archaeologists have found that two-dimensional multidimensional scaling generally yields the most appropriate results for a time plot (Drennan 1976b; Marquardt 1978; Stark and Curet 1994). Resulting plots are usually linear but curved, with a C or U shape. One-dimensional solutions tend to order units in a line that cuts through the middle of the C or U, mixing deposits of different time periods. Stress for the two-dimensional solution is 0.0615. This is within the range of 0.05 to 0.10 cited by Davison (1983:91–92) as representing a good fit between stimulus coordinates and original data.

The stimulus configuration for the 38 samples is shown in Figure 20.2. The plot exhibits a dispersed backward C shape, as the curve sketched in by eye suggests. In the figure, units are classified according to Figure 20.1. As can be

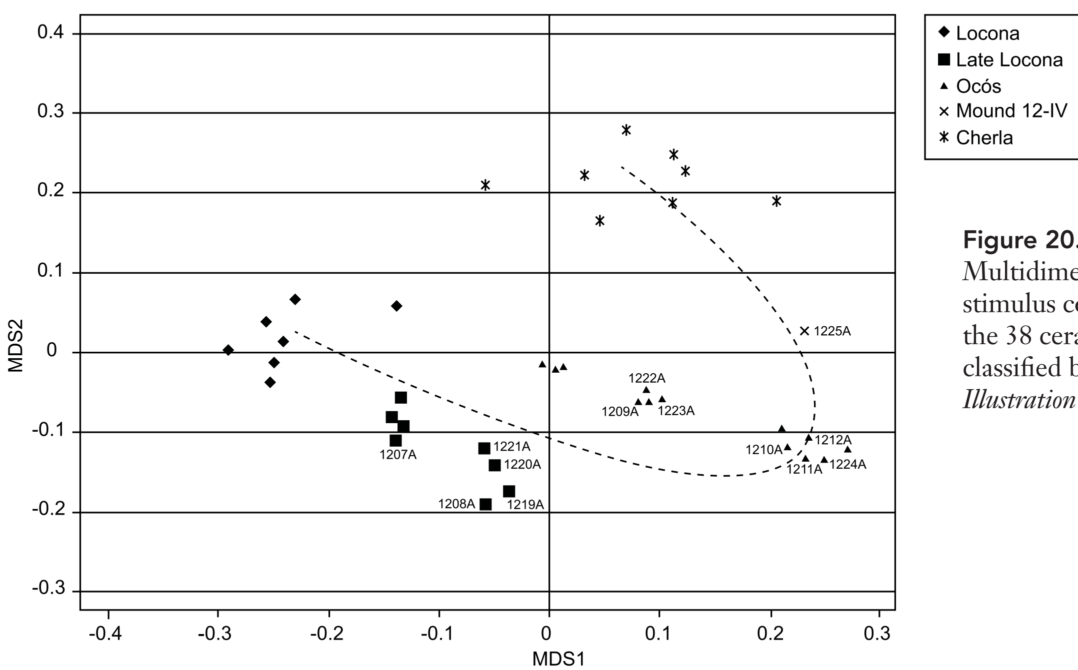


Figure 20.2. Multidimensional scaling stimulus configuration, with the 38 ceramic samples classified by phase. *Illustration by R. Lesure.*

seen, units of the Locona, Late Locona, Ocós, and Cherla phases generally fall along the curve in the correct order by phase. The units for each phase or subphase separated in the intuitive analysis appear in dispersed but distinct groups along the curve. Cherla is strongly differentiated from the rest, with a crucial link being Sample 1225A, the one originally interpreted as Late Ocós and now considered a mix of Ocós, Cherla, and some likely transitional sherds.

The two longest stratigraphic sequences included in the analysis are samples from middens in Mound 12. The sequences, 1207A through 1212A and 1219A through 1225A, are labeled in Figure 20.2. They are ordered correctly at the phase level. Units within a given phase (or subphase) tend to be either closely grouped or dispersed, yielding a lack of any satisfying sense of linear order.

Yet grouping by phase is strikingly successful, as shown in Figure 20.3, in the average linkage clustering of the coordinates from the multidimensional scaling (using JMP Pro 12.0.1). All the phases are successfully clustered, the only quibble being that Ocós samples are divided into two clusters.

Correspondence Analysis

Following Duff (1996), Jennifer Carballo seriated Formative-period refuse samples from central Tlaxcala using correspondence analysis and group average (or average linkage) cluster analysis (Lesure et al. 2014d:332–39). Correspondence analysis—performed here using JMP Pro 12.0.1—is designed for the analysis of large contingency tables. It identifies rows or columns with similar patterns of counts. The graphical output is similar to that of multidimensional scaling. The input, however, is different: ordinal values rather than the continuous distance measures of multidimensional scaling.

That shift brings us back to the challenge of incorporating distinctions at different typological levels (type class, specific type, details of rim form). The solution in multidimensional scaling was to average three separately calculated dissimilarity matrices. At first glance, correspondence analysis provides worse options. One could devise a huge contingency table split by both type and form (with 0's in many cells), but it is doubtful whether that would get at the key time-sensitive elements: beveled- and wedge-rim bowls (Locona) *versus* gadrooned- and scalloped-rim bowls (Ocós) and so forth.

For seriation of the Tlaxcala materials, we devised an input matrix based on Boolean variables (Lesure et al. 2014d:337–39). That same approach is used here for Paso de la Amada. The variables, described in Table 20.3, are statements that are either true (= 1) or false (= 0) for a given refuse sample. In the resulting matrix, the columns correspond to individual refuse samples and the rows are the variables from Table 20.3. The variables are devised based on characteristics of the phases shown in Figure 20.1, with

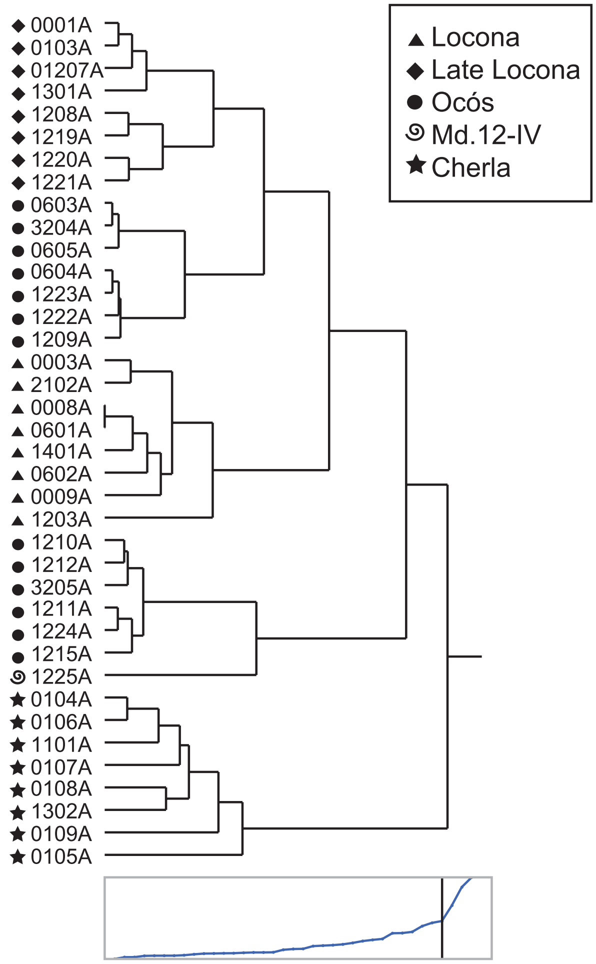


Figure 20.3. Cluster analysis of the coordinates from the multidimensional scaling (average linkage). *Illustration by R. Lesure and Katelyn Jo Bishop.*

the addition of Early Locona, represented by the single sample 0101A. One subtle tweak needs to be acknowledged: the variable 14:Earspools registers *two or more* ear ornaments. This is because some fragments had worked down into earlier deposits underneath the earspool-heavy Mound 1 platform—including one in the earliest deposit (0101A). Inclusion of that dramatically distorted results of the correspondence analysis.

The percentages of positives (1's) among the samples intuitively assigned to each phase or subphase are provided in Table 20.4. The patterning is strong. The more interesting point is the stark division between Ocós and Cherla compared to the more fuzzy division between Locona, Late Locona, and Ocós. The latter represent cases of gradual change, whereas the Ocós/Cherla transition was an abrupt stylistic shift. Both multivariate analyses bring out that distinction.

Figure 20.4 is a plot of the first two principal axes from the correspondence analysis of all 57 samples (including the transitional or mixed samples 1214A and 1225A from

Table 20.3. Boolean variables for correspondence analysis

Variable	Description
1:CotanRed-High	Cotan Red > 10% of rims identified to type
2:Plainware-Low	Decorated Rim Plain + Coarse < 10% of all type classes (leave out unidentified rims)
3:BR1+BR2-High	BR > 20% of B + BR + BC and BR1b + BR1c + BR2 > 70% of all BR (both must apply)
4:T2b+T2c-High	T2b +T2c > 20% of slipped tecomates (that is, forms T2 + T3, including all their variants)
5:PlainTeco-Low	T1 + T1a < 60% of all identified tecomates (leave out T)
6:ChiloRed-High	Chilo > 65% of Chilo Red + Paso Red
7:ChiloBR3/7	BR3a, b, c, or d, or BR7, present in Chilo Red
8:AmadaBlk-Br	Amada Black-to-Brown present
9:BR3+BR7-High	BR > 20% of B + BR + BC and BR3a + BR3b + BR3c + BR3d + BR7 > 40% of all BR (both must apply)
10:B1b-High	B1b > 25% of B1a + B1b
11:PasoRed-High	Paso > 40% of Chilo + Paso Red
12:PinoB&W	Pino Black and White present
13:ModRimT1-High	Mavi Buff + Michis Burnished Rim > 30% of Decorated Rim Plain type class
14:Red-Low/Blk-Wh-High	Red < 50% and Black-White > 25% among type classes Red + Brown-Orange-Pink + Black-White
15:EarOrnaments	Two or more fragments of clay ear ornament present
16:J1	Form J1 present in types Coarse or Mavi Buff

Table 20.4. Boolean variables from Table 20.3 with percentages of positives (1 as opposed to 0) among the samples intuitively assigned to each phase

Variable	Early Locona	Locona	Late Locona	Ocós	Cherla
1:CotanRed-High	100.0	0.0	0.0	0.0	0.0
2:Plainware-Low	100.0	7.7	0.0	0.0	0.0
3:BR1+BR2-High	0.0	100.0	0.0	0.0	0.0
4:T2b+T2c-High	0.0	61.5	15.4	12.5	8.3
5:PlainTeco-Low	100.0	76.9	38.5	6.3	0.0
6:ChiloRed-High	100.0	100.0	100.0	0.0	8.3
7:ChiloBR3/7	0.0	15.4	61.5	50.0	25.0
8:AmadaBrBlk	0.0	0.0	61.5	50.0	16.7
9:BR3+BR7-High	0.0	0.0	46.2	100.0	8.3
10:B1b-High	0.0	15.4	30.8	75.0	8.3
11:PasoRed-High	0.0	0.0	0.0	93.8	75.0
12:PinoB&W	0.0	0.0	0.0	12.5	100.0
13:ModRimT1-High	0.0	0.0	7.7	0.0	91.7
14:Red-Low/Blk-Wh-High	0.0	0.0	0.0	0.0	100.0
15:EarOrnaments	0.0	0.0	0.0	0.0	83.3
16:J1	0.0	0.0	0.0	0.0	100.0

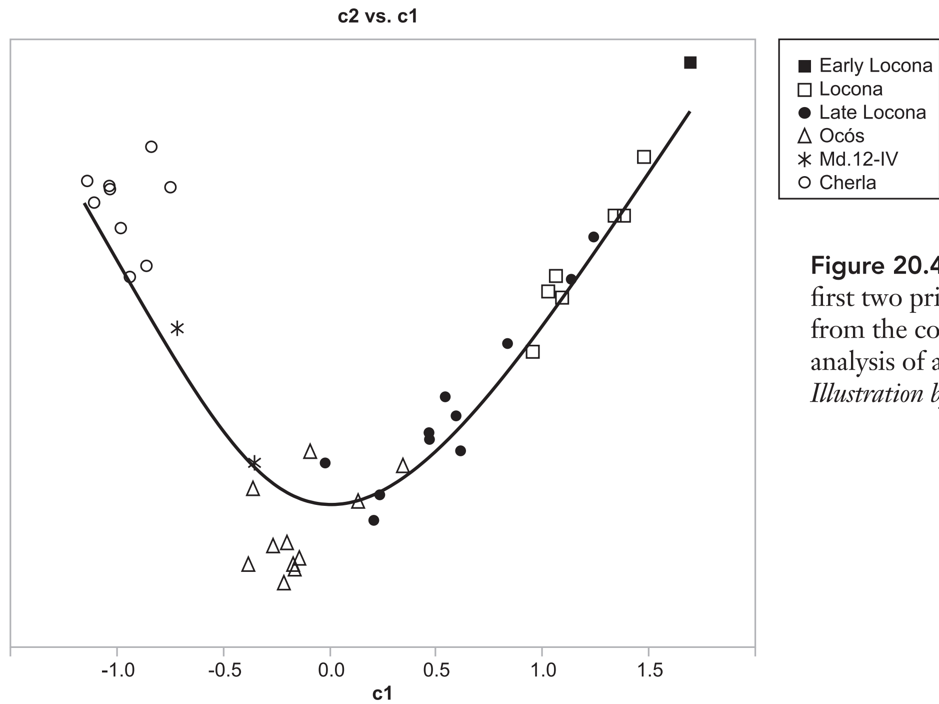


Figure 20.4. Plot of the first two principal axes from the correspondence analysis of all 57 samples. *Illustration by R. Lesure.*

the pre-platform occupation surface at Mound 12 [Md12-IV]). In contrast to multidimensional scaling, small samples were included in the analysis. The plot conforms well to the sort of horseshoe-shaped curve that suggests coherent results. The Cherla samples are strongly separated from the others, with the two Md12-IV samples falling between Cherla and Ocós. Ocós is separated from Locona, and Early Locona appears where it should, at the far end of the curve. Late Locona partially overlaps both Locona and Ocós.

The results of the group average cluster analysis of all three principal axes resulting from the correspondence analysis are shown in Figure 20.5. Inclusion of the third component in addition to the two graphed in Figure 20.4 separates the Early Locona sample out at a high level. The first division is between Early Locona and everything else. That is followed by division of Locona (with two Late Locona samples) from Late Locona/Ocós/Cherla, then Cherla from Late Locona/Ocós and finally Late Locona (with one Ocós sample) from Ocós (with four Late Locona samples).

Results for the two lengthy stratigraphic sequences from Mound 12 (1206A through 1214A and 1218A through 1225A) are shown in Figure 20.6. The earliest and latest units in each sequence are correctly positioned with respect to the others. In each case, the Late Locona samples and the Ocós samples are successfully distinguished from each other. However, the correspondence analysis does not successfully reproduce the specific stratigraphic ordering within phases. It is possible that further work on the input for the correspondence analysis would yield improved results, but I doubt that things would improve dramatically. The data appear to allow grouping by phase/subphase but not specific ordering of units.

One final experiment involved a further effort to separate Locona, Late Locona, and Ocós. The Early Locona, Cherla, and Md12-IV samples were excluded from this analysis, along with the variables devised to separate out those units. The variables included were 3:BR1+BR2-High through 11:PasoRed-High in Table 20.3. Figure 20.7 shows the results of group average clustering of the three principal axes. The separation of Locona, Late Locona, and Ocós is quite good but still not perfect.

STRATIGRAPHIC JUSTIFICATION OF THE PHASES

Strong patterning by phase is evident when the refuse samples are pooled (see Table 20.4). Multivariate analysis of refuse samples treated as individual units also separates the three phases (Locona, Ocós, and Cherla), with, in addition, a discernible transition between Locona and Ocós, described here as Late Locona (Figures 20.2–20.5). The present section contributes to the stratigraphic justification of the phases. Since it is anticipated that publications on Aquiles Serdán and Mound 6 at Paso de la Amada will address this topic in some detail, remarks here are brief. Data for the figures and the table are from Data Record A2 (the Level A rim sherd analysis), available online from the Costen Institute of Archaeology Press.

To examine chronological patterns, I primarily use the set of Boolean variables devised for the correspondence analysis. In Figures 20.8 through 20.10, blackened cells denote instances in which a statement from Table 20.3 was

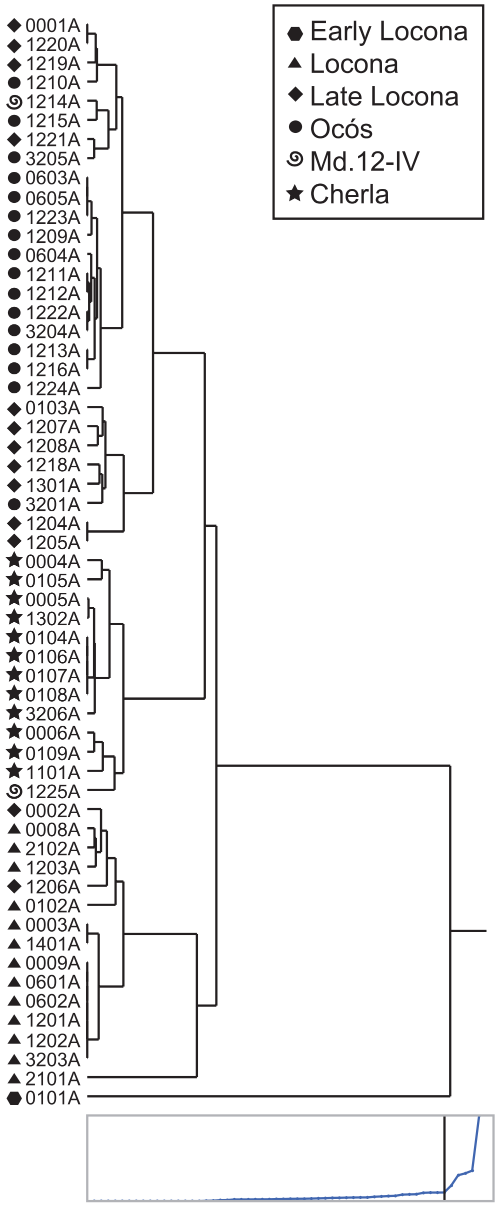


Figure 20.5. Cluster analysis of the coordinates from the three principal axes resulting from the correspondence analysis. *Illustration by R. Lesure and Katelyn Jo Bishop.*

true for a given refuse sample. Variables 7, 8, 14, 15, and 16 record only the presence of a given artifact. It proves helpful to know the actual counts; those are included in the corresponding cell (when greater than 0). Asterisks indicate departures from expectations that merit some comment in the following paragraphs.

Expectations for the phases are derived from the pooled samples for each phase, presented above in Table 20.4. For the purposes of easy comparison, those are provided in Figure 20.8 (shaded gray). No Early Locona sample is considered here. For Locona, we expect positive results for variables 3, 4, 5, and 6 (a low percentage of plain tecomates, a high percentage of Chilo Red, and Forms BR1, BR2, T2b, and T2c common). Note that in the case of variables 4 and 5, not all samples yielded positive results, an issue for all the phases (see Table 20.4). For Late Locona, we expect positive results in 62 to 100 percent of cases for variables 6 to 8 (a high percentage of Chilo Red, presence of Forms BR3 or BR7 in Chilo Red, and presence of Amada Black-to-Brown). In addition, in 31 to 46 percent of cases, we expect positive results for variables 5 and 9 (a low percentage of plain tecomates and forms BR3 and BR7 common). For the Ocós phase, we expect positive results in 50 to 100 percent of cases for variables 7 through 11 (forms BR3 or BR7 in Chilo Red, presence of Amada Black-to-Brown, a high percentage of Paso Red, and forms BR3, BR7, and B1b common). Finally, for the Cherla phase, we expect positive results in 75 to 100 percent of cases in variables 11 through 16 (high percentages of Paso Red and of the Black and White type class generally, a low percentage of the Red type class, a common occurrence of Michis Burnished Rim and Mavi Buff among plain-bodied tecomates, and presence of Pino Black and White, clay ear ornaments, and low-necked jars (Form J1) in the Coarse or Mavi Buff types.

In Trench 4, three refuse units in a stratified sequence—3203A, 3204A, and 3206A—capture the full basic phase sequence considered in this book, Locona, Ocós, and Cherla (Figure 20.8). The results strongly support the division of what Ceja Tenorio (1985) referred to as Ocós into three separate phases. They also point to some of the limitations of this (as with any) procedure for separating the phases. The limitations in this case are associated particularly with two of the variables that record simply the presence of a given artifact, variables 8 (presence of Amada Black-to-Brown) and 15 (presence of two or more ear ornaments). Amada Black-to-Brown is highly diagnostic of Late Locona and Ocós but rather rare. Numerous Ocós refuse units do not include any exemplars of the type. The absence here in a sample of 553 rims is somewhat surprising, but there were three Amada rims in the other large Ocós refuse sample from Mound 32 Feature 6 (3205A). Ear ornaments are generally a good Cherla-phase diagnostic, but their use appears to have varied by social status (Chapter 17). The absence of earspools in 3206A is likely a signal of the relatively low status of the occupants of the mound at that time.

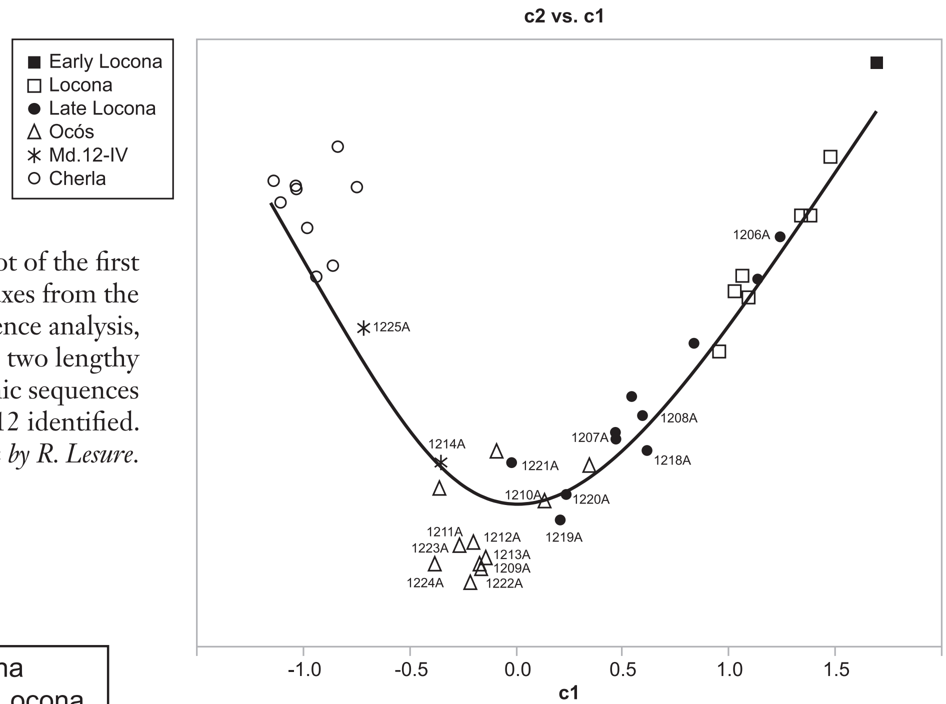


Figure 20.6. Plot of the first two principal axes from the correspondence analysis, with samples in two lengthy stratigraphic sequences from Mound 12 identified. *Illustration by R. Lesure.*

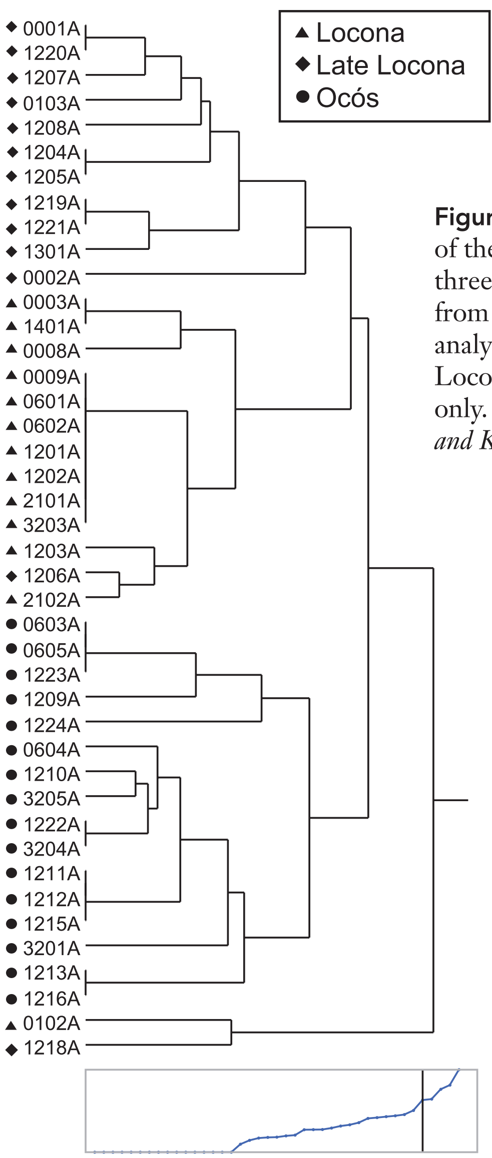


Figure 20.7. Cluster analysis of the coordinates from the three principal axes resulting from the correspondence analysis of Locona, Late Locona, and Ocós samples only. *Illustration by R. Lesure and Katelyn Jo Bishop.*

Variable	Mound 32 Trench 4			Expectations based on Table 20.4			
	3203A (Locona)	3204A (Ocós)	3206A (Cherla)	Locona	Late Locona	Ocós	Cherla
1:CotanRed-High							
2:Plainware-Low							
3:BR1+BR2-High				100%			
4:T2b+T2c-High				62%			
5:PlainTeco-Low				77%	39%		
6:ChiloRed-High				100%	100%		
7:ChiloBR3/7		3			62%	50%	
8:AmadaBlk-Br		*			62%	50%	
9:BR3+BR7-High					46%	100%	
10:B1b-High					31%	75%	
11:PasoRed-High						94%	75%
12:PinoB&W			19				100%
13:ModRimT1-High							92%
14:Red-Low/Blk-Wh-High							100%
15:EarOrnaments			*				83%
16:J1			1				100%
Total rims	253	553	108				
Percent Red identified to type	63.6	51.1	33.3				

Figure 20.8. A stratified sequence of three refuse samples from Mound 32, compared to expectations based on the entire pooled sample for each phase or subphase. Rows are the Boolean variables described in Table 20.3. Blackened cells indicate cases in which the appropriate statement from Table 20.3 was "true" (= 1) for a given sample. For variables that register the presence or absence of a given artifact, the observed count is provided (if > 0). Asterisks are discussed in the text. The percentage of the Red type class identified to type provides a measure of how eroded the collection was, an issue particularly important for variables 6 and 11. Expectations based on the entire pooled sample for each phase (in gray shading) register which of the Boolean variables yield a high percentage of 1's for a given phase. The percentage of 1's is provided in the corresponding cell (if > 30). *Illustration by R. Lesure.*

Variable	Locona		Late Locona				Ocós			Oc/Ch
	1201A	1202A	1218A	1219A	1220A	1221A	1222A	1223A	1224A	1225A
1:CotanRed-High										
2:Plainware-Low										
3:BR1+BR2-High										
4:T2b+T2c-High										
5:PlainTeco-Low										
6:ChiloRed-High										
7:ChiloBR3/7				9	10	5	3	3		2
8:AmadaBlk-Br				2	2	1				1
9:BR3+BR7-High										
10:B1b-High										
11:PasoRed-High										
12:PinoB&W										4
13:ModRimT1-High						*				
14:Red-Low/Blk-Wh-High										
15:EarOrnaments										
16:J1										
Total rims	40	57	80	150	170	142	97	103	118	151
Percent Red identified to type	42.1	54.2	48.7	31.3	48.4	45.1	41.9	54.8	80.0	57.6

Figure 20.9. A stratified sequence of 10 refuse samples from Mound 12, based on the same Boolean variables as the previous figure. Sample 1225A is from the ground surface immediately under the platform, with a mixture of Ocós and Cherla artifacts. The asterisk is discussed in the text. *Illustration by R. Lesure.*

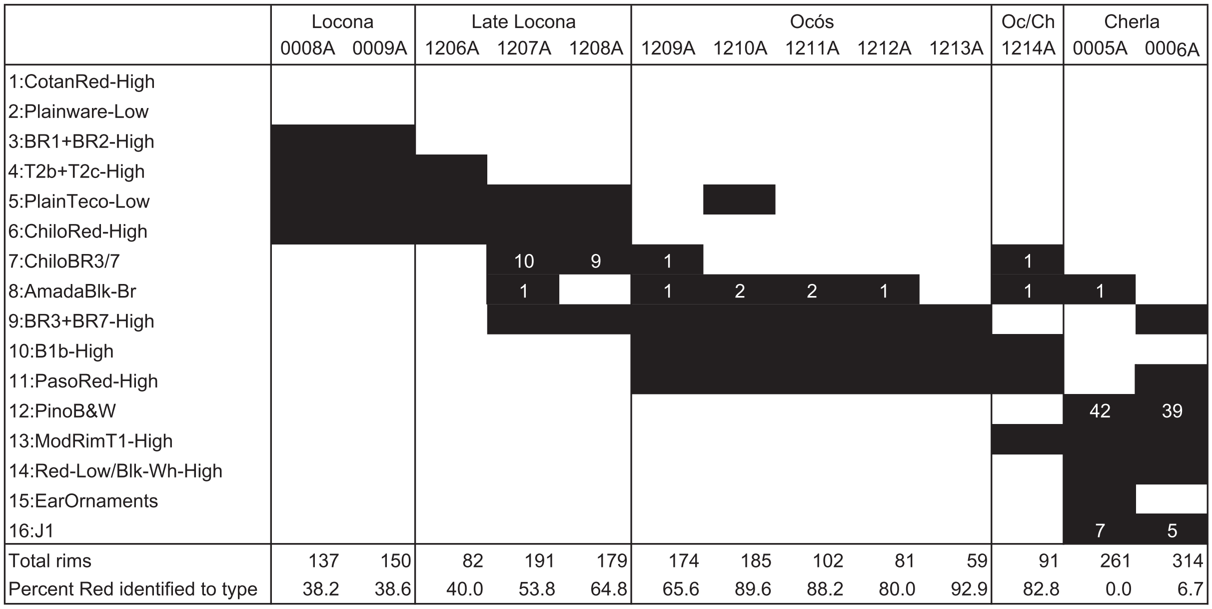


Figure 20.10. A stratified sequence of 10 refuse samples from Mound 12 (1206A through 1214A) with, at the left, two unmixed Locona samples from Mz-250 and, at the right, two (relatively) unmixed Cherla samples from Trench 1 (Clark's 1995 excavation between Mounds 6 and 7). *Illustration by R. Lesure.*

Table 20.5 presents, for the same three units from Mound 32, rim sherds identified in some way beyond simply an assignment to type class (mostly by assignment to one of the types described in Chapter 8). The types are grouped according to whether they are typical of Locona, Ocós, and so forth. There are a few carry-ups in the two later deposits, and one can glimpse portions of battleship curves in, for instance, the decline but not disappearance of Chilo Red and Papaya Orange-Pink between Locona and Ocós. Still, the grouping of types into the three phases (among three stratified units from the same trench) is strong.

Figure 20.9 presents a longer stratigraphic sequence from Mound 12. The sequence begins in Locona and ends with the mixed Ocós-Cherla ground surface underneath the platform. Units 1218A through 1225A are from Feature 11 in Section T1E of the trench. Units 1201A and 1202A (Feature 28 and Floor 8 in the extensive excavations in 1993) are displaced horizontally from those in T1E; for their stratigraphic relation to Feature 11, see Figure 4.8 and associated discussion. Separation of Locona from Late Locona is clear, as is the appearance of Cherla traits in 1225A, the uppermost layer of the Feature 11 pit. The elevated presence of burnished-rim Michis tecomates in 1221A is highly unusual (see Table 20.4). The rarity of Amada Black-to-Brown again poses a problem. At first glance, Late Locona and Ocós may seem rather similar, but there are important differences, particularly the prominence of Chilo Red (compared to Paso Red) among the Late Locona samples. Noteworthy as well are the significant numbers of BR3 and BR7 in Chilo Red in Late Locona compared to Ocós. The prevalence of outcurving rims (B1b) compared to outsloping rims (B1a) in these Late Locona samples is unusual, but it does occur in 30.8 percent of the samples from that subphase (Table 20.4).

A final example is shown in Figure 20.10. Here, the stratigraphic sequence is 1206A through 1214A, in the extensive excavations of 1992 (primarily Unit E4). I have added at the left two pure Locona contexts from Mz-250 and at the right two Cherla samples with (especially in the case of 0006A) little admixture from previous phases. The basic sequence again emerges quite clearly. In this case, also, the separation of Late Locona from Ocós is clear.

In sum, the basic goal of this section has been to reiterate that the differences among samples observed in previous sections of this chapter really are the result of diachronic change rather than, for instance, synchronic variation between clusters of residences.

CHRONOLOGICAL PATTERNS AMONG THE CERAMICS

This final section presents a series of tables that break down the assemblage of units analyzed to Levels A or B by phase. Note that this involves an expansion of the set of samples under consideration (from 57 to 126), since analyses in the preceding sections consider only units with ceramic analysis to Level A. (On levels of ceramic analysis, see Table 2.2 and associated discussion.) For description of the type classes, types, and vessel form designations mentioned here, see Chapter 8. Samples from three mixed but chronologically interesting contexts are included in these

Table 20.5. Percentage breakdown of identified rim sherds in the stratigraphic sequence of refuse samples from Mound 32 Trench 4

Types	Locona	Ocós	Cherla
	3203A	3204A	3206A
Typical Barra types			
Tusta Red	0.57	2.10	0.00
Tusta Red and Brown	0.00	0.30	0.00
Totals	*0.57*	*2.40*	*0.00*
Typical Locona types			
Chilo Red	43.18	16.82	1.43
Colona Brown	7.95	1.50	0.00
Gallo Pink on Red	0.00	0.60	0.00
Guijarra Stamped	1.70	0.00	0.00
Michis Specular Red Rim	1.70	0.90	1.43
Papaya Orange-Pink	11.93	2.40	0.00
Totals	*66.48*	*22.22*	*2.86*
Locona, Ocós, possibly Cherla			
Michis, unidentified	0.00	0.30	1.43
Michis Red Rim	18.75	34.53	7.14
Totals	*18.75*	*34.83*	*8.57*
Typical Ocós types			
Mijo Black and White	0.00	3.60	0.00
Paso Red	2.84	14.11	1.43
Totals	*2.84*	*17.72*	*1.43*
Ocós or Cherla			
Michis Burnished Rim	0.00	0.90	0.00
Typical Cherla types			
Aquiles Orange	0.00	0.00	1.43
Bala White	0.00	0.00	11.43
imported (Extranjero types)	0.00	0.00	4.29
Mavi Buff	0.00	0.00	15.71
Mavi Red and Buff	0.00	0.00	2.86
Pampas Black and White	0.00	0.00	1.43
Pino Black	0.00	0.00	2.86
Pino Black and White	0.00	0.00	27.14
Totals	*0.00*	*0.00*	*67.14*
Not diagnostic			
Brown	0.00	6.61	1.43
Coarse	8.52	5.41	12.86
Red or Red Rim	2.84	9.91	5.71
Totals	*11.36*	*21.92*	*20.00*
Total number of identified rims	**176**	**333**	**70**

tables. Md32-plat is the fill of the Locona-phase platform at Mound 32 with mixed Barra and Locona; Md12-IV is the buried ground surface under the Cherla-phase platform at Mound 12 (Ocós with some Cherla); Md1-V is the buried ground surface under the Cherla-phase platform at Mound 1 (mixed Ocós and Cherla with some Locona).

The changing frequencies of the type classes are shown in Table 20.6. The category "Other" consists mainly of bichromes. The main chronological patterns in surface treatment come out quite clearly. Decorated Rim Plain rises from Early Locona to Ocós, then plateaus. Red slips start out high and gradually decline. Over the sequence from early to late Locona, the main type is Chilo Red, replaced by Paso Red in Ocós and Cherla. Black-White-Gray instead starts out low and rises. The modest jump from Late Locona to Ocós marks the increased popularity of Mijo Black and White; there is a much more dramatic jump from Ocós to Cherla with the appearance of Pino Black and White and Pino Black. The mixed character of Md12-IV and Md1-V is evident particularly in this type class. There is some fluctuation in Brown-Orange-Pink. The Locona peak corresponds to the popularity of Colona Brown and Papaya Orange. The more modest Cherla peak should correspond to Bala Brown and Aquiles Orange, though many rims of the type class in those samples were not identified to type. The Coarse type class, which includes ritual vessels such as censers, proves to be a small, consistent percentage of assemblages throughout the occupation.

Table 20.7 presents the relative percentages of identified types by phase. In consideration of this table, it needs to be borne in mind that numerous rims were identified to type class only and not to a specific type. The types are grouped according to their expected phase of occurrence based on Clark and Cheetham (2005) (sometimes under slightly different names, as discussed in Chapter 8). They are generally well behaved, with deviations readily explicable in relation to the known mixing of some deposits. The most common Barra types (Cotan Red, Tusta Red, and Bayo Brown) are concentrated in two Early Locona

Table 20.6. Relative Percentages of Type Classes by Phase[a]

Type Class	Early Locona	Md32-plat	Locona	Late Locona	Ocós	Md12-IV	Md1-V	Cherla
Decorated Rim Plain	12.6	8.2	16.9	27.6	32.9	41.1	35.9	30.4
Red	66.7	68.2	57.2	52.1	44.9	35.8	35.2	20.4
Brown-Orange-Pink	9.2	13.6	14.8	7.3	6.2	1.8	8.5	8.9
Black-White-Gray	5.7	2.7	2.3	4.4	7.4	15.9	14.5	33.4
Stamped	0.0	0.0	0.9	1.8	1.5	0.9	0.5	0.5
Coarse	4.6	2.7	6.9	6.4	6.7	4.3	4.7	6.2
Other	1.1	4.5	0.9	0.4	0.4	0.3	0.6	0.3
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total rims	**87**	**110**	**1267**	**1516**	**2488**	**704**	**943**	**3744**
Unidentified rims[b]	**14**	**45**	**279**	**395**	**628**	**412**	**222**	**919**

[a] Includes units with ceramic analysis to Level A or B.
[b] Not included in total rims.

features and in mixed Barra-Locona fill of the Mound 32 platform. Other Barra types occur mainly as rare carry-ups in other deposits. Among Locona types, the rarity of Michis Specular Red Rim in relation to Michis Red Rim is notable; the former appears to have been mainly confined to the early part of the Locona phase. The precipitous decline in Chilo Red from Late Locona to Ocós is one of the main markers of the transition between the two phases. The Chilo Red observed in the Cherla sample reflects mixing in those deposits, particularly the platform fill at Mound 1. The only surprise for the Ocós types is the virtual absence of Alba Gray and Alba Red on White. The latter is readily identifiable and seems to have been a minor type at Paso de la Amada. Alba Gray was represented in the NWAF type collections by a small set of sherds with evenly colored light gray slip. Those identified here fit the characteristics of that collection well, but they were extraordinarily rare. If the surface were allowed to vary dramatically from white to black, then Alba Gray might start to overlap with Mijo Black and White. In the Paso de la Amada Cherla sample, the most prominent types are Pino Black and White, Michis Buff, Bala White, and Mavi Buff. The category "Pino, unidentified" is included because, early in the analysis, I was not distinguishing between Pino Black and White and Pino Black; I believe most of the Pino category is actually Pino Black and White.

Data Record 20.2 gives the raw data used to compose Tables 20.6 and 20.7. Rims classified to type class but not to a named type are registered as "unidentified" within each type class.

The rest of the tables examine patterns among the vessel forms. Table 20.8 considers the distribution of vessel forms according to the simplified functional classification described in Chapter 8. There is a basic formal–functional coherence throughout the 400 years under examination, with open bowls and tecomates the main forms. Patterns to note include the gradual rise in open bowls and the dramatic falloff of slipped tecomates. Tecomates with unslipped rims rise sharply during the Locona phase and then plateau. Tecomate lids and vertical-walled bowls are generally early forms, while plain jars make an appearance only at the end of the sequence. As discussed in Chapter 8, if the Cherla "basin" BR9 was a functional replacement for the Locona-Ocós "basin" B9, that would undermine the suggestion that the latter might have been used for boiling foods by the addition of heated rocks to the liquid contents.

Table 20.9 examines the basic modified-rim forms (minus the "basin" BR9). The row at the bottom records the percentage of bowls having modified rims. That percentage falls in the last three columns at the right because of the decline in the practice of rim modification of open bowls in the Cherla phase. Most of BR1, BR2, and BR3 in the Cherla sample are carry-ups, a point that posed challenges for multivariate analysis. Nevertheless, the association of BR1 with Locona, and BR3 and BR7 with Ocós is clear.

Table 20.10 provides relative percentages by phase of the detailed vessel form codes described in Chapter 8 (Figure 8.1).

Table 20.7. Relative percentages of identified types by phase

Types	Early Locona	Mound 32 Platform	Locona	Late Locona	Ocós	Md12-IV	Md1-V	Cherla	N
Typical Barra types									
Cotan Red	18.52	5.26	1.25	0.47	0.25	0.00	0.54	0.20	45
Bayo Brown	3.70	1.32	0.79	0.37	0.15	0.00	0.00	0.00	17
Tusta Red	1.85	1.32	0.23	0.00	0.45	0.20	0.00	0.07	16
Casnel Black on Orange	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1
Tepa Red on White	0.00	0.00	0.11	0.19	0.15	0.00	0.00	0.00	6
Tepa Red on Buff	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	1
Monte Red on Buff	0.00	2.63	0.11	0.00	0.10	0.00	0.13	0.03	7
Salta Orange	0.00	0.00	0.00	0.19	0.05	0.00	0.00	0.03	4
Capote White	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1
Typical Locona types									
Chilo Red	44.44	52.63	38.02	34.58	11.54	6.48	11.74	6.62	1316
Michis Specular Red Rim	1.85	0.00	1.93	0.28	0.25	0.20	1.21	0.20	42
Papaya Orange	0.00	5.26	8.97	0.84	0.81	0.20	0.67	0.00	114
Colona Brown	0.00	2.63	8.51	1.97	3.13	0.20	1.08	0.36	180
Guijarra Stamped	0.00	0.00	1.36	1.41	1.21	0.20	0.54	0.43	69
Gallo Pink on Red	0.00	3.95	0.68	0.19	0.25	0.00	0.40	0.07	21
Gallo Pink on Brown	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	1
Locona, Ocós, or Cherla									
Michis Red Rima	14.81	10.53	17.82	28.49	32.44	34.01	27.80	13.86	1914
Michis, unidentified	3.70	1.32	3.75	7.69	3.68	13.16	1.08	1.46	308
Typical Ocós types									
Paso Red	0.00	0.00	4.43	2.62	21.91	13.97	14.44	6.48	874
Mijo Black and White	0.00	0.00	0.23	4.78	7.91	0.20	1.21	0.10	223
Amada Black-to-Brown	0.00	0.00	0.00	1.22	0.71	1.02	0.13	0.13	37
Alba Gray	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	1
Alba Red and White	0.00	1.32	0.00	0.00	0.00	0.20	0.40	0.23	12
Ocós or Cherla									
Michis Burnished Rim	0.00	0.00	0.79	2.62	4.74	9.31	12.42	13.33	670

Types	Early Locona	Mound 32 Platform	Locona	Late Locona	Ocós	Md12-IV	Md1-V	Cherla	N
Typical Cherla types									
Pino Black and White	0.00	0.00	0.00	0.00	0.20	1.01	0.00	9.59	299
Pino, unidentified	0.00	0.00	0.00	0.28	0.00	3.44	10.26	14.19	525
Pino Black	0.00	0.00	0.00	0.00	0.05	0.00	0.13	1.39	44
Mavi Buff	0.00	0.00	0.00	0.19	0.10	1.01	2.43	7.77	262
Mavi Red Rim	0.00	0.00	0.00	0.00	0.00	0.61	0.67	1.06	40
Bala White	0.00	0.00	0.00	0.28	0.00	5.26	2.56	7.64	279
Bala Brown	0.00	0.00	0.00	0.00	0.05	0.20	0.40	2.32	75
Aquiles Orange	0.00	0.00	0.11	0.00	0.00	0.20	0.81	1.12	42
Extranjero Black and White	0.00	0.00	0.00	0.19	0.10	0.81	0.54	1.16	47
Fine Gray	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1
Imported Kaolin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1
Pampas Black and White	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1
Other									
Coarse	7.41	3.95	9.99	9.09	8.26	5.95	5.94	7.67	662
Brown, unidentified	0.00	2.63	0.68	2.06	1.41	1.59	2.02	2.35	152
Serdan Brown	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	1
Burnished Buff	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1
Red on Orange	1.85	0.00	0.00	0.00	0.00	0.00	0.13	0.00	2
Red and White	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	1
Red and Buff	0.00	1.32	0.00	0.00	0.05	0.00	0.13	0.03	4
Suchiate Brushed	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	1
Xquic Red	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1
Total rims	**54**	**76**	**881**	**1067**	**1985**	**494**	**741**	**3023**	**8321**

Table 20.8. Functional classification of vessel forms split by phase

Form	Early Locona	Mound 32 Platform	Locona	Late Locona	Ocós	Md12-IV	Md1-V	Cherla
open bowl	22.0	25.9	40.2	39.0	39.3	28.6	35.2	48.3
vertical-walled bowl	4.0	4.4	1.6	0.7	0.8	0.3	0.3	0.5
restricted-mouth bowl	0.0	0.7	3.2	2.5	2.1	1.3	1.0	1.6
unspecified bowl	9.0	8.1	1.7	0.5	3.8	14.8	9.1	5.2
slipped tecomate	34.0	25.2	18.6	11.8	9.3	4.1	8.5	6.0
decorated tecomate	0.0	0.0	0.0	0.7	0.5	0.5	0.1	0.1
unslipped tecomate	11.0	6.7	14.1	22.1	28.1	28.6	32.6	25.4
plain jar	0.0	0.0	0.3	0.0	0.0	0.1	0.1	1.4
slipped jar	0.0	0.7	0.1	0.1	0.1	0.1	0.2	0.1
tecomate lid	4.0	1.5	2.1	0.5	0.2	0.1	0.9	0.1
unspecified tecomate	16.0	25.9	14.5	17.5	12.1	19.8	9.6	9.6
basin (Form B9)	0.0	0.7	1.1	1.5	0.6	0.3	0.4	0.0
basin (Form BR9)	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.3
censer	0.0	0.0	0.5	0.6	0.6	0.2	0.6	0.4
crude plate (censer?)	0.0	0.0	2.0	2.5	2.4	1.2	1.4	1.0
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total rims	**100**	**135**	**1520**	**1906**	**2983**	**1006**	**1021**	**4274**
Unidentified rims[a]	**1**	**13**	**26**	**5**	**132**	**110**	**144**	**388**

[a] Not included in total rims.

Table 20.9. Percentage distribution of modified rim vessel forms BR1 through BR8, based on rim sherds

Modified-Rim Bowl Form	Early Locona	Mound 32 Platform	Locona	Late Locona	Ocós	Md12-IV	Md1-V	Cherla
BR1	0.0	93.8	60.8	19.9	19.3	10.4	21.4	16.6
BR2	57.1	0.0	25.9	18.6	12.3	13.4	12.2	16.3
BR3	14.3	0.0	3.2	38.6	41.5	46.3	38.8	28.6
BR4	14.3	0.0	1.6	3.0	5.0	3.0	5.1	1.8
BR5	0.0	0.0	2.6	4.2	3.3	9.0	11.2	21.9
BR6	14.3	6.3	2.9	4.7	1.3	0.0	2.0	1.1
BR7	0.0	0.0	1.9	9.7	16.8	11.9	9.2	12.0
BR8	0.0	0.0	1.0	1.3	0.5	6.0	0.0	1.8
Total rims	**7**	**16**	**309**	**236**	**398**	**67**	**98**	**283**
Percent modified rim[a]	**20.0**	**30.2**	**43.5**	**29.1**	**29.1**	**14.8**	**21.1**	**11.9**

[a] Percentage of all bowls (B, BR, BC) that have modified rims (BR1–BR8).

Table 20.10. Relative percentages by phase of the vessel form codes described in Chapter 8

Form Code	Early Locona	Locona	Late Locona	Ocós	Md12-IV	Cherla
B	6.9	0.6	0.5	3.0	0.4	1.0
B1	20.7	16.7	23.9	23.4	31.5	35.3
B2		0.2			0.8	0.4
B3	5.2	1.8	0.7	0.9	0.8	0.8
B4	1.7	2.5	2.5	2.6	1.7	7.9
B5		3.3	2.3	1.9	2.1	1.9
B6			0.1	0.1		
B7			0.1			
B8			0.1	0.1		
B9		1.0	1.5	0.7	0.4	
BC						0.1
BR1		13.8	2.5	2.7	0.8	1.3
BR2		5.0	2.4	1.7		1.4
BR3		0.8	4.9	5.7	2.5	1.7
BR4	1.7	0.4	0.4	0.7	0.8	0.2
BR5		0.5	0.5	0.4	0.8	1.0
BR6	1.7	0.7	0.6	0.2		0.1
BR7		0.3	1.2	2.2	2.1	0.9
BR8		0.2	0.2	0.1	1.7	0.2
BR9			0.1	0.1		0.5
C		0.4	0.6	0.6	0.4	0.3
J-pl.		0.2				1.7
J-sl.		0.1	0.1	0.1	0.4	0.3
L	3.4	2.0	0.5	0.3		0.1
P		0.1				
P1-2		1.8	2.6	2.6	1.2	1.0
T	15.5	13.7	17.2	11.8	15.8	12.3
T1	3.4	15.2	21.9	28.2	28.6	22.5
T2	39.7	18.0	11.5	9.2	5.8	6.2
T3		0.7	0.5	0.4	0.4	0.4
T4			0.8	0.5	0.8	0.1
T5						0.1
Total percent	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total rims	**58**	**1624**	**1863**	**2779**	**241**	**2229**
Unidentified		**33**	**3**	**119**	**1**	**1**

Figure 21.1. Bayo Brown vessel from Paso de la Amada: top: sherd from Mound 6 that tested positive for theobromine; bottom: reconstruction drawing of Barra-phase vessel assemblage, with pot similar to (a) marked. *Photo by Terry G. Powis; drawing by Ayax Moreno, used here courtesy of John Clark and the New World Archaeological Foundation.*

CHAPTER 21

Residue Analysis of Pottery from Paso de la Amada: Evidence for Use of Chili Pepper (*Capsicum* spp.)

Terry G. Powis, Richard G. Lesure, Michael Blake,
Louis Grivetti, and Nilesh W. Gaikwad

The history of food is one of the last intellectual frontiers.
Sophie Coe, 1994

THE CHEMICAL ANALYSIS of organic residues on ancient pottery fragments has given us a fresh look at food preparation and consumption in the past—opening new windows on the sometimes murky history of our ancient food practices (King and Powis 2014). For example, using mass spectrometry to analyze residues, archaeo-chemists have recently discovered early grape wine production in Armenia (Barnard et al. 2010; McGovern 2009), traced the likely origins of milk/dairy consumption in both Britain and Switzerland (Copley et al. 2005; Spangenberg et al. 2006), identified pulque production in Mexico (Correa-Ascencio et al. 2014), confirmed the earliest traces of cacao beverages in Mesoamerica (Powis et al. 2007) and South America (Zarrillo et al. 2018), and identified the use of ilex in Early Mississippian contexts at Cahokia (Crown et al. 2012) and Etowah (King et al. 2017) in the American South.

Given our understanding that containers made of low-fired ceramics, shell, and even stone are just porous enough that some parts of the concoctions they once held can be captured (recovered in a physical sample) and identified (detected chemically) allow us to determine how particular containers were used in a variety of social contexts and also when, where, and how particular foods or other concoctions were made. This brings up some important considerations for absorbed residue studies. First, it is vital to understand the nature of the food or beverage of interest. Second, not everything is absorbed into containers. And, third, not everything absorbed will preserve for centuries or millennia in the archaeological record. While any food or drink held in a container may have many different chemical components, only a small number will be unique only to that particular food or drink. Therefore, it is critical to understand the chemical nature of the target source and choose chemical indicators, or biomarkers, that indicate only its presence. That can be harder than it sounds.

The original goal of the residue research was to understand the whole range of possible foods (although primarily beverages) that villagers may have consumed through an investigation of organic compounds (residues) absorbed into the pottery fabrics of early Mokaya tecomates, bowls, dishes, and plates. In 2006 several of the authors conducted a small study on 16 pottery sherds, looking for evidence of cacao use during the earliest occupations from 1900 to 1300 BC (Barra-Cherla phases). One of the 16 vessels, a brown-slipped tecomate, tested positive for theobromine. This Bayo Brown ceramic type, with vertical fluting on its exterior surface, dated to the Barra phase (1900–1700 BC) (Figure 21.1). It was found in construction fill between Structures 6-3 and 6-4 in Mound 6 at Paso de la Amada. To date, this vessel, along with pots found in early contexts at the Olmec capital of San Lorenzo (Powis et al. 2011), represents the earliest evidence for cacao use in Mesoamerica (Powis et al. 2007, 2008).

Given the initial positive result, we wanted to expand the sample size not only to confirm cacao in additional vessel forms and types and contexts across the site's history but also to test for other possible staples, such as maize, chili, and manioc. While these four represent a fraction (out of 60) of the plant species of economic importance in the Soconusco, they are the best represented archaeologically at the site (Blake and Neff 2011:49–50). In this new study, we did not find traces of cacao, maize, or manioc. Fifteen sherds (9 percent) tested positive for chili.

In the summer of 2012, we tested 158 sherds for chemical traces of cacao, chili, maize, and manioc. The occupation of Paso de la Amada began during the Barra phase (1900–1700 BC), a period when both agriculture and pottery were introduced. Barra ceramic technology copied the styles of fancy gourd containers and was adopted for competitive social displays—perhaps linked to feasting (Clark and Blake 1994). Most Barra pottery consists of flat-bottomed tecomates or deep incurved bowls. Both are thin-walled, finely finished, and elaborately decorated. These ceramics were not designed for cooking but for holding liquids, presumably beverages such as *chicha* (corn beer), chocolate, or *atole* (a drink of ground corn and chocolate), consumed in social settings and conferring prestige on the giver. From the Locona phase, rounded-bottom utilitarian vessels appeared, and their importance in the vessel assemblage increased from then through the end of the occupation of the site (Clark and Gosser 1995; see also Table 2.8 and associated discussion in this volume). The basic idea is that pottery was initially used primarily for the serving of beverages, but from the Locona phase on, ceramic containers were used for a wide range of purposes, including cooking, preparation, storage, and service of both foods and beverages.

THE SAMPLE

The sample included 158 pottery sherds from 50 different proveniences. Sherds were chosen to represent a range of vessel forms and parts of vessels across multiple phases from early Locona to Cherla. The clumping or dispersion of samples across proveniences has no particular significance. We opened bags to select sherds until we had a set of well-preserved sherds from a given phase that seemed representative of the basic range of forms (Data Record 21.1). No intact vessels were sampled in this study. Ceramic forms consisted of 60 tecomates with slipped exterior walls, 54 tecomates with unslipped exteriors, 34 bowls, five censers, two plates, and two vases. A sample was taken primarily from either the interior base or the lower body of each vessel. In a few instances the neck and lid (or cover) were sampled for residue. The majority of the vessels were slipped either black, red, orange, or brown and were decorated with either gadrooning, fluting, incised lines, or fabric impressions. Ceramic types and their associated phases are also listed in Data Record 21.1. All the vessels are derived from stratified contexts dating from the Barra through Cherla ceramic phases in Mounds 1, 6, 7, 12, and 32.

RESIDUE COLLECTION

Sherds studied were housed at the New World Archaeological Foundation lab in San Cristóbal de Las Casas, Chiapas, Mexico. All the sherd material was stored in plastic bags inside flour sacks. Although the flour sacks were housed in a storage facility, none of the vessels had been stored in a humidity-controlled environment since their excavation. Accession numbers were given to each sherd sampled. (See Data Record 21.1.)

The material had been previously washed. As a consequence, no organic residue was visible on the inside of each vessel. Ancient Mokaya pottery is low-fired, typically under 650°C, and therefore is ideal for absorbing and retaining organic compounds. While there were no visible organics adhering to the interior of these pottery fabrics, chemical extraction techniques were necessary for confirmation using a standardized technique. The interior surface of each vessel was lightly scraped with a new piece of fine-grained sandpaper to remove any substances that may have permeated the vessel wall. Latex gloves were worn for each sample collected. Burr from each sample, ranging from 1 to 10 g, was captured on a new sheet of multipurpose white paper, and the material was funneled into clean, previously unused collection vials and immediately sealed. New sheets of sandpaper and multipurpose white paper were used for each sample collected. This method was rigorously upheld throughout the collection process to eliminate potential cross-contamination of sample materials. Following collection, sealed vials were sent to the Metabolomics Lab in the Department of Nutrition at the University of California–Davis for analysis.

LABORATORY ANALYSIS

Capsaicin, dihydrocapsaicin, 4-OH,3-OMe-benzylamine, 3,4-Dihydroxybenzylamine, and formic acid were purchased from Sigma-Aldrich Chemical Company (St. Louis, Missouri). All solvents were mass spectrometry grade and all other chemicals used were of the highest grade available. Acquity UPLC HSS T3 1.7 µm (1 x 150 mm) column was purchased from Waters Corporation in Milford, Massachusetts.

Extraction of Paso de la Amada Pottery Samples

In total, 158 pottery samples were extracted using the following procedure: 222 mg of burr from each sample was vortexed with 1 ml of methanol:chloroform mixture (1:1) for three minutes and then centrifuged. The resulting precipitate from each sample was removed, and the supernatant was concentrated with SpeedVac. To the residue, 100 ul of methanol:water (1:1) was added. This was then vortexed and filtered with 5 kD membrane filters. The filtrates were transferred to vials for UPLC/MS-MS analysis.

Ultra Performance Liquid Chromatography (UPLC)/MS-MS Analysis

A Xevo-TQ triple quadruple mass spectrometer (from Waters) was used to record MS and MS-MS spectra using electro spray ionization (ESI) in positive ion (PI) mode, with a capillary voltage of 3.0 kV, an extractor cone voltage of 3 V, and a detector voltage of 500 V. Cone gas flow was set at 50 L/h, and desolvation gas flow was maintained at 600 L/h. Source temperature and desolvation temperature were set to 150 and 350°C, respectively. The collision energy was varied from 6 to 13 to optimize four different daughter ions. The acquisition range was 20 to 350 D. Pure standards (Figure 21.2) (capsaicin, dihydrocapsaicin, 4-OH,3-OMe-benzylamine, and 3,4-Dihydroxybenzylamine) were introduced to the source at a flow rate of 10 ml per minute by using methanol:water (1:1) and 0.1 percent formic acid mixture as the carrier solution to develop multiple reaction monitoring (MRM) for UPLC/MS-MS operation.

UPLC/MS-MS analyses of all the samples were carried out with a Waters Acquity UPLC system connected with a Xevo-TQ triple quadruple mass spectrometer. Analytical separations on the UPLC system were conducted using an Acquity UPLC HSS T3 1.7 µm column (1 x 150 mm) at a flow rate of 0.15 ml per minute. The gradient started with 100 percent A (0.1 percent formic acid in H_2O) and 0 percent B (0.1 percent formic acid in CH_3CN), changed to 50 percent A over three minutes, followed by a four-minute linear gradient to 10 percent A, resulting in a total separation time of seven minutes. The elution from the UPLC column was introduced to the mass spectrometer and resulting data were analyzed and processed using MassLynx 4.2 software. Pure standard mixture was used to optimize the UPLC conditions prior to analysis. After LCMS analysis, the remaining extract of the samples was stored at -80°C in the Metabolomics Lab in the Department of Nutrition at UC Davis for further evaluation.

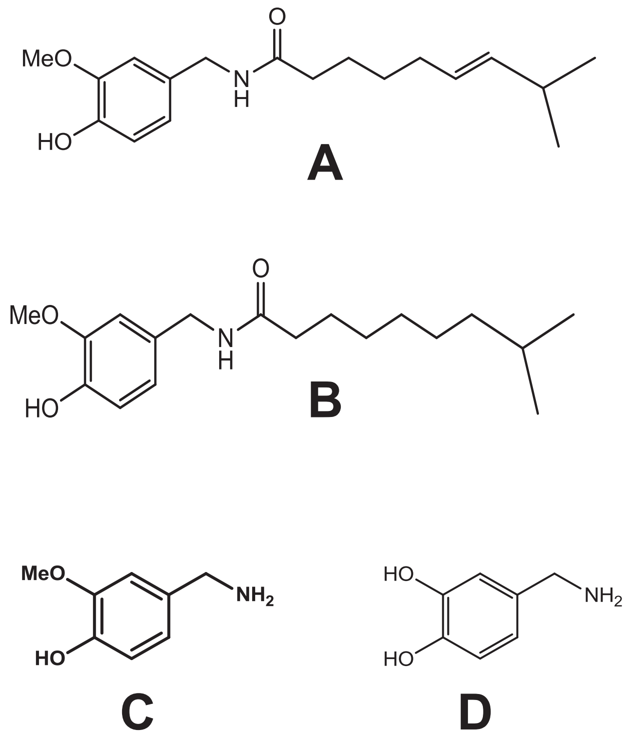


Figure 21.2. Structures of: (a) capsaicin; (b) dihydrocapsaicin; (c) 4-OH,3-OMe-benzylamine; and (d) 3,4-Dihydroxybenzylamine.
Illustration by Nilesh Gaikwad.

RESULTS

As noted at the beginning of this chapter, the current study was focused on identifying organic compounds from cacao, chili, maize, and manioc. However, no evidence for cacao, maize, or manioc was identified in any of the 158 samples analyzed. Of the 158 samples derived from archaeological contexts, 15 returned results that we interpret as consistent with the presence of chili pepper (*Capsicum* spp.) (See Data Record 21.1.) Positive results for chili pepper were found in Vessels 83, 88, 93, 102, 113, 115, 121, 123, 128, 129, 132, 133, 134, 145, and 154. Vessels 83, 88, and 93 represent the earliest positive chemical signature and confirm early chili pepper consumption at Paso de la Amada by 1700 BC (Locona phase) (Figure 21.3). Vessels 102, 113, 115, and 145 are dated slightly later, to 1500 BC (Ocós phase), while Vessels 121, 123, 128, 129, and 132–134 are all dated from 1300 to 1200 BC (Cherla phase). All the pottery that tested positive for chili derived from either Mound 1 or Mound 12 at Paso de la Amada.

The UPLC/MS-MS analyses of Paso samples clearly show a presence of peak at 5.04 and 5.47 minutes that matches well with the standard capsaicin (Figure 21.4) and dihydrocapsaicin (Figure 21.5). Samples also showed a presence of peak at 0.80 minutes that matches well with the standard 4-OH,3-OMe-benzylamine (Figure 21.6). Similarly, peak at 0.81 minutes matched well with the standard 3,4-Dihydroxybenzylamine (Figure 21.7). Additionally, no peaks that corresponded with the standard capsaicin peak were seen in Paso samples (data not shown). Data Record 21.1 shows all the positive results for capsaicin, dihydrocapsaicin, 4-OH,3-OMe-benzylamine, and 3,4-Dihydroxybenzylamine (83, 88, 93, 102, 113, 115, 121, 123, 128, 129, 132, 133, 134, 145, and 154), which collectively confirm the presence of chili. The rest of the Paso samples did not show presence of detectable peaks at 5.04, 5.44, 0.82 and 0.81 minutes.

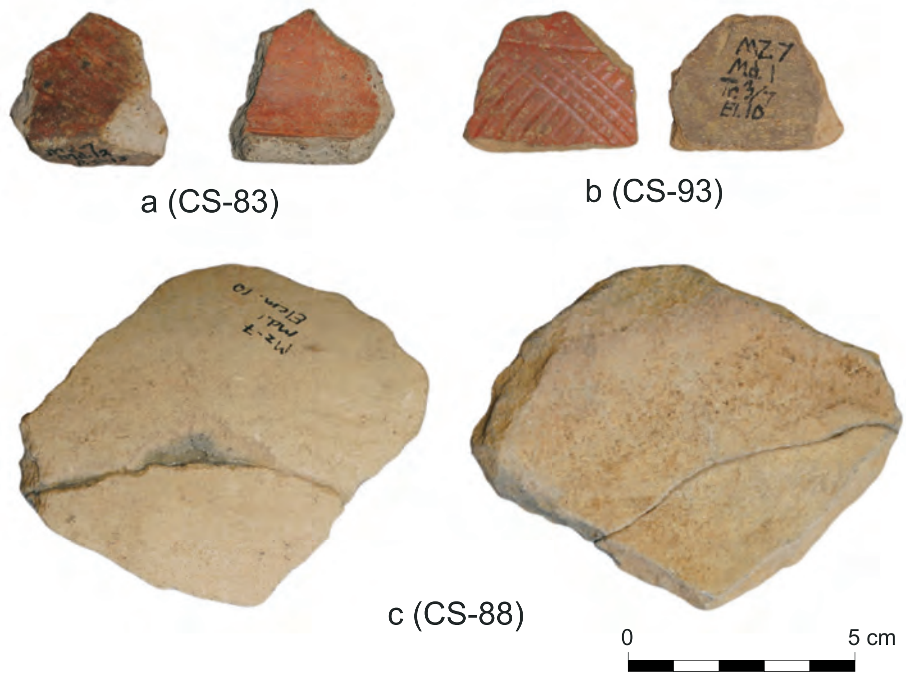


Figure 21.3. Earliest sherds from Paso de la Amada containing evidence for chili. Proveniences: (a) Md. 12 P5/13; (b) Md. 1 Feature 10; (c) Md. 1 Feature 10. *Photos by Terry G. Powis.*

PREVIOUS RESEARCH ON MESOAMERICAN USE OF CHILI PEPPER

The genus *Capsicum* is New World in origin and contains a complex of 20 to 30 wild species and five domesticated taxa: *C. annuum*, *C. baccatum*, *C. chinense*, *C. frutescens*, and *C. pubescens* (McLeod et al. 1982). Of the five domesticated species of chili pepper, *C. baccatum* and *C. chinense* initially were domesticated in northern South America, while it is probable that *C. annuum*, *C. frutescens*, and *C. pubescens* initially were domesticated in Mexico or northern Central America (McLeod et al. 1982; Perry et al. 2007; Pickersgill 1969).

Powis et al. (2013) recently summarized what is known about *Capsicum* in the archaeological record (see below), and Kraft et al. (2014) examined a range of evidence—linguistic, ecological, archaeological, and genetic—to reveal the birthplace of chili. Kraft et al. (2014) traced where jalapeño and bell peppers were first used and likely domesticated to a region of Central/East Mexico, in a swathe ranging from southern Puebla and northern Oaxaca to southeastern Veracruz. They pinpointed the place where chili (*Capsicum annuum*) was domesticated by looking for areas where there was the greatest diversity of its wild relatives. They reasoned that the more diversity, the longer wild pepper lineages had been evolving. This kind of traditional genetic evidence, based on 139 wild peppers, seemed to pinpoint the origins of the chili pepper's domestication to northeastern Mexico. But Kraft and his colleagues also took into account previously obtained archaeological remains of pepper plants, along with linguistic evidence. Kraft et al. (2014) found, east of the Valley of Tehuacán, where the most ancient remains of the spice have been uncovered, the oldest word for chili, spoken in Proto-Otomanguean some 6,500 years ago. (Note that *chili* has more recent origins, in the Aztec language Nahuatl, from some 1,500 years ago.) To this evidence they added a mathematical model of the distribution of wild chili pepper plants to predict areas most environmentally suitable for the domesticated chili pepper. That shifted the origins of the big bang of chili heat to a region in Central/East Mexico.

Relatively few sites in Mesoamerica, Central America, and South America have yielded remains of *Capsicum*. We therefore know little about how groups such as the Mokaya, Olmec, Zapotec, and Maya used chili peppers. Powis et al. (2013) did find *Capsicum* residues in 2,400-year-old pottery samples from the site of Chiapa de Corzo in southern Mexico, home of the Mixe-Zoquean; it is the earliest evidence of chili consumption in properly dated archaeological sites. They discovered *Capsicum* residues in five different pottery vessels, including two spouted jars used for pouring liquids into another container (Powis et al. 2013). The pottery vessels may have been used in either a culinary, pharmaceutical, or ritual perspective during the last few centuries before the time of Christ.

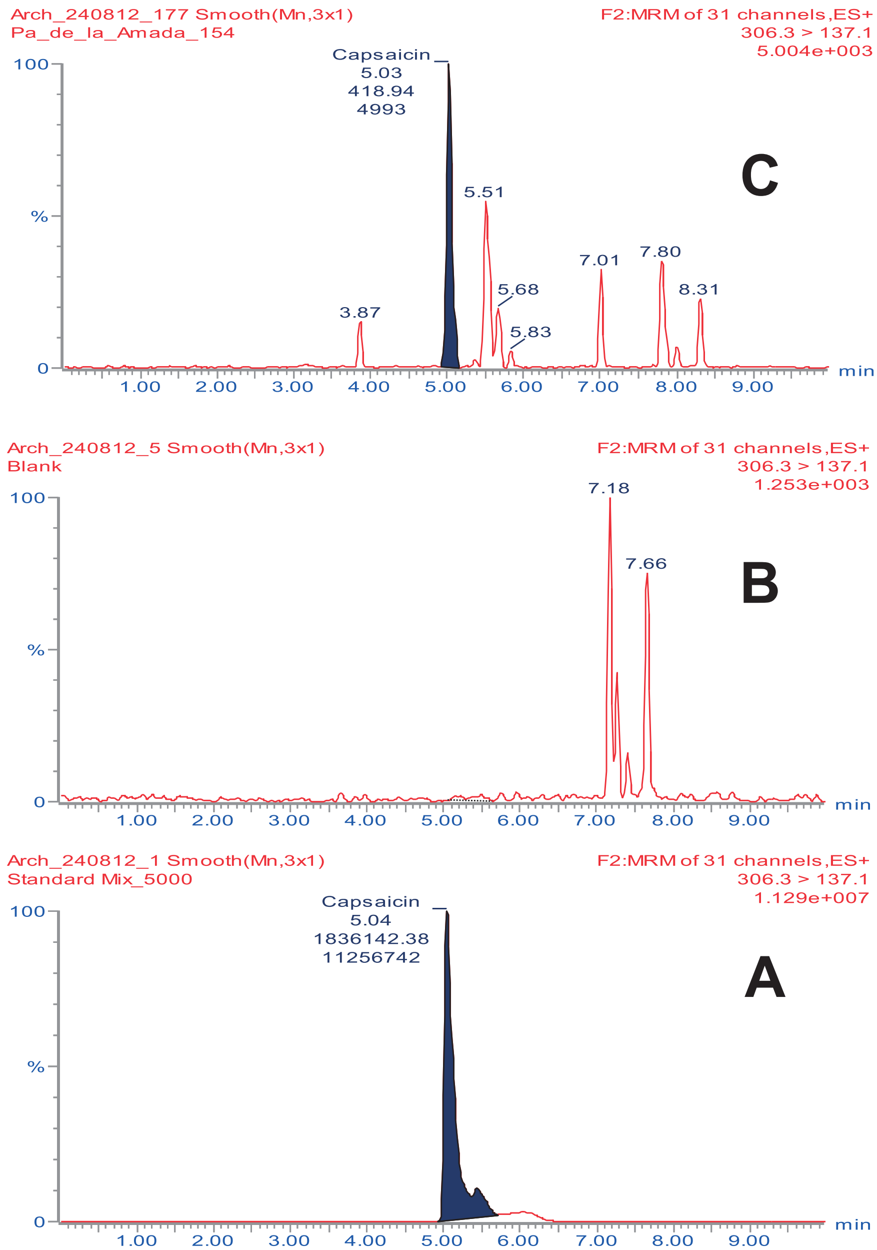


Figure 21.4. UPLC/MS-MS chromatograms illustrating: (a) standard capsaicin; (b) blank; (c) representative Paso sample confirming the presence of capsaicin. *Illustration by Nilesh Gaikwad.*

Except for the recent study conducted by Powis et al. (2013), no chemical extractions have been performed on pottery to determine the use of chili peppers. The occurrence of *Capsicum* in the paleoethnobotanical record is limited to microfossil and macrofossil remains only. And those pepper specimens that have been found archaeologically are few in number compared to the frequency of other foodstuffs, such as beans, maize, manioc, and squash. The identification of so few chili pepper remains may be the result of poor preservation, sampling bias and/or error in both the field and the laboratory, and/or the lack of a research focus on the daily subsistence and dietary practices of Mesoamerican peoples.

In South America, Perry et al. (2007) have identified starch grains of *Capsicum* from the sites of Loma Alta and Real Alto in southwestern Ecuador. These microfossil remains were found on milling stones and in cooking pots dating to around 6,000 years ago, representing some of the earliest dated chili peppers in the New World. Pickersgill (1969) also identified *C. baccatum* and *C. chinense* from two coastal Peruvian sites (Huaca Prieta and Punta Grande) that have been securely dated to around 3,800 years ago.

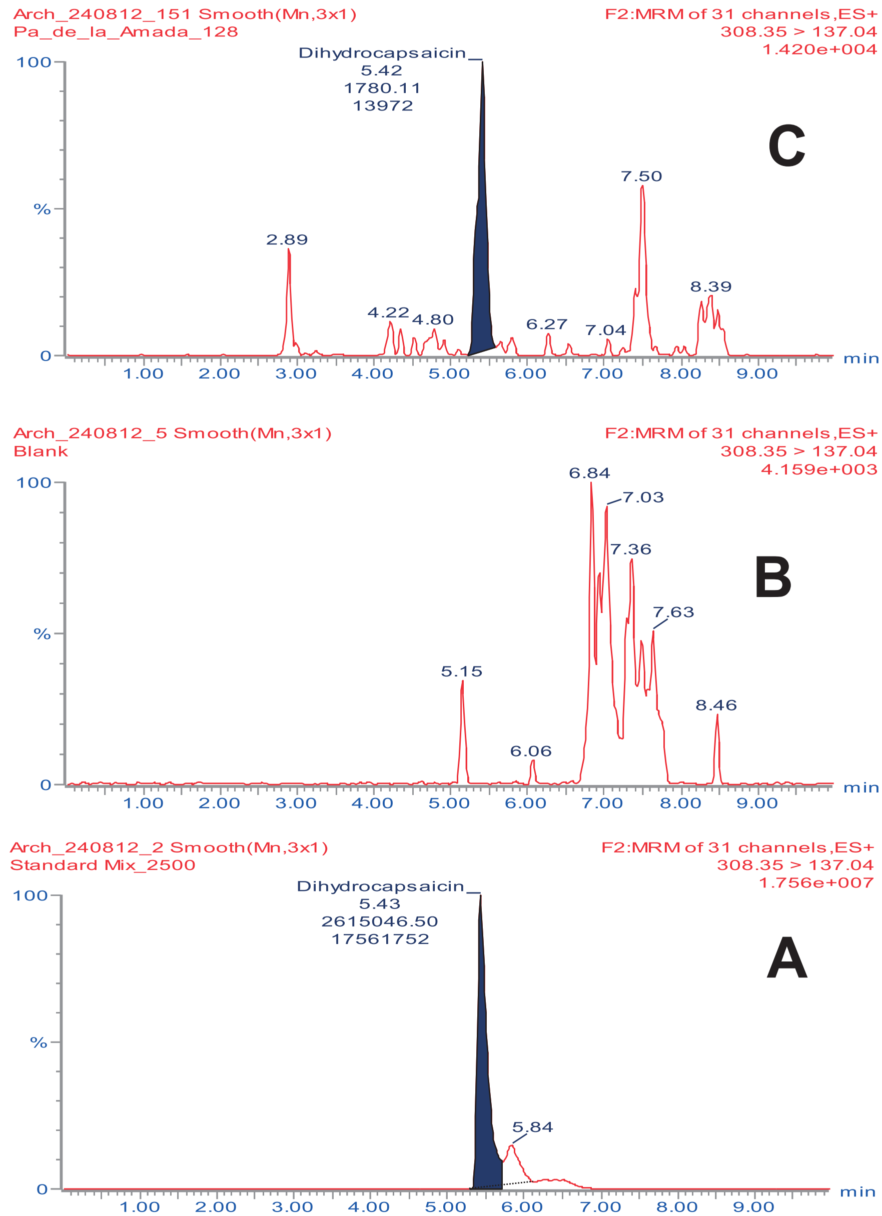


Figure 21.5. UPLC/MS-MS chromatograms illustrating: (a) standard dihydrocapsaicin; (b) blank; (c) representative Paso sample confirming the presence of dihydrocapsaicin. *Illustration by Nilesh Gaikwad.*

In Mesoamerica, the macrofossil data are more robust. In Oaxaca, Mexico, Perry and Flannery (2007) identified 8,000-year-old chili stems, possibly harvested from wild chilis, from the dry cave Guila Naquitz. Domesticated chili peppers have also been recovered from Guila Naquitz and the nearby site of Silvia's Cave. A total of 122 well-preserved chili peppers (identified as *C. annuum* and *C. frutescens*) were recovered with other domesticates (avocados, beans, maize, and squash) in floor deposits dating from AD 600 to 1521. Both species, along with the other domesticated plants, were discarded as refuse, likely by work groups who camped in the caves for short periods while away from their villages (Perry and Flannery 2007).

Elsewhere in Mexico, McClung de Tapia and Barba (2011) identified macrofossil remains of *Capsicum* in construction fill while excavating in the tunnel under the Pyramid of the Sun at Teotihuacan. The remains are dated to AD 150–250. In northern Mexico, Minnis and Whalen (2010) identified *C. annuum* from a room in Site 315, located about 3.2 km from Casas Grandes/Paquime in northwestern Chihuahua. The charred specimen was excavated from a subfloor trash deposit dating to AD 1200–1450.

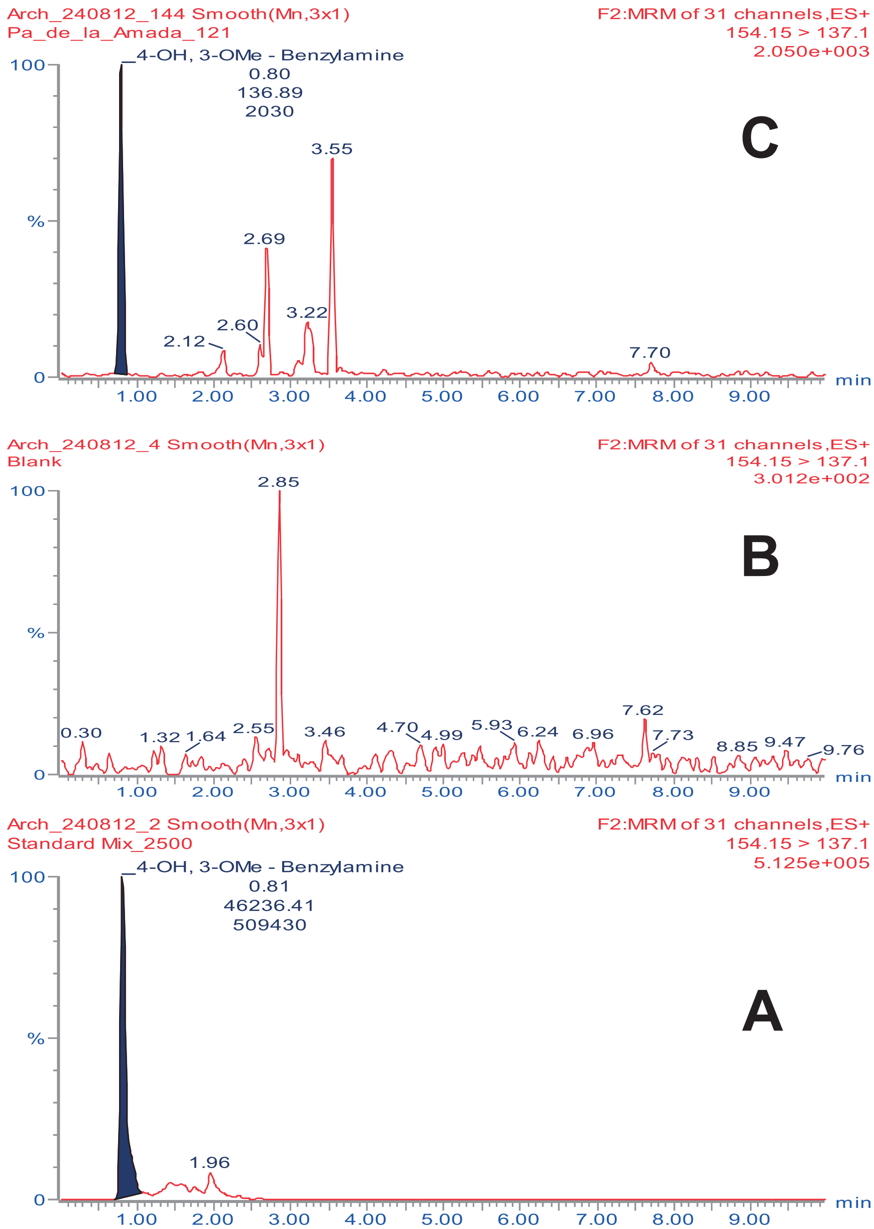


Figure 21.6. UPLC/MS-MS chromatograms illustrating: (a) standard 4-OH-3OMe-benzylamine; (b) blank; (c) representative Paso sample confirming the presence of 4-OH-3OMe-benzylamine. *Illustration by Nilesh Gaikwad.*

Comparatively speaking, the recovery of chili peppers from archaeological sites in the Maya area has been rare. Based on archaeological and linguistic evidence, Colunga-Garcia Marin and Zizumbo-Villarreal (2004) indicated that chili was being cultivated by 1700 BC, if not earlier. Lentz (1999) concluded that by at least 1200 BC, the ancient Maya had a maize-based system of food production that included beans, peppers, and squash. Archaeologically, the earliest example of chili in the Maya area comes from the northern Belize site of Cuello, where one seed of wild *Capsicum* spp., dating to the Middle Preclassic (1000–400 BC), was found during flotation (Miksicek et al. 1991; Turner and Miksicek 1984). Wood charcoal from domesticated chili was also recovered from a sealed *chultun* (subterranean storage feature) at Cuelllo and dated to the Late Preclassic (AD 100–200) period (Hammond and Miksicek 1981). At Cerros, another site located in northern Belize, a single seed, identified as *Capsicum spp.*, was found in a Late Preclassic deposit (Cliff and Crane 1989). Late Classic carbonized peduncles of *C. annuum* have been identified at Dos Pilas in Guatemala (Lentz 1991). Ceren, located in El Salvador, has produced the best archaeological evidence

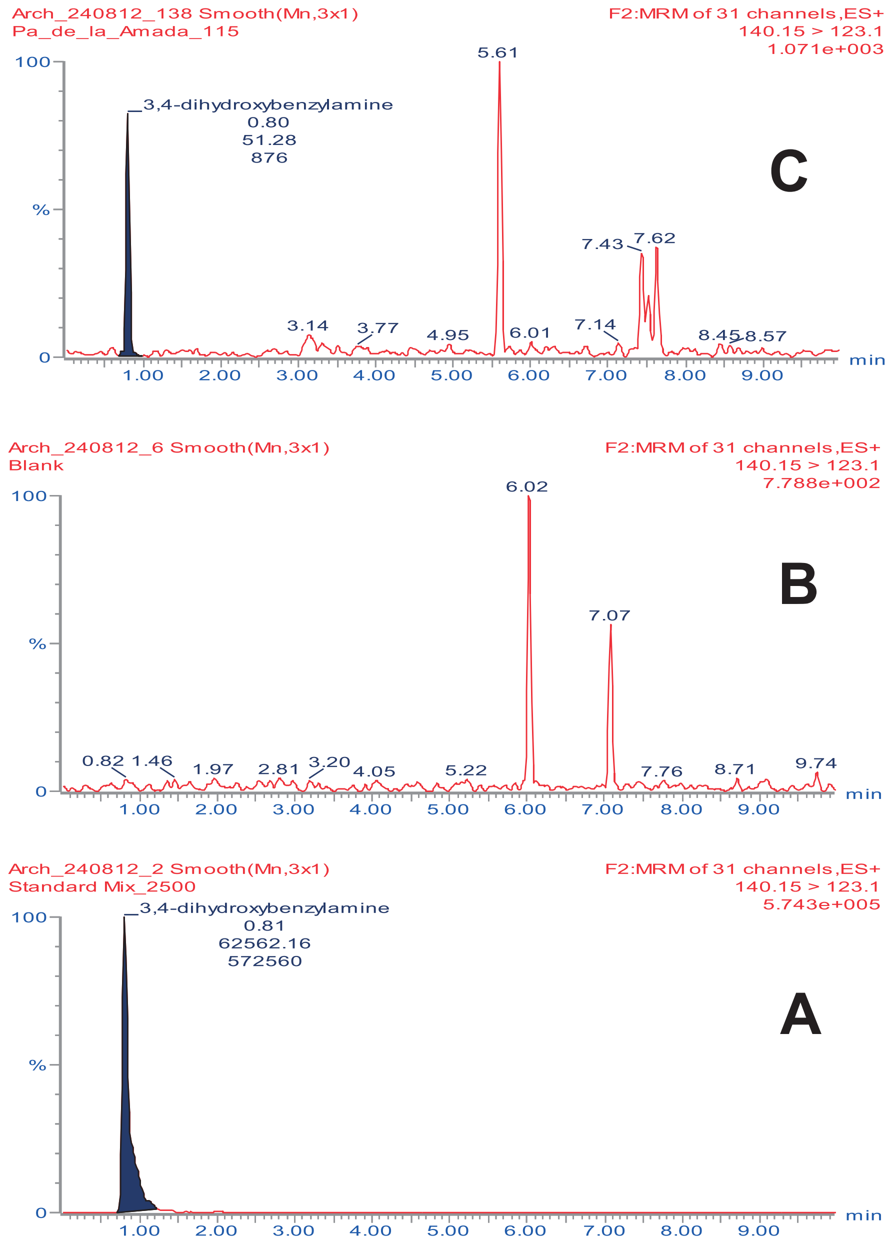


Figure 21.7. UPLC/MS-MS chromatograms illustrating: (a) standard 3,4-Dihydrobenzylamine; (b) blank; (c) representative Paso sample confirming the presence of 3,4-Dihydrobenzylamine. *Illustration by Nilesh Gaikwad.*

for chili in Mesoamerica. Lentz et al. (1996) reported the carbonized remains of seeds, peduncles, and rinds of *C. annuum*. These macrofossils were found in great abundance, especially in storage rooms and in a kitchen area where the ancient Maya suspended chili peppers from rafters in large clusters. These carbonized remains were well preserved by ash and lava from the Loma Caldera volcanic eruption in AD 540 (Lentz et al. 1996).

DISCUSSION OF THE PASO DE LA AMADA RESULTS

It is clear that chili was consumed at Paso de la Amada. Can we learn anything about specific consumption patterns from the internal breakdown of the sample by phase, context, and vessel form? Our reading of the results is that chili was probably widely used in meals throughout the occupation of the site but that its residue is often poorly preserved due to a variety of not-well-understood factors.

One salient pattern among the samples that tested positive for chili is the steep temporal gradient: 5 percent positives among Locona samples, 11 percent among Ocós samples, and 33 percent among Cherla samples. Those results raise the possibility of sample age being a significant factor in deterioration of the residue. That seems likely, but consideration of the temporal breakdown of the Locona samples indicates that other factors must be involved: 14 percent of early Locona samples tested positive, compared to 4 percent of late Locona and none of the samples simply classified as "Locona."

Those observations lead to a second salient pattern: the unequal distribution of positive results among excavation locales. From Mound 1, 21 percent of 47 samples tested positive, and from Mound 12, 10 percent of 48 samples. There were no positive results from Mound 6, Mound 32, or Mz-250 (with 30, 22, and 11 samples, respectively). Those last locations were an important source of Locona samples. Inclusion of those helps to generate the temporal gradient in positive results, though the high incidence of positives in the two Cherla proveniences (Lot 11 in Units F9 and H9 at Mound 1) is important as well.

Depth beneath surface is not a good predictor of positive results: the samples from Mound 6 (all negative) were particularly deeply buried and apparently well preserved. Further, preservation seems to vary even within individual excavation locales. It is surprising that two of 10 samples from Mound 1 Feature 10 were positive whereas all of the 12 samples from Feature 15 at the same mound were negative. We would have expected the reverse, since the refuse in Feature 15 included larger, better-preserved sherds. Materials in the two features were at similar depths beneath surface, and those in Feature 15 were more deeply buried than the Cherla samples in F9 and H9, no more than 4 m away horizontally.

The overall conclusion we draw from the above is that deterioration of traces of chili is a significant factor and that the processes involved are complex enough to not be predictable in any obvious way (such as age or depth beneath surface). The implication is that there are limits on how far we will be able to push interpretation of positive results by vessel form.

Chili residues were identified on a range of vessel forms, most commonly on utilitarian tecomates with unslipped exterior walls (Michis Red Rim or related types, six cases, 40 percent of those that tested positive) but also on bowls or dishes (five cases, 33 percent), tecomates with slipped exteriors (three cases, 20 percent), and a censer (Form C1, one case, 6 percent). Overall, those results suggest that chili was widely used in different kinds of foods and beverages. The plain-walled tecomates were used for cooking, transport, and storage of food and liquids. Bowls were mainly used for food service, and slipped-exterior tecomates likely had a variety of functions, including liquid service. The positive result on the censer is a surprise. We are not sure what to make of that, except to suggest that it reinforces the idea that the use of chili was widespread.

Overall, the breakdown by vessel form suggests that chili may have been more important in foods than in beverages. The rate of positive results was similar among plain-walled tecomates (11.1 percent) and bowls (14.7 percent) and somewhat less among slipped tecomates (5 percent). Of course, many of the slipped tecomates tested were Locona samples from locations that yielded no positive results. However, considering Cherla samples only, we get the same pattern: 43 percent positive results among the plain tecomates tested, 43 percent among the bowls, and 14 percent among the slipped tecomates.

CONCUSIONS

The present study initially was conducted to search for chemical traces of cacao, chili, maize, and manioc in a variety of vessel forms (such as bowls, dishes, plates, and tecomates). While we sought to recover evidence of cacao, maize, and manioc, none was found. However, we identified traces of *Capsicum* in 9 percent of the sampled pottery. The results of the chemical extractions provide definitive proof that Locona-, Ocós-, and Cherla-phase ceramics from Paso contained *Capsicum*. The information obtained from the Paso pots extends the date of chili pepper use by Mesoamerican peoples by 1,300 years, to about 1700 BC, in the Initial Formative period.

While our scientific study has pushed back the antiquity of Mesoamerican chili pepper presence, we are most interested in how the pepper may have been used either from a culinary, pharmaceutical, or ritual perspective during this early time period. Finding positive *Capsicum* evidence in 14 samples of different pottery types and shapes—and where *Capsicum* was the only residue identified—raises a number of questions. It is important to mention that the analyses conducted on these samples were repeated to verify the presence of *Capsicum* in the positive samples. The fortuitous finding of *Capsicum* species in these pots provides the earliest evidence of chili consumption in well-dated Mesoamerican archaeological contexts.

ACKNOWLEDGEMENTS

We would like to thank Alfredo Lopez Austin, Aurora Montufar Lopez, David Lentz, Ruth Dickau, Dolores Piperno, Emily McClung de Tapia, Patricia Crown, John Clark, Marco Beteta, Paul Minnis, and Sonia Zarrillo for providing information about chili peppers in Mesoamerica and South America. Many thanks to Instituto Nacional de Antropología e Historia and the Consejo de Arqueología for giving permission for the project and for exporting the samples for analysis, as well as to Centro INAH Chiapas for providing the Chiapa de Corzo samples. Norbert Stanchly is thanked for reviewing an earlier version of this chapter.

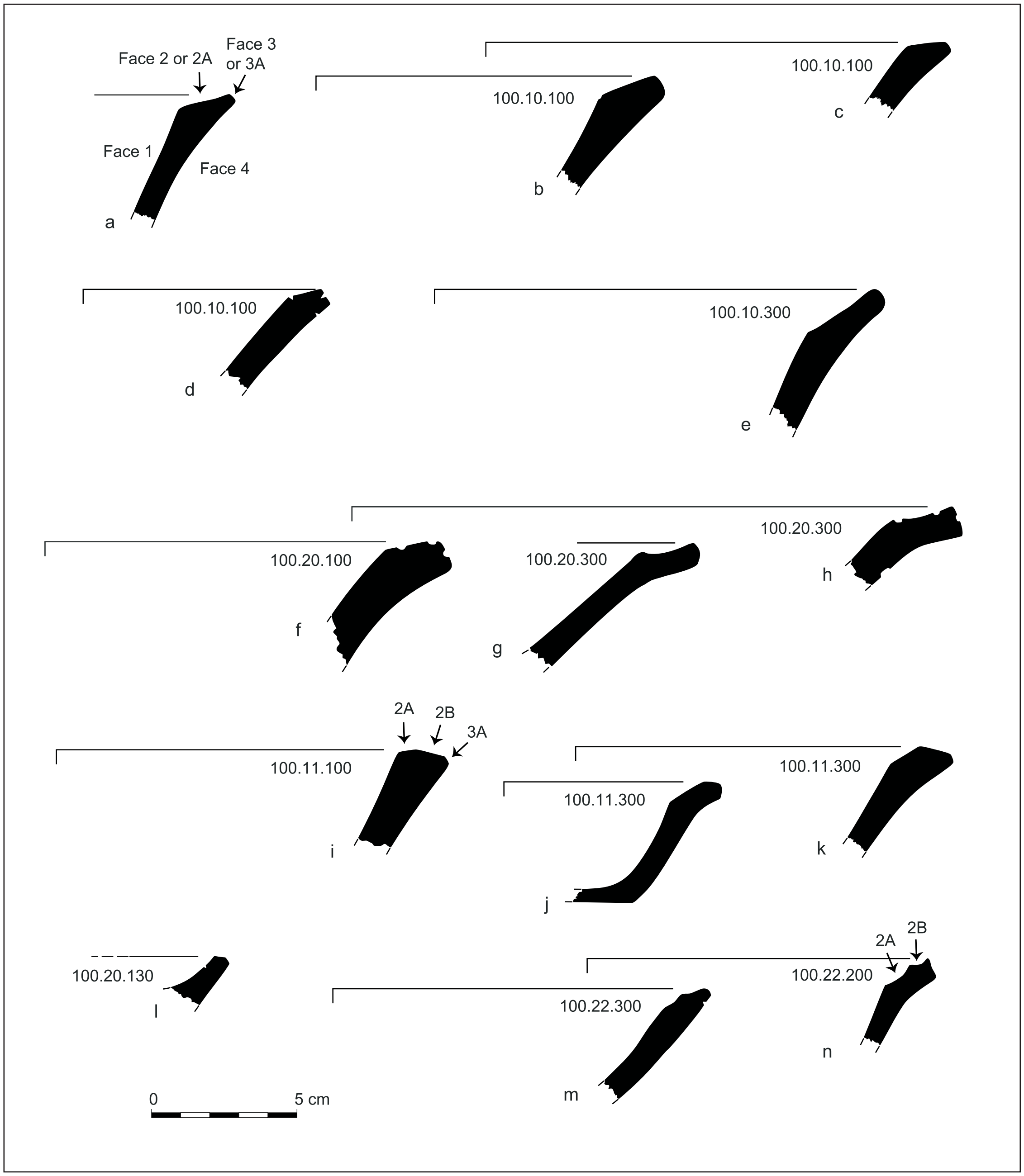


Figure 22.1. Beveled-rim bowls from Paso de la Amada: (a) Chilo Red from Md. 12 H7/41; (b) Papaya Orange from Md. 32 T4F/212; (c) Chilo Red from Md. 32 2/243; (d) Chilo Red from Md. 32 T4F/210; (e) Chilo Red from Mz-250 4/30; (f) likely Papaya Orange from Mz-250 8/62; (g) Papaya Orange from Mz-250 5/51; (h) Brown/red slipped from Mz-250 4/24; (i) Red from P32A/5A-1; (j) Red from Mz-250 5/51; (k) Red from P32/4; (l) Red from Md. 21 P2/4; (m) Red from P32/4; (n) Colona Brown from Mz-250 11/84. *Illustration by R. Lesure.*

CHAPTER 22

Beveled-Rim Bowls and Innovative Aggrandizers: Micro-Stylistic Analysis of a Locona Vessel Form

Richard G. Lesure

THIS CHAPTER REPORTS on a micro-stylistic analysis of variation in the rim form of beveled-rim bowls. Coding of the rim sherds was conducted in 1998 by myself and Jennifer Smit Carballo, then a beginning graduate student at the University of Michigan. Excavations at Mound 32 and Mz-250 had increased the available sample of beveled-rim bowls (Form BR1c) and thickened-beveled-rim bowls (Form BR1b), both characteristic of the Locona phase. During the basic analysis of those materials, it became clear that there was a spectrum of variation in the details of the rims that was rather crudely represented by the form codes. In addition, it appeared that Forms BR1c and BR1b were conceptually related, with the rarer BR1b being an exotic transformation of BR1c. The first goal of the study was to develop a coding system for understanding rim variation among beveled-rim and thickened-beveled-rim bowls.

A second motivation for the study was the idea that the detailed scrutiny of variation in these serving dishes might have implications for understandings of social processes at Paso de la Amada. Most ambitiously, it might provide an opportunity to evaluate the "innovative" character of the "aggrandizers" who, in the model then recently presented by Clark and Blake (1994), were key figures in the emergence of social inequality. The entrepreneurial character of leaders was an assumption of the model. It had not previously been subject to empirical evaluation; nor, at least in the case of Initial Formative coastal Chiapas, has it since.

The results of the analysis are not as clear-cut as originally hoped, perhaps in part because the settlement system was more complex than I envisioned back in 1998. The analysis is presented in four sections: a description of the coding system, discussion of how such data might bear on the postulated character of leaders, an analysis of the data from that perspective, and an assessment of the results.

VARIATION IN BEVELED RIMS

Beveled-rim bowls are most common in the Locona phase. They decline significantly in Ocós. The most common manifestation ("the norm"), constituting 43.3 percent of the collection studied here, is illustrated in Figure 22.1a–d. The rim is composed of two circumferential faces, a flat interior bevel (Face 2) and a flat lip (Face 3). The interior of the vessel will be referred to here as Face 1, the exterior as Face 4. Exterior walls of these vessels are outcurving or outsloping, without a sharp break in the profile below the lip. The highest point on the vessel is typically at the join of Face 2 and Face 3. Thickening of rims occurs between the Face 1/Face 2 join and Face 4 ("1/2–4 thickening"); see, for example, Figure 22.1a–c.

The most common variant on this norm has a rounded rather than flat lip: Face 3 is convex in profile (Figure 22.1e). Also relatively common is for the bevel to be fluted: Face 2 is concave in profile; the lip is either rounded or flat (Figure 22.1f–h). In a few cases the lip is pointed and thus Face 3 is absent altogether. Together these variants make up 37.7 percent of the sample of 231 rim sherds.

Rarer variants tend to diverge more radically from the norm. In a few cases there is a point of flexion in Face 4 beneath the 1/2 join, resulting in an everted rim. This form, often associated with scalloping along the exterior edge of the rim, became more common in the Ocós phase. A more frequent variant involves thickening not just at 1/2–

4 but also between the 2/3 join and the 3/4 join (Figure 22.2). That is the transformation that produces the exotically thickened rim of Form BR1b. Such thickening is often but not always accompanied by additional circumferential faces beyond the original Face 3. Those are labeled Face 3A, Face 3B, and so on (Figure 22.2f–h). Those faces may be flat, fluted, or rounded. There may alternatively be multiple such faces (3A, 3B) even in the absence of 2/3–3/4 thickening. Also, the bevel is sometimes given two circumferential faces (2A and 2B), which again may be flat, fluted, or rounded (Figure 22.1m–n). Further decoration is by circumferential grooves located on Face 1 just below the join with Face 2 (Figures 22.2b, 22.2g); on the exterior near the base or other parts of Face 4; or on one or more individual faces of Face 2A, Face 3A, and so on, in those cases beside an inner edge, in the center of the face, or along an outer edge (Figures 22.1d, 22.1f, 22.1h). There is other variation in the collection, such as a gentle curve rather than a distinct break for the 1/2 transition, scalloping or notching of the rim (five cases and one case, respectively), and spaced vertical grooves on the exterior. There is also, as is evident in Figure 22.1, considerable variation in vessel thickness and in the relative widths of Face 2, Face 3, and so forth. However, the above appeared to be governed by a systematic logic of variation. The following coding system is an effort to represent that variation.

Each rim sherd is coded with eight digits presented in groups of three, two, and three digits, separated by periods. The first group records three aspects of the geometry of the rim, registered as present (1) or absent (0). From left to right those are: the presence of 1/2–4 thickening, the presence of 2/3–3/4 thickening, and the presence of a point of flexion in Face 4 below the 1/2 join, creating an everted rim. Those traits are present on, respectively, 99.1 percent, 5.2 percent, and 2.6 percent of the analyzed collection.

The second group of digits records the presence of Faces 2A and 2B. Those are recorded as 0 if absent, 1 if present and flat, 2 if present and fluted (concave in profile), and 3 if present and rounded (convex in profile). A few unusual sherds without any Face 2A were originally coded, but those were dropped from the analysis here as not "beveled rims." Thus all sherds studied have a 1, 2, or 3 leading the second set of digits; 3.0 percent have, in addition, a Face 2B.

The third group of digits records the presence of Faces 3A, 3B, and 3C, coded 0, 1, 2, or 3, as for Face 2. Those are present, respectively, on 94.4, 3.5, and 0.8 percent of the collection.

One, two, three, or four circumferential grooves were recorded on 19.9, 10.0, 4.3, and 0.4 percent of the collection, respectively. Initially, an effort was made to analyze patterns in the location of grooves, but that proved cumbersome, with the sample sizes small. Presence and number of grooves only are considered (briefly) in the analyses presented below.

The coded sample, split by locale, is presented in Tables 22.1 (Locona contexts) and 22.2 (Ocós contexts). Recording emphasized Locona and late Locona midden contexts of the Basic Refuse Sample, though in several cases the sample was augmented by rim sherds from other nearby contexts. (see Chapter 2 for Refuse Sample nomenclature.) The Mound 1 sample, entirely from Refuse Sample 0103A (late Locona), is too small for inclusion in the analyses later in this chapter. The Mound 12 Locona sample is from Locona units 1201A and 1202A and late Locona units 1207A, 1218A, 1219A, 1220A, and 1221A. In addition, one sherd is included from an unscreened but definitively Locona provenience (Lot 47). The Mound 12 Ocós rims are from 1209A, 1210A, 1211A, 1222A, 1233C, 1234C, and 1240C. At Mound 21, only nine beveled-rim bowls were available from Samples 2101A and 2102A. An additional nine rims from P2/4, a mixture of the Locona ground surface and the lowest layer of the platform fill, were included, along with two rims from platform fill (P1/5, P4/5) and three from the Locona ground surface (P3/4). The Mound 32 Locona rims are from 3203A and the Ocós rims are from 3204A, plus one from P2/4 platform fill. The Mz-250 rims are from 0008A and 0009A, augmented with 18 other rims from the Locona-era ground surface. The Pit 32 excavation rims are from 0001A, 0002A, and 0003A, augmented with nine from the Early Formative ground surface or sherds that had worked their way into pre-occupation deposits.

INNOVATIVE AGGRANDIZERS?

The model of the emergence of social inequality developed by Clark and Blake (1994) and applied particularly to the Mazatán region postulated that inequality emerged as an unintended consequence of the strategies pursued by social actors. The activities of leaders were crucial: "in emergent chiefdoms or transegalitarian societies, we postulate the necessary presence of ambitious males (aggrandizers) competing for prestige" (Clark and Blake 1994:18). The figure of the aggrandizer was imagined as an entrepreneurial innovator, on inspiration in large part from the ethnographic literature on Melanesian big men. Hayden (1995:18) characterized the aggrandizer as "any ambitious, enterprising, aggressive, accumulative individual (elsewhere referred to as accumulators, or 'triple A' personalities) who strives to become more dominant in a community, especially by economic means."

There are reasons to be concerned about whether the agency of leaders will indeed take such a form in transegalitarian societies cross-culturally. For instance, Lederman (1990) links variation in the salience of big men as leaders in the northern versus southern highlands of New Guinea to variable cultural understandings of the kinds of transformative impact that leaders (as opposed to collectivities or to individuals generally) can have on events. The agency of leaders, indeed, is shaped by "culturally specific kinds of creativity" (Lederman 1990:12). Given such concerns, it

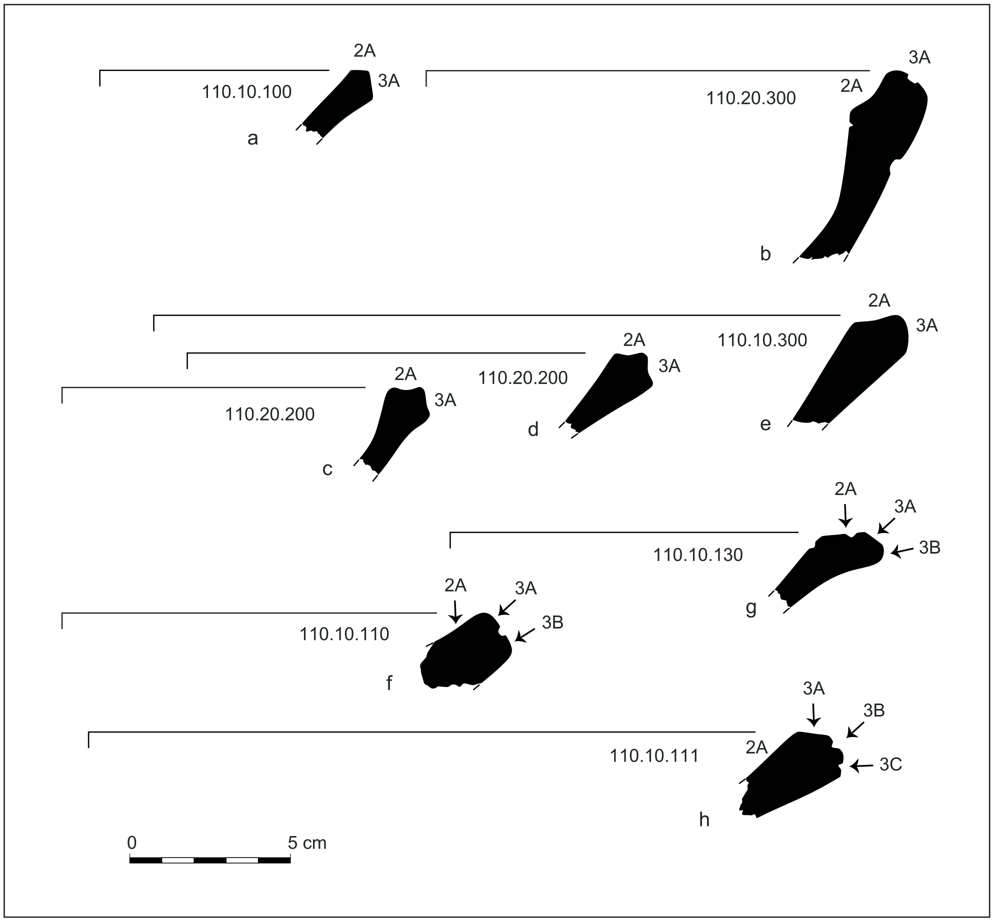


Figure 22.2. Beveled-rim bowls from Paso de la Amada: (a) Chilo Red from Md. 32 3/240; (b) eroded from Mz-250 11/84; (c) Colona Brown from Md. 32 2/231; (d) Md. 12 T1E/14; (e) Chilo Red from Md. 32 3/240; (f) Red from Mz-250 4/22; (g) Red from Md. 12 T1E/17; (h) Chilo Red from Md. 32 T4F/201. *Illustration by R. Lesure.*

seems useful to explore ways of subjecting the postulated character of aggrandizers at Paso de la Amada to empirical evaluation.

An important theme in the literature on aggrandizers in transegalitarian societies is that these individuals are creative, manipulative innovators. It is this aspect of leaders at Paso de la Amada that, in 1998, I was hoping to test with the study of beveled-rim bowls. I will first sketch out the linking arguments and then note certain problems with them.

Creative innovation in the details of the rim form of beveled-rim bowls would of course not have been a necessary part of the political activities of aggrandizers. Thus absence of evidence for innovative aggrandizement in this domain would not disprove the postulated character of these leaders. However, positive evidence would bolster the assumptions being made in application of the model to the Mazatán case. The idea for the analysis came from the observation that the variation seen in beveled-rim bowls—a relatively simple norm and increasingly complex and flamboyant transformations in decreasing frequency—seemed reminiscent of the kind of variation in agency postulated to have characterized the community of Paso de la Amada. Could it have been aggrandizers and their families who manipulated the norm, adding extra faces to the bevel and so forth? These were, after all, service vessels, and food service is one of the domains in which we would expect aggrandizers to have pursued their political activities. It seems possible that such readily observable variations on the norm of beveled-rim bowls would have been a signal to followers or potential followers of the ambitions or ability of a leader. Under this logic, we would expect the more flamboyant variants on the norm to be more frequent in the households of aggrandizers and consequently more prominent in the refuse generated by those households.

The question then becomes: Which are the houses of aggrandizers? Promising points to be made in 1998 were two recently excavated Locona-phase middens, one immediately beside the 30 m long platform in Mound 32 and the other in Mz-250, at a considerable distance from the main occupation area and not associated with any known plat-

Table 22.1. Detailed coding of beveled rim bowls, Locona phase, with counts by excavation locale

Rim Form Code	Steps from Norm	Mound 1	Mound 12	Mound 21	Mound 32	Mz-250	P32	Total
000.10.100	1				1			1
001.10.300	3					1		1
100.10.000	1		3	3		2	1	9
100.10.100	0	1	7	15	14	43	10	90
100.10.300	1		10	2	4	20	10	46
100.11.100	1					1	1	2
100.11.300	2					1	1	2
100.20.100	1			1	2	9	2	14
100.20.110	2						1	1
100.20.130	3			1				1
100.20.300	2		1			8	2	11
100.22.200	4					1		1
100.22.300	4						1	1
100.30.000	2		2	1		1		4
100.30.100	1	1	1		3		1	6
100.30.330	4		1					1
101.10.300	2		1					1
101.30.300	3						1	1
110.10.110	2					1	1	2
110.10.130	3		1					1
110.10.210	3					1		1
110.20.200	3		1					1
110.20.210	4				1			1
110.20.300	3					1		1
110.20.131	5	1						1
Total		3	28	23	25	90	32	201

form. The analysis did not include materials from Mound 6, where at any rate intact secondary refuse deposits were limited. However, in the earlier Locona phase, the site was characterized by widely scattered large residences on platforms (including Mound 32), and it seemed possible that each of those was the residence of an aggrandizer. The task was thus to compare the Mound 32 sample to those from other locations.

No doubt one could find various problems with the above logic, but two points seem particularly relevant. First, the study as conceived in 1998 treated residences as individual and autonomous units. If we instead imagine the multi-dwelling residential groups discussed in Chapter 7 (see Figures 7.10 and 7.11), then expectations for the refuse samples become less obvious. The Locona occupation at Mound 12 was part of a settlement unit that included Mound 13, where there was a platform with multiple construction episodes from Locona into Ocós. If there were status differences between settlement units, then the Mound 13–Mound 12 unit could well have been more prominent than that at Mound 32 (always remembering that Mound 6, emerging as preeminent during the Locona phase, is not included in the analysis). A second issue is that the study as originally conceived does not take into consideration the importance of the southwestern area of the site, with the ballcourt, the Mound 6 residence, and a likely plaza between them. Arguably, we might expect greater interest in political activity (and perhaps more innovative beveled-rim bowls) closer to that area than farther away. In terms of distance to Mound 6, the samples studied are as follows: Mound 12, 270 m; P32, 290 m; Mound 32, 350 m; Mound 21, 490 m; Mz-250, approaching 1 km. Alternatively, distances from the center of the ballcourt are: Mound 12, 160 m; Mound 32, 180 m; Mound 21, 320 m; P32, 360 m; Mz-250, more than 700 m.

ANALYSES

The focus of the analysis was the Locona sample (Table 22.1, minus the three Mound 1 rims). The basic idea was that the households of ambitious, politically engaged individuals might have been more apt to choose innovative beveled-rim bowls diverging from the norm.

In no case did Mound 32 emerge as distinctive in this regard. Instead, Mound 12 and P32 (the Pit 32 excavations south of Mound 1—see Chapter 6) consistently emerged as richer in innovative bowl forms. These are the two locales closest to Mound 6.

Innovative variants on the beveled-rim norm (100.10.100) fall into something of a progressive series in that several variants close to the norm are common (100.10.300, 100.20.100) whereas increasingly elaborate variants are rare (for example, 100.22.200, 110.10.130, 110.20.131). The first analysis involved counting the steps from the norm. Steps considered include 2/3–3/4 thickening, presence of a point of inflection in Face 4, extra faces (2B, 3B, 3C), and fluted or rounded rather than flat faces. Presence of any of those was scored equally as a step from the norm. The scores corresponding to each code are provided in Tables 22.1 and 22.2. They range from 0 to 5, or 0 to 4 when the three rims from Mound 1 are excluded.

The question is whether any of the locales have generally higher scores than the others. The distributions are skewed and were analyzed with versions of the Wilcoxon rank sum test using JMP Pro 12.0.1. The version for more than two samples is referred to as the Kruskal-Wallis test. The scores are pooled and ranked (in this case from 1 to 198), taking into consideration ties. The results are presented in Table 22.3, including the sum of the ranks for each locale, the expected sum based on the null hypothesis of identical distributions, and the mean rank. The locales are listed in order of decreasing mean rank, with higher values corresponding to samples with more innovative beveled-rim bowls. The Kruskal-Wallis test calculates a chi-square approximation, which indicates with a significance of $p = 0.0106$ that the samples do not all have the same distribution (chi square = 13.1339, df = 4).

Table 22.2. Detailed coding of beveled rim bowls, Ocós phase, with counts by excavation locale

Row Labels	Steps from Norm	Mound 12	Mound 32	Total
100.10.100	0	2	8	10
100.10.300	1	4	3	7
100.13.300	2	1		1
100.20.100	1	2		2
100.20.110	2	1		1
100.30.100	1		1	1
100.30.300	2	1		1
101.10.300	2	2		2
101.20.300	3		1	1
110.10.100	1		1	1
110.10.111	3		1	1
110.10.300	2		1	1
110.20.100	2		1	1
Total		13	17	30

A Wilcoxon rank sum test on each pair of locales helps to explore the contours of those differences. The Mound 12 and P32 samples are not significantly different from each other ($p = 0.6204$), but they each have significantly higher ranks than Mound 32 and Mound 21, the two samples with lowest mean rank ($p < 0.05$). In addition, Mound 12 is significantly higher than Mz-250 ($p = 0.0419$), but in this case P32 is not ($p = 0.1284$). Finally, the three samples with lowest mean ranks, Mz-250, Mound 32, and Mound 21, are not significantly different from each other ($p > 0.12$). In summary, pair-wise rank sum tests indicate a significant divide between Mound 12 and P32 and the other samples.

Another analysis included in Table 22.3 is Simpson's measure of diversity, described by Pielou (1969:223–24), which varies from 0 to 1. The minimum possible diversity of 0 corresponds to the case in which only one category of beveled-rim bowl is represented, while the maximum diversity of 1 would be the case in which each beveled rim is assigned to a different category. Diversity scores were calculated on the data on frequencies of codes in Table 22.1. Mound 12 and P32 again emerge on top, here because of their greater variety of codes and dispersion of rims across

Table 22.3. Analyses of Locona-phase beveled rim bowls data from five excavation locales

	Count of Rim Sherds	Kruskal-Wallis Rank Sum Analysis			Diversity Index	Distance from Mound 6 (m)
		Sum of Ranks	Expected Sum under Null Hypothesis	Mean Rank		
Mound 12	28	3389.5	2786	121.054	0.81	270
P32	32	3652.5	3184	114.141	0.81	290
Mz-250	90	8756	8955	97.289	0.71	1000+
Mound 32	25	2103	2487.5	84.120	0.66	350
Mound 21	23	1800	2288.5	78.261	0.57	490

them. Indeed, the order of decreasing diversity is the same as that of decreasing mean rank in the rank sum analysis. That point is of interest because the diversity analysis looks at the data in a different way. It considers the frequencies of the original codes without the intervening step of calculating steps from the norm.

Tests examining the distribution among locales of *rim diameters* of beveled-rim bowls and the *number of circumferential grooves* did not yield significant results. Beveled-rim bowls at Mounds 21 and 32 had more grooves than bowls from the other locales. However, the only significant differences among the paired comparisons was that Mz-250 had significantly lower mean rank than Mound 32, Mound 21, and P32. Finally, there were not significant differences *between the Locona and Ocós samples*, either at Mound 12 or Mound 32. I suspect that part of the Ocós sample of beveled-rim bowls in those cases may be carried up from underlying Locona levels.

DISCUSSION

Of the five Locona-phase habitation areas considered, it was the inhabitants of Mound 12 and P32 who were most innovative in their choice of beveled-rim bowl variants. In refuse samples from Mound 12 and P32 (the Pit 32 excavation to the south of Mound 1) there is greater diversity in varieties of beveled-rim bowls than at Mound 32, Mound 21, and Mz-250. The variants at Mound 12 and P32 also tend to be further removed from the norm than those at the other locales.

These results do not meet my expectation at the time the data were collected, that inhabitants of Mound 32 would be most innovative. However, as noted above, that expectation was based on an overly simple understanding of the organization of the site. The high values for P32 are still something of a surprise, but those for Mound 12 can be made sense of according to the logic proposed here if, as suggested in Chapter 7, the Locona occupation there was part of a settlement unit that included a large residence at Mound 13. We don't know the size of the Mound 13 building, but it is noteworthy that there were multiple construction episodes there in Locona into Ocós as opposed to only one at Mound 32. (See Chapters 5 and 6.) The settlement unit at Mound 13–Mound 12 may well have been more prominent and/or more successful than that at Mound 32. Finally, of the locales considered, Mound 12 and P32 are closest to Mound 6.

In sum, given current understandings of the site, some kind of link between innovation in beveled-rim bowls and political processes seems possible. Clearly, the situation is more complex than originally postulated. Any link is likely to be subtle.

CONCLUSIONS

The analyses in this chapter began with two basic claims about the beveled-rim bowls: first, that Locona-phase vessel forms BR1c and BR1b (Figure 8.1) were conceptually related in that the latter was an exotic transformation of the former; second, that those two form categories were rather crude divisions of what was in fact a spectrum of variation of forms progressively further removed from a norm. A coding scheme has been described and data on 231 rim sherds presented. The Locona-phase portion of that data was then analyzed to evaluate previously proposed understandings of leaders as agents in Locona-era Paso de la Amada. Although not as conclusive as originally hoped, the study seems promising enough to justify further investigation, hopefully with an expanded dataset.

PART V
HUMAN REMAINS

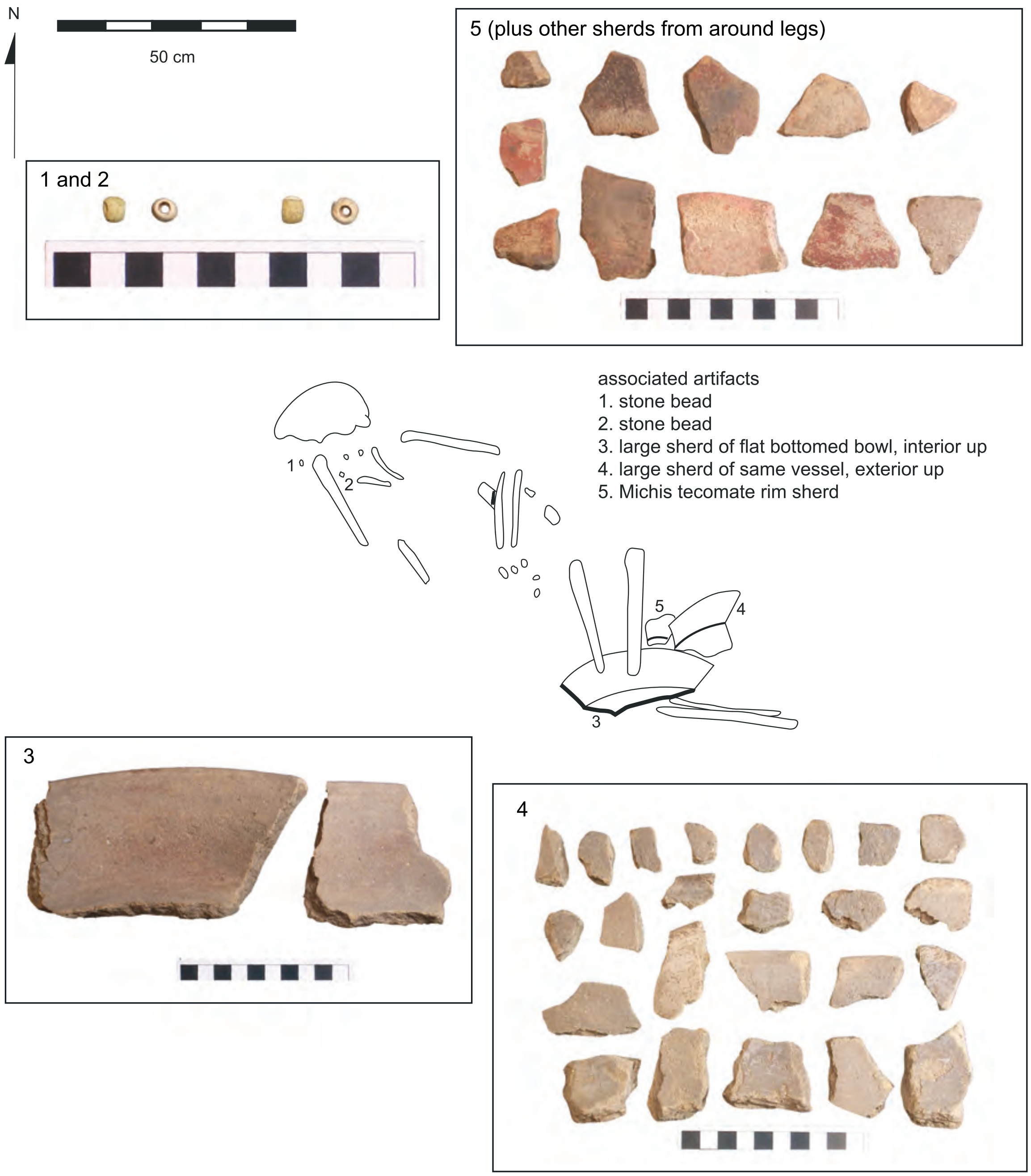


Figure 23.1. Burial 5, plan drawing and associated artifacts. *Illustrations in this chapter prepared by R. Lesure, A. Bishop, Barry Brillantes, and project staff.*

CHAPTER 23

Catalog of the Burials

Richard G. Lesure and Kristin Hoffmeister

THIS CATALOG OF burials includes both excavation records and osteological analysis. For further commentary, see the appropriate excavation chapter (3 through 6) or Chapter 24 on paleopathology.

Ceja Tenorio (1985) excavated four burials, which he numbered 1 to 4. Burials 5 to 8 and 10 to 12 are described here. Hoffmeister determined that the partial remains from Mound 12, originally labeled Burial 9, were not human. A redeposited cluster of bones, likely from a single individual, was discovered in the platform fill of Mound 1 (Md. 1 Feature 1). That cluster was not originally assigned a burial number. The burial excavated at Mound 32 in 1997 (Md. 32 Burial 1) was not included in the sequential numeration for the site because of uncertainty about assignments of numbers by other investigators.

BURIAL 5

Original Identifier. Pit 32 Burial 1

Provenience. P32D, between 88 and 92 cm below datum or about 50 cm below surface

Phase. Most likely Locona, possibly Ocós

Illustration. Figure 23.1

Preservation. Poor. The bones are highly fragmentary, represented by only cranial fragments, remnants of two dental crowns, and long bone diaphyseal fragments. There is little cortical bone preserved.

Description. The articulated body was placed on its right side, loosely flexed, head to the northwest.

Age and Sex. Sex is indeterminate due to the absence of relevant sexually dimorphic features preserved. Based on long bone size and positioning of bony elements in situ, this individual was an adult at time of death.

Dental Remains and Pathologies. Two teeth are partially preserved. The first is a maxillary left second molar. The crown is complete, but the root was damaged postmortem. There is a single carie on the occlusal surface, which has experienced moderate levels of attrition consistent with other adults in this population. Vestiges of calculus are present on the buccal surface. No hypoplasias are evident. Finally, there are four fragments of enamel from an unidentifiable molar. There is no identifiable pathology on the long bone or cranial fragments.

Directly Associated Objects. Two small greenstone beads from the neck and face region. Under the knees, two badly deteriorated pieces of a large, red-slipped Locona or Ocós bowl.

Excavation and Analysis. Excavated by Lesure and Tomás Pérez Suárez, May 1992. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 6

Original Identifier. Pit 32 Burial 2

Provenience. P32E2 and P32E4, depth of 90 to 95 cm below datum, about 50 cm below surface

Phase. Most likely Locona, possibly Ocós

Illustration. Figure 23.2

Preservation. Poor. Only cranial fragments and lower limb diaphyseal fragments are present.

Description. The body was probably articulated, flexed, and lying on its right side, with the head toward the northwest.

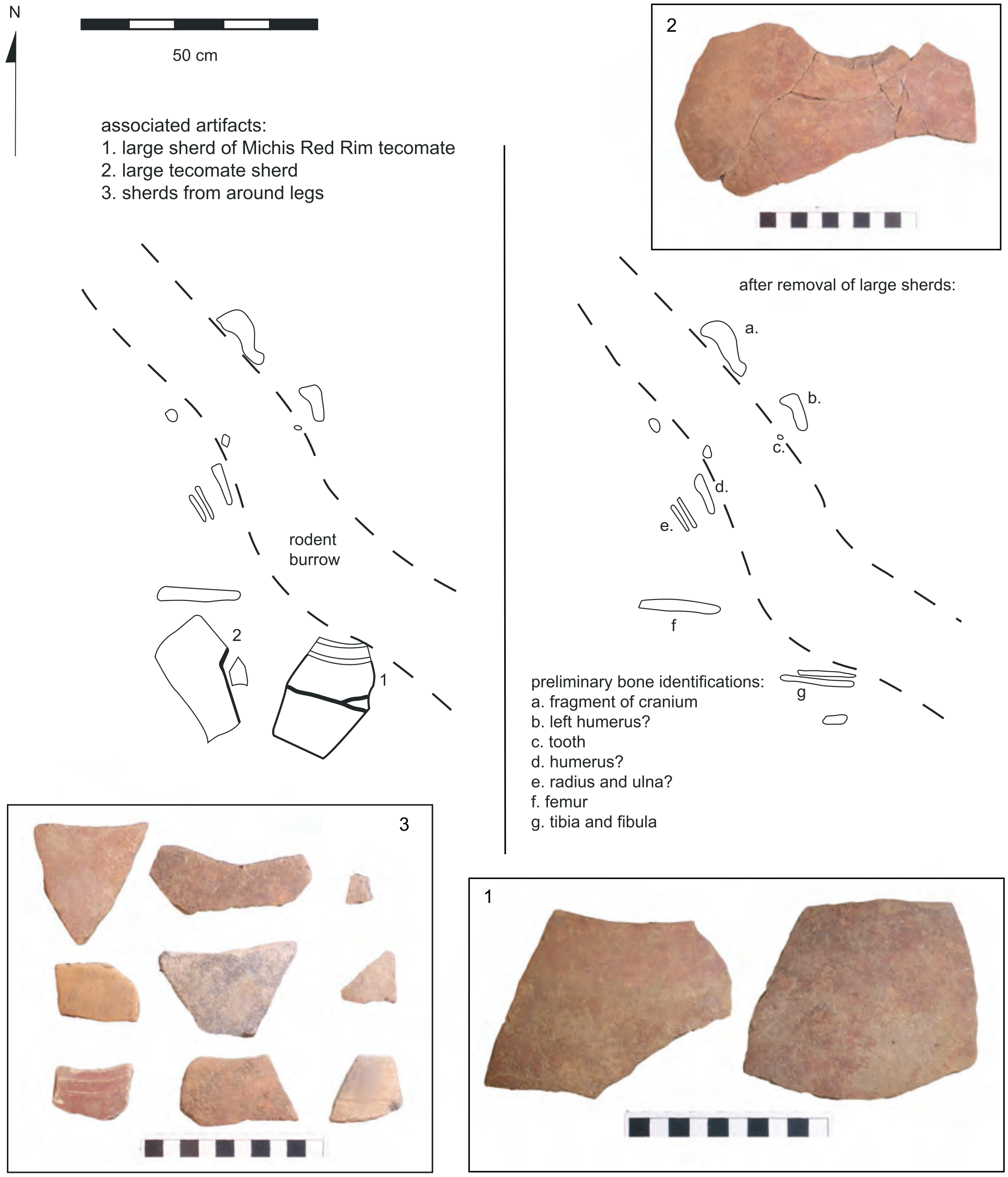


Figure 23.2. Burial 6: plan drawing and associated artifacts.

Age and Sex. An adult, based on the size and fusion of the long bones

Dental Remains and Pathologies. A right maxillary first molar with a broken root is present. The crown is fully formed, and wear is consistent with adulthood. In addition, two caries are evident, one on the occlusal surface and the other on the buccal surface. Additional root and enamel fragments are present but are not sufficiently diagnostic to identify. No other skeletal pathology is evident.

Directly Associated Objects. A large fragment of a Michis tecomate had been laid, interior side down, over the lower legs.

Excavation and Analysis. Excavated by Lesure and Pérez, May 1992. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 7

Original Identifier. Pit 32 Burial 3

Provenience. P32E4, 94 cm below datum, about 60 cm below surface

Phase. Locona

Illustration. Figure 23.3 top

Preservation. Poor. The burial was disturbed by the dig-

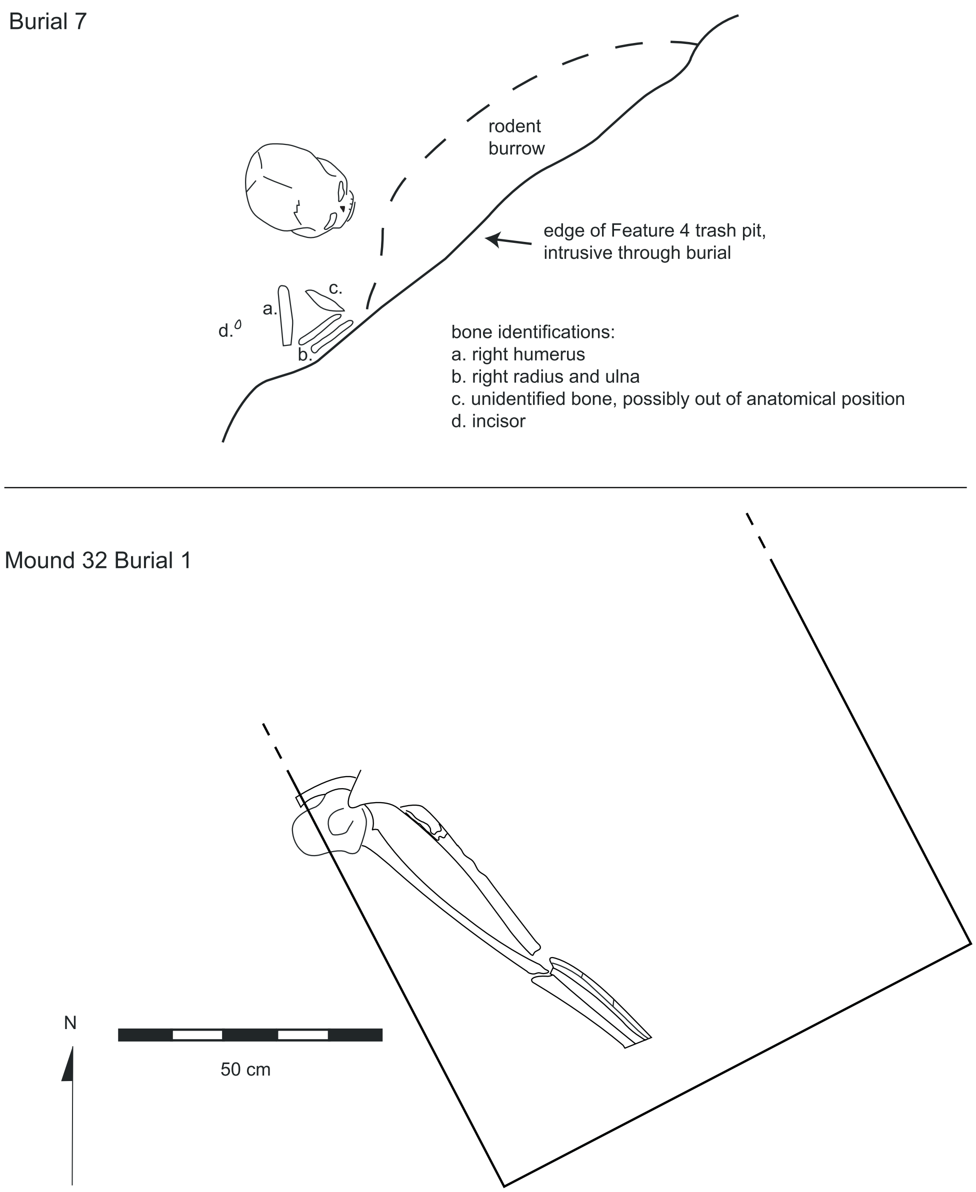


Figure 23.3. Burial 7 and Mound 32 Burial 1: plan drawing.

ging of the Feature 4 pit. Preserved remains include cranial vault fragments, broken portions of the first two cervical vertebrae, and portions of the right upper limb.

Description. The body was probably placed on its back, with its head toward the west or northwest.

Age and Sex. Based on the size and visible fusion, this individual is probably an adult. There are no pelvic remains present and the cranium is very fragmentary, which prevents sex and age estimates.

Dental Remains and Pathologies. There is no evidence of pathology on these remains, although very little cortical bone is preserved. One incisor was found, per Lesure's excavation notes, but no teeth were found with the excavated remains during cleaning or analysis. It is possible that the recorded tooth was removed for isotope sampling prior to the summer of 2011.

Directly Associated Objects. None in the preserved portion of the burial

Excavation and Analysis. Excavated by Lesure and Pérez, May 1992. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 8

Original Identifier. Mound 1 Burial 1

Provenience. Mound 1 Unit F12, Feature 14, 138–140 cm below datum

Phase. Cherla or possibly Ocós

Illustration. Figure 23.4

Preservation. Fair. Rodent disturbance had removed some bones.

Description. The individual had been placed on her back and left side, with the head to the northwest, legs loosely flexed. The left arm was bent double, with the hand under the chin. The right arm was loosely bent, with the hand resting on the chest.

Age and Sex. An articulated adult female who was 30 to 40 years old at death, based on pelvic and cranial morphology

Dental Remains and Pathologies. The cranium is preserved in sections: the calvarium, basicranium, and face. There is some evidence of pinprick porosity on the right orbital roof that was largely healed at the time of death. The left orbit is not sufficiently preserved to systematically examine for presence of pathology. There is no evidence of diploic thickening or pathological porosity on the external cranial vault indicative of porotic hyperostosis.

The sphenoid of Burial 8 exhibits a clear deformity of shape. The greater wings are much taller than normal in a superior–inferior direction. The foramen rotundum on the left greater wing has a distended shape and is positioned more anterior than is expected. In addition, it has approximately five accessory foramina anterior and lateral to it. These accessory channels have rounded, well-circumscribed margins. It appears that the foramen spinosum was incomplete, which isn't necessarily pathological. The right greater wing is unusually convex on the endocranial surface compared to the normal concave fossa. The foramen rotundum is oddly placed, as was seen on the left side of the sphenoid, although the accessory foramina are not present. Again, the entire greater wing is quite elongated. The lesser wing pieces also exhibit significant size discrepancies: the right side is more elongated than the left side. The changes in size are asymmetrical and not clearly reflected in surrounding cranial bone. It is likely that these changes are not pathological in origin but are postmortem shape changes due to the depositional environment.

The postcranial remains are largely preserved, aside from the inferior vertebrae, ribs, and long bones of the hands and feet. The cervical vertebrae are the only part of the spinal column preserved for this individual. There is marginal lipping on the anterior surface of the bodies of C3–C7. This is most pronounced around the C5–C6 transition. There is slight osteophyte development. There is no clear compression of the vertebral bodies or kyphosis.

Both clavicles are preserved. The right clavicle has a clear area of abnormal bony addition on the medial side, toward the lateral end of the bone. This area is the region of attachment for the deltoideus muscle. This bony abnormality is likely an enthesophyte. It projects approximately 2.01 mm off the normal surface of the cortical bone. It appears to be myositis ossificans. This pathology is not bilaterally symmetrical and is evident only on the right side.

Finally, there is evidence of pathology in the region of both elbows. Beginning on the left side, there are changes to the distal humeral epiphysis. On the anterior side, the coronoid fossa appears to be somewhat enlarged. There is coalesced microporosity on the medial side of the capitulum, but it is impossible to assess if any lipping was present along the margins due to postmortem damage. There is a raised ridge of osteophytes between the trochlea and capitulum of the left humerus, with coalesced porosity extending from the anterior side toward the posterior side. This ridge continues to separate the trochlea and capitulum and terminates in an area of postmortem damage inferior to the olecranon fossa on the posterior side of the bone. The definition of the capitulum is lost toward the lateral side. Instead of a continuous raised ridge that normally marks the lateral border of this feature, it tapers off into the lateral epicondyle, as does the associated articular surface. Instead, the lateral epicondyle appears enlarged relative to normal. On the anterior side of the distal diaphysis, the intertubercular sulcus is elongated, with very sharp borders.

The left ulna is additionally affected. The superior half of the olecranon process is broken off postmortem, but both pieces are preserved. There is pathology on the articular surface of this region. The radial notch is abnormally large and there is evidence of antemortem activity on the inferior margins of the radial notch based on porosity and degradation of the subchondral bone. Within the trochlear notch, on the medial half immediately adjacent to the non-articular bone, it is clear that a portion of the normal articular surface was removed antemortem. This region is at the medial border of the ulna and measures 10.76 mm in the superior–inferior direction and 5.01 mm in the medial–lateral direction from the normal non-articular cortical bone to its greatest extension on the articular surface. The surface of this region is lower in elevation than the surrounding normal articular bone and its lateral border with the articular surface is marked by a slightly raised rim. The medial border is smooth and fairly well integrated with non-articular bone of the proximal ulna. The surface of this area appears sclerotic. There is some minor lipping along the olecranon's borders. Unfortunately, the left radius is missing both epiphyses, preventing any significant pathological assessment.

The right upper limb bones are more fragmentary than those of the left. However, there is still clear antemortem degradation of the elbow joint based on the articular surfaces of all three bones involved. The distal-most portion of the right trochlea and capitulum is preserved as a fragment detached from the diaphysis. There is clear evidence of the raised, porous area between the capitulum and trochlea. There appears to be more severe expression on the right side, although it is impossible to assess the extent of this defect, as only a portion of the distal epiphysis is present. The right ulna is also partially present. The proximal half of the olecranon process is missing, although it is still evident that a portion of the articular surface was dam-

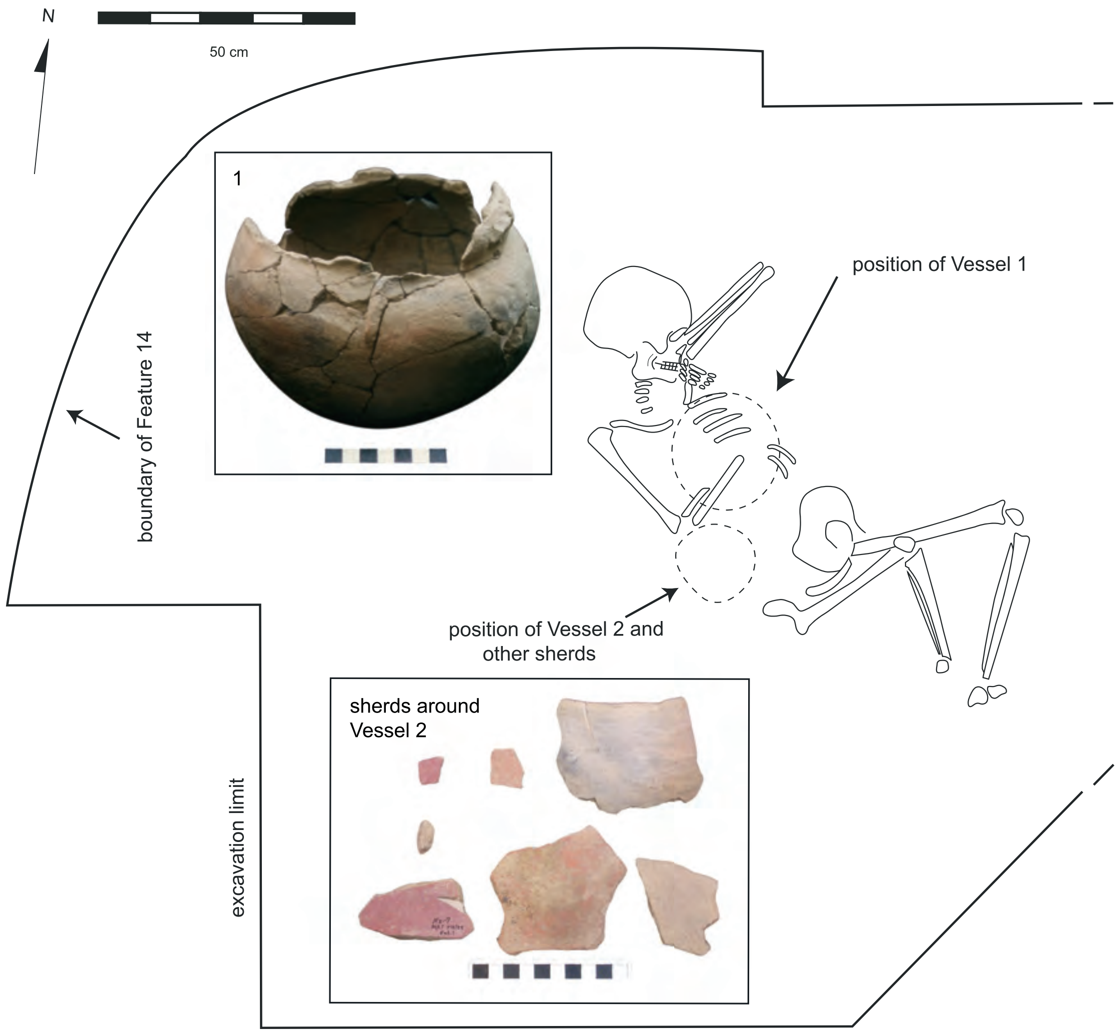


Figure 23.4. Burial 8: plan drawing and associated artifacts.

aged antemortem in the same location as seen on the left side, medial and immediately adjacent to the non-articular posterior half of the olecranon process. This is an area of dense, sclerotic bone surrounded by a raised ridge. There is minimal microporosity, and no remnants of normal subchondral bone remain in this well-defined region.

The right proximal radial epiphysis is preserved. The superior surface of the radial head is approximately 60 percent preserved. On the medial half of this surface there has been significant antemortem destruction of the articular bone. This region is depressed relative to the articular surface and its texture is irregular. The margins are poorly integrated with the surrounding articular bone. This region of destruction extends onto the side of the radial head, which exhibits significant lipping. The surface of this region is macroporotic and characterized by an uneven texture of ridges and furrows. The osteolytic activity that formed this region appears to have been active at death. The normal, smooth surface of the articular cortical bone is completely absent.

Teeth and associated alveolar bone are present for Burial 8. The mandible and maxillae are almost completely present. Beginning with the maxillary teeth, the maxillary left second and third molars were lost antemortem based on associated alveolar remodeling. The maxillary right third molar is absent, but there is no alveolar remodeling, so the timing of tooth loss is unclear. There are at least some vestiges of dental calculus on almost all present teeth. The anterior maxillary teeth also exhibit several linear enamel hypoplasias. Finally, there is an enamel pearl on the upper left lateral incisor root. The mandibular teeth are largely present, with only the left second and third molars having been lost antemortem. In addition, the right second and third molars are missing dental crowns and are represented only by in situ roots. There is dental calculus on the anterior teeth and abscesses on the right distal, lingual part of the mandible. The abscess perforates the external mandibular cortical bone on the lingual side of the bone, around the area of the right second and third molar roots. The margins are well circumscribed and sclerotic in appearance. There is additionally an antemortem channel between the alveolar sockets of the second and third mandibular molars. There is a single enamel hypoplasia evident on the mandibular dentition (on the lower left canine). Much of the remaining labial crown surfaces are obscured by dental calculus.

*Directly Associated Objec*ts. None

Indirectly Associated Objects. Two large vessel fragments were recovered from just above the chest region, some 5 to 10 cm above the bone. One was a small unslipped effigy tecomate with most of the effigy features and all of the rim broken away (ceramic type Michis Buff; effigy type Tenai group, Yacay type, Cuello variety). The other was a large rim sherd of a Michis Buff tecomate with a plain, polished rim band and an orange wash on the scraped body.

Excavation and Analysis. Excavated by Lesure, June 1992. Osteological analysis by Kristin Hoffmeister, summer 2011.

MOUND 1 FEATURE 1

Provenience. Mound 1 Units G9–G10 Lot 5, Feature 1

Phase. Locona, Ocós, or Cherla

Illustration. Figure 23.5

Preservation. Bones in fair condition

Description. Feature 1 was a concentration of human bone noted in excavation of the platform fill in Mound 1. It represents a burial that was disturbed and transported with fill for the platform. Some of the bone was deposited as an identifiable cluster. Original position and orientation are unknown. This burial was found with an artiodactyl calcaneus and human adult sternal rib end included with this individual. The cranial vault is partially preserved. It appears that there was some postmortem alteration to the shape of this individual, as the calvarium is elongated asymmetrically. There is no evidence of systematic antemortem cranial modification. In addition, there is rodent gnawing present on many cranial bones, most notably the petrous portions of the temporals. Both scapulae, several ribs, the left ilium, and several cervical and thoracic vertebrae are present. In most cases, the secondary centers of ossification had not yet fused at time of death. The neural arches of the vertebrae are fused, although not yet attached to the vertebral bodies. A partial composite proximal humeral epiphysis is present.

Age and Sex. Based on dental development, this individual was eight years +/- 24 months at death.

Dental Remains and Pathologies. There is no evidence of any pathology on the skeletal remains. There is a combination of both deciduous and permanent teeth present for this individual. The right deciduous canine, first molar, and second molar are all present, with root apices fully closed. A single carie is present on the deciduous canine on an interproximal contact surface. The permanent teeth are in varying states of formation consistent with an age estimate of six to 10 years at death. Hypoplasias are evident on both maxillary and mandibular permanent teeth.

Directly Associated Objects. Unknown because original burial was disturbed and redeposited

Excavation and Analysis. Excavated by Lesure, May 1992. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 10

Provenience. Mound 12 Unit H5 in Lot 25, just below the plow zone

Phase. Most likely Cherla or Jocotal, but could be later

Illustration. Figure 23.6 lower left

Preservation. Disturbed, with only the legs intact. The rest of the burial had been destroyed by plowing. Preservation is poor.

Description. Originally articulated

Age and Sex. Sex is impossible to diagnose. This individual is likely an adult based on fusion of metatarsal elements and size of long bone diaphyseal fragments. However, this is a very tentative assessment.

Dental Remains and Pathologies. There is very little cortical bone present. There is one clear proximal left pedal phalanx preserved, portions of metatarsals of both feet, and limited long bone fragments. No pathology is evident.

Directly Associated Objects. None in preserved portion of burial

Excavation and Analysis. Excavated by Lesure, March 1993. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 11, INDIVIDUALS 11A AND 11B

This is a double burial of two articulated individuals, 11A and 11B, in the same pit. They were apparently interred at the same time.

Provenience. Mound 12 Unit I7, Feature 22

Phase. Most likely Ocós

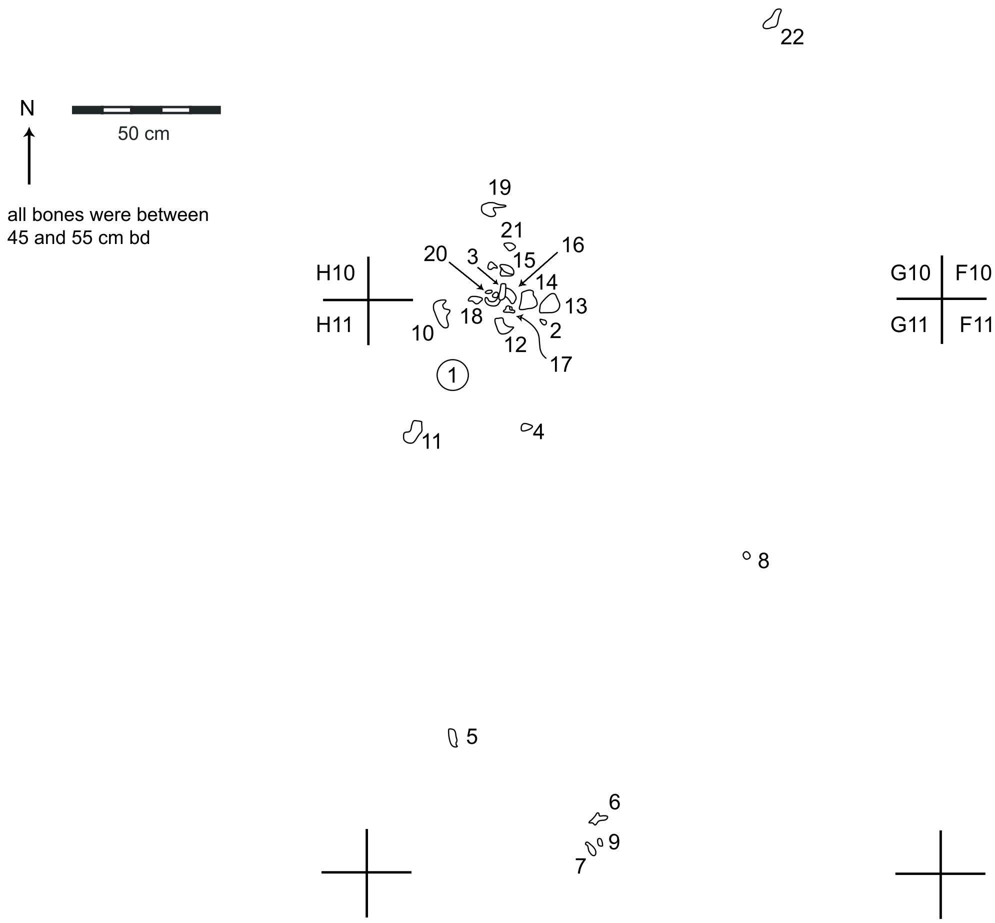
Illustration. Figure 23.6 top

Preservation. Bone preservation is fair.

Description. Individual A, head to the west, was to the northeast of and slightly higher than her companion. She was placed lying on her back and right side, face up, with legs loosely flexed. Her right hand was under her chin and her left hand under the right thigh. Individual B, also loosely flexed on the right side, was placed slightly lower than and to the southwest of Individual A, with her head to the northwest. Her arms were bent, with the hands around the face. It may be that the head was placed resting on the hands.

Age and Sex. Double burial of two articulated females, one adult and one young adult.

Dental Remains and Pathologies. Individual 11A was an adult female. It is clear that this individual was an adult at time of death based on size of the bony elements. However, a narrower age estimate is difficult due to fragmentary or missing remains. As described below, the level of attrition



1. cranium fragments
2. bone fragment
3. rib fragment
4. bone fragment
5. bone fragment
6. bone fragment
7. bone fragment
8. molar
9. bone fragment
10. pelvis fragment
11. cranium fragment
12. cranium fragment, with orbit
13. cranium fragment
14. pelvis or scapula fragment
15. vertebra
16. cranium fragment
17. bone fragment
18. cranium fragment
19. pelvis or scapula; same as 14 only other side of body
20. bone fragment plus 2 teeth
31. bone fragment
22. foot bone of some sort
23. (off page, 2+ m to north): mandible and rib fragments, other pieces of bone

Figure 23.5. Mound 1 Feature 1: plan drawing.

and antemortem tooth loss is most consistent with middle to old adulthood in this population. The cranial vault is largely present, although the inferior portion of the basicranium is largely missing. There is no clear evidence of any cranial pathology.

The right os coxae and three cervical vertebrae are preserved. There is no obvious pathology on the first or second cervical vertebrae, although there is minor lipping on the anterior side of the third cervical body. The long bones are all present in varying amounts. There is slight osteophyte development and porosity on the distal right humerus, which is present only as a fragment separated from the diaphysis. This ridge of osteophytic development separates the trochlea and capitulum, and the porosity varies in formation from pinpricks (less than 1 mm) to coalesced macroporosity. The left hand is represented by an isolated scaphoid, which exhibits a hooked appearance that is characteristic of degenerative joint disease. There are no further hand remains present for this individual. Moving inferiorly, the right tibial proximal epiphysis is present as a broken fragment. This portion of the tibia exhibits slight lipping on the medial condyle and a large region of eburnation. There is no corresponding eburnation on the distal right femoral epiphysis. The left foot is largely present, with lip-

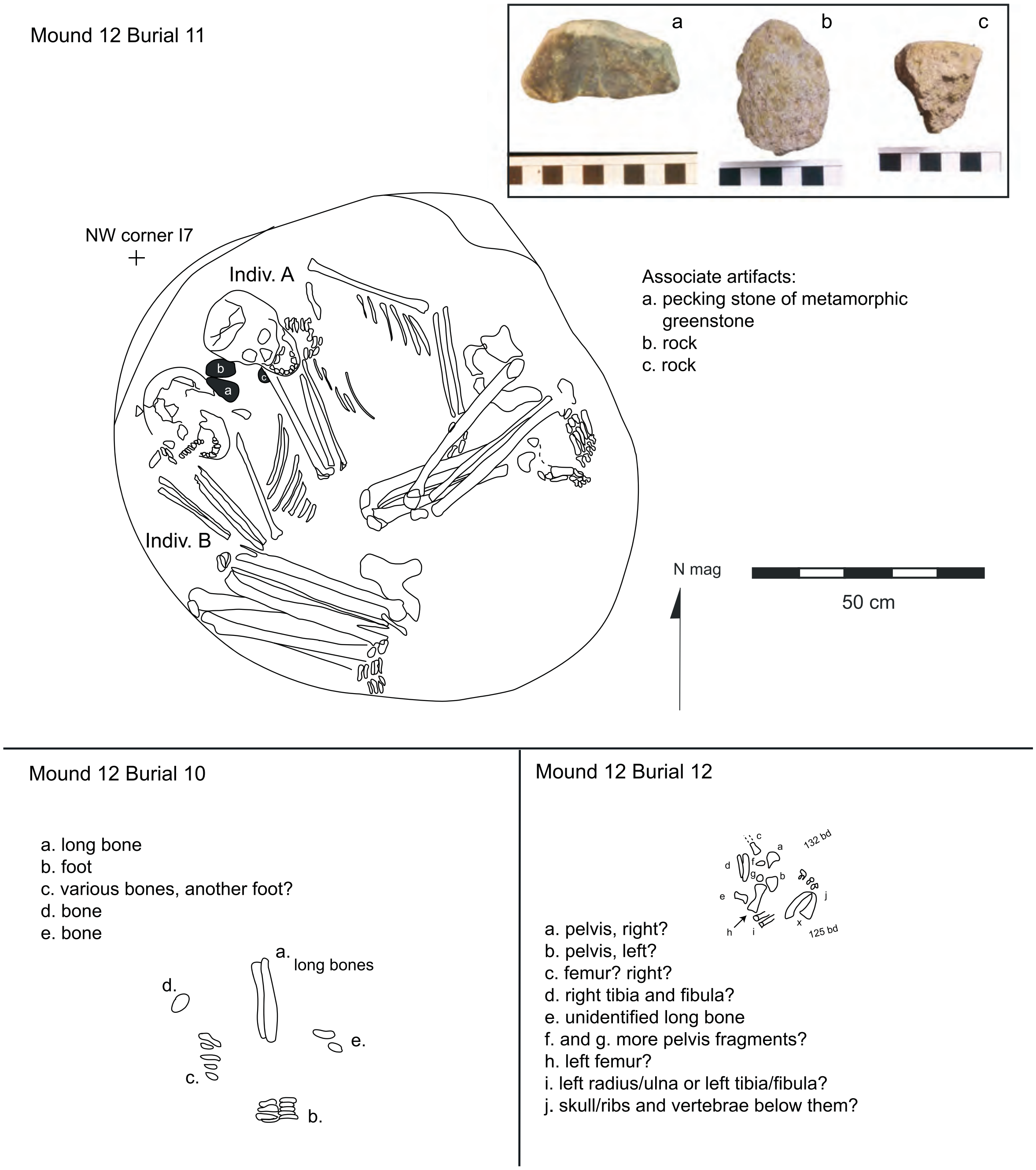


Figure 23.6. Burials 10, 11, and 12: plan drawings and associated artifacts.

ping on the distal articular area of the left first metatarsal. These changes are consistent with osteoarthritis.

There are 12 teeth present for individual 11A: three maxillary teeth and nine mandibular teeth. The left maxilla is characterized by significant alveolar resorption, with only the third molar and left canine root remaining. There is a thin line of calculus on the third molar, but no caries or linear enamel hypoplasias are evident. The right maxilla is almost entirely missing, and there is a possible upper right canine root present, although no crown is preserved. The mandible additionally exhibits significant alveolar resorption, with all missing teeth having been lost antemortem. There is significant calculus deposition on most teeth, and caries are present on the mandibular right lateral incisor, left lateral incisor, left canine, and left third premolar. Linear enamel hypoplasias are present on the left mandibular incisors, right lateral incisor, and right third and fourth premolars.

Individual 11B was a young adult female. The cranium is fragmentary but largely present aside from the basilar portions of the occipital and some of the smaller bones of the face. No indications of disease are visible on the cranium or long bone shafts, all of which exhibit above-average preservation. Deep arachnoid depressions on the inner table of the cranium are normal variations. On the parietals, three of these depressions appear to perforate through both the inner and outer table. However, these perforations are due to postmortem removal of the external cortical bone and are not evidence of any antemortem pathology.

Most teeth are preserved and exhibit moderate levels of attrition, consistent with a young adult from this population. There are vestiges of calculus on most teeth, and there seems to be a concentration of calculus on the right side of the dental arcade. There is some evidence of periodontal infection, as the alveolar border is porotic and concave on the distal, buccal portions of the right side of both the maxilla and mandible. Seventeen of the preserved 27 teeth exhibit at least one linear enamel hypoplasias on the lingual or buccal surface. No caries are present.

Directly Associated Objects. Three stones placed between the heads of the two individuals.

Excavation and Analysis. Excavated by Lesure, March 1993. Osteological analysis by Kristin Hoffmeister, summer 2011.

BURIAL 12

Provenience. Mound 12 Unit I7

Phase. Most likely Ocós

Illustration. Figure 23.6 lower right

Preservation. Articulated but only partially preserved. Bones of the infant are in poor condition.

Description. The head appears to have been toward the southeast and the bent legs to the northwest.

Age and Sex. This individual was a neonate within two months of birth at the time of death on the basis of the maxillary left lateral incisor crown development. This age estimate was further substantiated by the lack of fusion of secondary centers of ossification both in the cranial and postcranial remains, including lack of fusion of hypoglossal canals, tympanic ring, dens, and other elements. As this is a juvenile, no sex was diagnosed.

Dental Remains and Pathologies. The cranial vault is largely present, but the facial bones are almost entirely absent. There is significant removal of the external cortical bone on the cranium, preventing assessment of significant pathology in this region. Postcranially, there is clear periostitis on the left humerus, in addition to both femoral diaphyses. An additional long bone fragment also exhibits periostitis, although it is difficult to identify this fragment due to postmortem damage and distortion of original size and shape due to significant abnormal antemortem periosteal activity.

Directly Associated Objects. None

Excavation and Analysis. Excavated by Lesure, March 1993. Osteological analysis by Kristin Hoffmeister, summer 2011.

MOUND 32 BURIAL 1

Original Identifier. Mound 32 Burial 1

Provenience. Mound 32 Unit 2, Lot 239, 40 cm beneath the plow zone

Phase. Cherla or Jocotal

Illustration. Figure 23.3 bottom

Preservation. The preservation is poor and the skeletal remains are fragmentary.

Description. Articulated adult, only partially preserved

Age and Sex. On the basis of a partially preserved right greater sciatic notch, this individual is possibly a female.

Dental Remains and Pathologies. There are at least three thoracic neural arches partially preserved, but there is no obvious pathology on the limited observable portions. One partial metacarpal is present. Most of the right limb bones are at least partially preserved, and the left lower limb diaphyses are present. There is no evidence of pathology on the observable portions.

Directly Associated Objects. No directly associated objects were discovered in situ. Several bone ornaments were recovered in the relatively small amount of dirt excavated as Lot 239. They may originally have been ornaments worn by the deceased. However, they were recovered in the screen rather than in their original position. There are three bone finger rings and one bone tube.

Excavation and Analysis. Excavated by Christopher Attarian and Enrique Flores, March 1997. Osteological analysis by Kristin Hoffmeister, summer 2011.

Table 24.1. Summary of Paso de la Amada skeletal sample

Provenience	Burial No.	Time	Age	Sex
32D	5	Locona/Ocós	probable adult	–
32E	6	Locona/Ocós	probable adult	–
32E	7	Locona/Ocós	probable adult	–
Md. 1	8	Cherla/Late Ocós	middle adult	F
Md. 1	Lot 5/G9-10	Cherla	8 y ± 24 mos.	–
Md. 12	10	Ocós	probable adult	–
Md. 12	11A	Ocós	adult	F
Md. 12	11B	Ocós	young adult	F
Md. 12	12	Ocós	birth ± 2 mos.	–
Md. 6	13	Ocós	middle adult	F?
Md. 32	1	Cherla	adult	F?
A	1	Ocós	old adult	M
B	1	Cherla	adult	F
B	2	Cherla	15 y ± 36 mos.	–
B	3	Cherla	15–23	F?
C	1	Ocós	old adult	M
C	2	Ocós	young adult	F
C	3	Ocós	birth ± 2 mos.	–
D	1	Ocós	middle adult	M
G	1	Locona	young adult	F
O	1	Ocós	adult	–
O	2	Ocós	adult	–
R	1	Cherla	n.d.	–
S	1	Cherla	n.d.	–
X	1	Locona	15 y ± 36 mos.	–
T	1	Cherla	adult	–

CHAPTER 24

Skeletal Indicators of Health at Paso de la Amada

Kristin Hoffmeister

The shift from a nomadic lifestyle to a sedentary agricultural one had a significant impact on human societies throughout the world. Health changes associated with this shift have been thoroughly examined utilizing skeletal data. The primary emphasis of this research has been the seemingly paradoxical increase in the prevalence of skeletal indicators of poor health associated with the shift to agriculture, which is also linked with positive increases in sociocultural complexity and population growth (Cohen and Armelagos 1984; Larsen 2002, 2006; Steckel and Rose 2002).

Paso de la Amada is uniquely situated to provide insight into the health of early sedentary people in Mesoamerica due to its chronology and extensive excavations that have provided substantial archaeological data (Blake et al. 1995; Ceja Tenorio 1985; Lesure 2011a). The site's occupation overlaps the projected period of time in which populations in the region were becoming increasingly sedentary and reliant on agricultural produce. Previous work on this issue indicates that the transition to a sedentary lifestyle was gradual and that groups throughout Mesoamerica transitioned from a nomadic to a sedentary lifestyle at different times and rates (Blake et al. 2006).

The purpose of the present chapter is to systematically describe and evaluate skeletal indicators of health and disease among the mortuary sample from Paso de la Amada. There have been few previous studies on the Paso de la Amada skeletal sample. Ardern (2003) produced a master's thesis that included basic burial descriptions for 15 of the Paso de la Amada burials excavated in 1995 by Clark and colleagues. The present analysis expands upon Ardern's (2003) earlier work and provides a more thorough analysis of the pathology of the Paso de la Amada skeletal collection, with an emphasis on health at the transition to agriculture rather than social organization. In particular, this chapter assesses the health of the Paso de la Amada population using paleopathological data and common indicators of health and stress, including periostitis, linear enamel hypoplasia, porotic hyperostosis, cribra orbitalia, caries, and calculus. To fully understand the patterning of these skeletal indicators, the Paso de la Amada skeletal sample was further assessed for possible chronological patterning in disease, as well as possible differences in prevalence when compared to contemporaneous sites in the area. It was anticipated that systematic analysis of skeletal pathology would allow for a more thorough understanding of the health status of this population on the precipice of significant transition.

METHODOLOGY

All fieldwork was conducted in the summer of 2011 at the New World Archaeological Foundation Lab in San Cristóbal de las Casas, Chiapas, Mexico. Skeletal remains excavated by Richard Lesure and colleagues were cleaned, photographed, and inventoried. Those skeletons studied by Ardern (2003) had previously been cleaned and reconstructed. The skeletal sample is summarized in Table 24.1. The burials fall into three ceramic phases: Locona (1700–1500 BC), Ocós (1500–1400 BC), and Cherla (1400–1300 BC). It should also be noted that some dental remains and bony elements described by Ardern (2003) were absent from the collection in the summer of 2011 due to isotope and mitochondrial DNA sampling. As a result, these elements were not considered for the present analysis. In addition, Paso de la Amada Burials 1–4, excavated by Ceja Tenorio (1985), were not available for examination during the summer of 2011 and therefore are not included in this analysis.

The age and sex of all individuals were estimated using the standards presented by Buikstra and Ubelaker (1994). In addition, transition analysis, a multivariate technique that includes scores for the cranium and pelvis, was utilized to estimate adult age (Boldsen et al. 2002). For subadult remains, dental development was evaluated following Ubelaker's (1989) dental development chart, and epiphyseal union and skeletal maturation were also considered (Scheuer and Black 2004). While demographic information is certainly necessary to understand pathological processes, the primary focus of the skeletal evaluation was on skeletal pathology. Analysis of pathology included consideration of indicators of disease on all available skeletal remains. Areas of pathological insult were photographed and described using the descriptive methodology typically utilized in the field (Buikstra and Ubelaker 1994).

ASSESSING HEALTH AT THE TRANSITION TO AGRICULTURE

In addition to presenting basic skeletal data from Paso de la Amada, this chapter seeks to examine health during the significant changes associated with the transition to agriculture. To assess change in health over time and health in the broader context of social transitions associated with the shift to agriculture, dental enamel hypoplasia, periostitis, cribra orbitalia, porotic hyperostosis, caries, and dental calculus were utilized as indicators of health status of the population, following previous studies on health during significant transitions (Cohen and Armelagos 1984; Steckel and Rose 2002).

Linear Enamel Hypoplasias

Dental enamel hypoplasias are an important nonspecific indicator of childhood health status. Although the exact etiology of these dental defects is unclear, it is generally understood that they reflect physiological stress events that cause a disruption in amelogenesis. As a result, these defects have been utilized as general indicators of overall health of a population (Cook and Buikstra 1979; El-Najjar et al. 1978; Goodman and Armelagos 1985a, 1985b; Goodman et al. 1980; Skinner and Goodman 1992; Wright 1997). Because teeth do not remodel during life, linear enamel hypoplasias are preserved on the labial or buccal surfaces of the permanent dentition, providing insight into childhood health. Hypoplasias were scored on all available teeth following common observational techniques. The presence of hypoplasias on the labial surface was macroscopically assessed under natural light, using touch and 10x magnification to confirm their presence. The type of defect was recorded following the criteria identified by Buikstra and Ubelaker (1994). Although several types of hypoplasias are present in the Paso de la Amada sample, the majority are linear enamel hypoplasias (LEH). As a result, all defects are treated as linear enamel hypoplasias in the analysis, a common practice in LEH studies (Belcastro 2007; Palubeckaitė et al. 2006; Wright 1997). To ensure that each individual is represented only once in the analysis, the left antimere was selected to include in the sample. Finally, rather than attempt to correlate stress events for individuals, the present study focuses on each individual tooth type as the unit of analysis for chronological comparisons. To compare the Paso de la Amada skeletal population to others in Mesoamerica, the frequency of hypoplastic defects by individual was considered; however, it is recognized that this method is potentially problematic due to differential preservation of each individual.

Caries

Dental caries are areas of progressive tooth decay due to microbial activity related to food items consumed (Pindborg 1970). The dental enamel is demineralized, eventually forming a cavity that perforates into the dentine below the enamel crown (Ortner 2003). Previous research indicates that there is a relationship between significant changes in subsistence and dental health (Cohen and Armelagos 1984; Larsen et al. 1991). In particular, agriculture is associated with a higher prevalence of caries than what has been documented among hunter-gatherers (Cook and Buikstra 1979; Goodman and Rose 1990). This association has been attributed to malnutrition during dental development and the greater carbohydrate content in agriculturalist diets (Ortner 2003). In the present study, caries were scored on all available teeth following Buikstra and Ubelaker (1994). Small pits in the enamel that did not perforate the dentine are not considered in this study. Although the position of caries and their severity were recorded during data collection, these items are not systematically assessed here due to small sample size. Differential preservation of dental remains makes comparisons on an individual basis extremely difficult; however, individual-level comparisons are included in the discussion of caries frequencies during the agricultural transition to increase comparability with other skeletal samples throughout Mesoamerica. In addition, comparisons were done by individual tooth type and the caries frequency was calculated via the tooth count method (Hillson 1996). While some studies calculate caries rates for all teeth in a sample, a single well-preserved individual with many defects could easily overwhelm a small sample such as that seen at Paso de la Amada. As a result, only the left antimere was considered here. Correction factors for caries rates have been proposed in the literature (Lukacs 1995) but are not included in this study to allow for broader cross-cultural comparisons within Mesoamerica.

Calculus

During the lifetime of an individual, plaque accumulates on tooth surfaces. It mineralizes over time to become dental calculus. Calculus deposition is related to a variety of different factors, including diet, oral environment, hydration, salivation, and plaque (Dawes 1970; Lieverse 1999; Mandel 1972). Increased plaque deposition, and therefore dental calculus, has been related to the agriculturalist diet, rich in carbohydrates. Calculus hasn't been significantly emphasized in the literature surrounding health throughout agricultural transitions around the world due to the complexity inherent in its etiology. However, it is considered here to assess the potential shift to a softer, agricultural diet (Magennis 1999). The location and extent of calculus was recorded during data collection. However, only the presence of calculus by tooth type was considered here. As with other dental defects, only the left antimere was considered in this analysis to combat the small sample size and vast differences in preservation in the Paso de la Amada sample.

Periostitis

Periostitis is formed by a reaction of the periosteum to any external stimulation for new bone development. It is characterized by deposition of a new layer of bone over the original cortical bone. Clinically, periosteal reactions have been linked to a variety of pathological conditions, including treponematosis (Hackett 1976), tuberculosis (Roberts and Buikstra 2003; Santos and Roberts 2001), trauma (Lovell 1997), and nonspecific infections, such as those caused by *Staphylococcus* and *Streptococcus* (Ortner 2003). In some cases, this condition can be definitively associated with such a pathology. However, undifferentiated periosteal lesions of indeterminate origin on long bones are common (Ortner 2003). As a result, it is considered nonspecific in its etiology here. Previous work has utilized the prevalence of periostitis to assess stress and health in archaeological populations (Larsen 1995; Powell 1988; Steckel and Rose 2002; Wright 1994). Periostitis was scored for all long bones that were more than two-thirds present. To prevent a single individual from biasing the samples, only the left side was included per individual as a potential measure to combat issues with fragmentary remains. As the side was selected at random, this selection methodology is unlikely to bias the prevalence of periostitis to any significant degree. The overall prevalence of periostitis by both individual and individual long bone are considered here. Previous studies on health as indicated by presence of periosteal reactions have distinguished between active and healed defects. Due to the small sample size in this study, no attempt was made to separate the degree of healing, although it has been noted that the level of activity could have important implications for individual frailty (Wood et al. 1992).

Porotic Hyperostosis and Cribra Orbitalia

Porotic hyperostosis and cribra orbitalia are conditions that have been linked to nutritional deficiencies. Traditionally, these conditions have been interpreted as representing iron-deficiency anemia during childhood. However, some scholars have suggested that they instead are indicative of pathogen load or vitamin B12 deficiency (Ortner 2003; Stuart-Macadam 1992; Walker et al. 2009; Wapler et al. 2004). Regardless of their exact etiologies, it is generally accepted that the anemic or vitamin-deficient status that results in these defects has a biological cost and therefore can be utilized as an indicator of the health or frailty of an individual. Cribra orbitalia manifests skeletally as porous, thickened bone resulting from hypertrophy of the diploe in the orbital roofs. Only individuals with at least one scorable orbit were included in this study. Porotic hyperostosis is exhibited as porosity and diploic thickening visible on the external cranial vault, frequently localized around the lambdoidal region of the posterior parietals and occipital. Only individuals with at least the parietals and occipital preserved were included in this analysis. Although the degree of healing was scored during data collection, it was not considered here due to small samples. Due to the nature of this condition, all adults with evidence of porotic hyperostosis and cribra orbitalia presumably experienced some degree of healing (Ortner 2003).

Data Analysis

To assess the Archaic–Formative transition locally, linear enamel hypoplasias, cribra orbitalia, porotic hyperostosis, periostitis, caries, and calculus were examined using Fisher's exact tests to evaluate potential changes over time within the site. To avoid a potential "mortality bias," subadults are not included for this analysis (Cook 1981). Furthermore, some studies seek to assess sex-based or status-based differences in nonspecific health status (Cucina and Tiesler 2003). Due to the small sample size and poor preservation, such differences in these characteristics are not considered. Due to very small sample size for the Locona time period, the three Pit 32 burials, which date to the Locona or Ocós phases, are included in the Locona sample for chronological comparisons. Lesure and Blake (Chapter 6) further consider them to be most likely Locona due to damage apparently done to Burial 5 by the pit of Feature 4. In addition to chronological comparisons within the Paso de la Amada skeletal sample, the data as a whole were compared to other sites throughout Mesoamerica from a variety of time periods in order to better understand the prevalence of these health indicators in broader chronological and geographic contexts.

For the purpose of these comparisons, it is generally assumed that the mortuary sample is a reasonable representation of the living population at Paso de la Amada, even though it has been demonstrated that reconstructing health from mortuary data is paradoxical. As Wood et al. (1992) have demonstrated, skeletal remains are more accurate representations of the morbidity and mortality of nonsurvivors than of the living (Wood et al. 1992). To potentially deal with some of these issues, multiple health indicators are utilized, following Goodman's (1993) critique, and assumptions about the meaning of pathology prevalence in relationship to frailty are considered.

RESULTS

Demographic Composition of the Paso de la Amada Skeletal Population

There are 26 burials in the Paso de la Amada skeletal sample, divided into the three chronological phases. Of the 26 burials, 21 are adult individuals and five are subadults. Of the adults, there are six females, three possible or probable females, and three males, for an overall sex ratio of 3:1. Due to problematic preservation, eight individuals could not be accurately sexed. Table 24.1 lists the distributions of ages and sexes by phase. The Paso de la Amada skeletal sample is one of the earliest available mortuary collections in Mesoamerica. The antiquity of this sample is likely a significant contributing factor for the fragmentation of multiple individuals

Health at Paso de la Amada

Examining health of the Paso de la Amada sample is complicated by poor preservation of several burials. For several individuals, the external cortical bone is eroded, preventing systematic examination for pathological conditions. In addition, fragmentation further precluded any definitive diagnoses for some individuals. Those observations that were possible are presented in Chapter 23 or the appendix of this chapter, where the presence or absence of pathology is discussed for each individual. While many populations in Mesoamerica are known for elaborate dental decorations and cranial shaping, these cultural modifications were not observed in the Paso de la Amada skeletal collection and are therefore not included here.

On an individual level, 50 percent of adults with observable teeth (seven of 14) exhibit at least one hypoplastic defect. In addition, 66 percent of subadults with observable teeth (two out of three) exhibit at least one LEH, while the neonates do not have sufficiently developed and/or preserved dentition for confident diagnosis. There were three cases of porotic hyperostosis observed among the adults (30 percent), in varying states of healing. None of the subadults exhibited substantial evidence of this defect. Cribra orbitalia was identified in 44 percent of adults (four out of nine) but in no subadults. Periostitis is present on 25 percent of adults (three out of 12) and one neonate. Approximately 29 percent of adults (four out of 14) exhibited at least one carie, and almost all adult individuals had some evidence of dental calculus.

Because the individual is a potentially problematic unit of assessment due to differential preservation, the data are also presented by bony element (Tables 24.2–24.4). With regard to the dental data, the distribution of linear enamel hypoplasias between tooth types in the Paso de la Amada skeletal sample is similar to that found elsewhere (Goodman and Rose 1990; Wright 1997). The anterior dentition exhibits a greater prevalence of hypoplasias than the posterior teeth. Further, the frequency of caries in the Paso de la Amada adult sample was relatively low. For the maxillary dentition, three caries were observed out of 63 total teeth (0.05 percent). The mandibular dentition exhibits a similar distribution, with four caries observed out of a total of 55 teeth (0.07 percent). In contrast, the prevalence of dental calculus appears much higher. Calculus was more common on the anterior dentition, with 74 percent of anterior maxillary teeth (17 out of 23) affected and 85 percent of anterior mandibular teeth (17 out of 20) affected. The posterior dentition was somewhat less affected, but more than half of both maxillary and mandibular teeth were affected by dental calculus. Although very few adult individuals exhibited porotic hyperostosis or cribra orbitalia, due to the small sample of preserved cranial remains and orbital roofs, the prevalence appears quite high. Finally, periostitis was observed on the lower limb bones and appeared on only the radius for the upper limbs.

With regard to the remaining pathological observations, many of the conditions seem to group by age category. For example, older individuals are far more likely to have degenerative joint disease and a higher prevalence of dental defects, including advanced stages of attrition and antemortem tooth loss, whereas young adults are less likely to exhibit these conditions.

Health Changes over Time at Paso de la Amada

Linear Enamel Hypoplasias

The prevalence of linear enamel hypoplasias by tooth type over time is presented in Table 24.5. In terms of proportions of hypoplastic teeth, the Fisher's exact test indicates that there were no significant differences between chronological periods for any tooth types. Closer analysis of these data reveals a potential problem with regard to sample composition. A single individual, G-1, comprises the majority of the Locona sample. This individual had significant postcranial evidence of periostosis and other pathologies, which may indicate that the dental data for this individual is atypical of the Locona population overall, as not every individual in a population is expected to be ill.

Caries

With regard to the chronological comparison, Fisher's ex-

Table 24.2. Prevalence of dental defects by tooth type

	LEH		Caries		Calculus	
Tooth	N	% affected	N	% affected	N	% affected
Maxillary						
I1	9	56%	9	0%	8	75%
I2	9	44%	9	0%	8	88%
C	9	67%	9	0%	7	57%
P3	7	29%	7	0%	5	80%
P4	8	25%	9	0%	9	44%
M1	6	0%	7	14%	6	83%
M2	7	29%	7	29%	5	80%
M3	7	14%	6	0%	6	17%
Mandibular						
I1	6	67%	7	0%	6	83%
I2	6	50%	7	14%	6	83%
C	8	63%	8	12%	8	88%
P3	8	25%	8	12%	7	57%
P4	8	0%	8	0%	8	75%
M1	5	20%	6	0%	5	60%
M2	3	67%	4	0%	3	67%
M3	7	14%	7	14%	6	17%
Totals	113	35%	118	6%	103	66%

Table 24.3. Prevalence of cribra orbitalia and porotic hyperostosis among adults

Occurrence among adults		
	N	%
Porotic hyperostosis	10	30%
Cribra orbitalia	9	44%

Table 24.4. Prevalence of periostitis by long bone type among adults

Occurrence among adults		
	N	%
Clavicle	9	0%
Humerus	10	0%
Radius	11	9%
Ulna	10	0%
Femur	12	17%
Tibia	10	10%
Fibula	10	10%
Totals	72	7%

act test for all three periods resulted in almost no statistically significant results, as demonstrated in Table 24.6. The only significant difference over time was for the prevalence of caries in maxillary second molars between the Locona and Ocós periods. This difference is likely an artifact of the Locona-period sample being quite small and disproportionately represented by Burial G-1, an individual who exhibits several other pathologies. The other maxillary second molar from this sample is from an individual excavated in Pit 32, which is characterized by extremely poor preservation and thereby cannot be systematically assessed for pathology.

Calculus

The calculus data are presented in Table 24.7. Almost all adult individuals in the sample had some degree of calculus development. There was comparatively little calculus deposited on the third molars for both the maxillary and mandibular dentition, which could be related to the fact that these teeth do not fully erupt until the teen years. Overall, the Fisher's exact test indicates that there were no statistically significant results for the chronological comparisons between time periods.

Cribra Orbitalia and Porotic Hyperostosis

The data for cribra orbitalia and porotic hyperostosis are presented in Table 24.8. Only three adult individuals out of 10 with preserved cranial vaults exhibited porotic hyperostosis in this sample. Those affected all date to the Ocós period, which also had the largest available sample of preserved crania to examine. Four out of nine individuals with at least one preserved orbit presented with some level of cribra orbitalia. Although the state of healing was not systematically included in this comparison, it is noteworthy that all individuals with evidence of porotic hyperostosis and cribra orbitalia were adults with at least some degree of healing at time of death. Furthermore, the presentation of these conditions was very minor, either related to a decreased virulence during life or an advanced degree of healing at death. As with the other health indicators, there are no statistically significant differences in the prevalence of either condition over time at Paso de la Amada.

Table 24.5. Fisher's exact test for chronological comparisons of hypoplastic teeth

	Locona		Ocós		Cherla		All Three Periods	Locona-Ocós	Ocós-Cherla
Tooth	+	–	+	–	+	–	P	P	P
Maxillary									
I1	1	0	3	3	1	0	> 0.9999	> 0.9999	> 0.9999
I2	0	1	2	4	1	0	0.6429	> 0.9999	0.4286
C	1	0	2	3	2	0	0.1071	> 0.9999	0.1429
P3	1	0	1	4	0	1	0.5238	0.3333	> 0.9999
P4	1	0	1	4	0	2	0.2857	0.3333	> 0.9999
M1	0	1	0	4	0	1	> 0.9999	> 0.9999	> 0.9999
M2	0	2	2	3	0	0	0.5238	0.5238	> 0.9999
M3	0	1	1	3	0	1	> 0.9999	> 0.9999	> 0.9999
Mandibular									
I1	1	0	2	2	1	0	> 0.9999	> 0.9999	> 0.9999
I2	1	0	2	2	0	1	> 0.9999	> 0.9999	> 0.9999
C	1	0	2	3	2	0	0.1071	> 0.9999	0.1429
P3	1	0	1	5	0	1	0.4643	0.2857	> 0.9999
P4	0	1	0	6	0	1	> 0.9999	> 0.9999	> 0.9999
M1	0	0	1	3	0	1	> 0.9999	> 0.9999	> 0.9999
M2	0	0	2	1	0	0	> 0.9999	> 0.9999	> 0.9999
M3	0	1	1	3	0	1	> 0.9999	> 0.9999	> 0.9999

Note: + = number of teeth with hypoplasias; – = number of teeth without hypoplasias.

Periostitis

The data on periosteal reactions for each long bone category are presented in Table 24.9. Although there appear to be some differences in the distribution of periostitis over time, Fisher's exact test indicates that there were no statistically significant changes in the proportion of periostitis over time. As seen with the dental data, the majority of burials date to the Ocós period, and this distribution is reflected in the numbers of available long bones to assess for periostitis. The femora appear to be most affected by periostitis for the overall Paso de la Amada sample, although this may simply be a reflection of the better preservation of larger, denser long bones relative to less robust bones. It is likely that the small sample sizes for the Locona and Cherla samples, which are each composed of only a few individuals, further confound any conclusive analysis of this measure. In fact, the Locona sample includes only one adult (Burial G-1), which exhibits periostitis on all lower-limb long bones.

DISCUSSION

Changes over Time

Overall, there is very little indication of significant changes in the prevalence of stress markers in the Paso de la Amada sample over the three time periods examined. Given the relatively short time periods being compared, it is not surprising that significant changes in health were not detected. In other studies, changes in lesion frequency across the agricultural transition appear to be part of a complex, culturally and geographically embedded process that varies regionally. The emerging research suggests that the predicted increasing lesion frequency with the rise of intensive agriculture is far more complicated than previously anticipated and likely contingent upon regional dietary variation and subsistence practices (Hodges 1989; Pinhasi and Stock 2011; Steckel and Rose 2002). Elsewhere in Mesoamerica, several sites give insight into

Table 24.6. Fisher's exact test for chronological comparisons of caries prevalence

Tooth	Locona		Ocós		Cherla		All Three Periods	Locona-Ocós	Ocós-Cherla
	+	–	+	–	+	–	P	P	P
Maxillary									
I1	0	1	0	6	0	2	> 0.9999	> 0.9999	> 0.9999
I2	0	1	0	6	0	2	> 0.9999	> 0.9999	> 0.9999
C	0	1	0	5	0	3	> 0.9999	> 0.9999	> 0.9999
P3	0	1	0	5	0	1	> 0.9999	> 0.9999	> 0.9999
P4	0	1	0	6	0	2	> 0.9999	> 0.9999	> 0.9999
M1	0	1	1	4	0	1	> 0.9999	> 0.9999	> 0.9999
M2	2	0	0	5	0	0	**0.0476**	**0.0476**	> 0.9999
M3	0	1	0	3	0	2	> 0.9999	> 0.9999	> 0.9999
Mandibular									
I1	0	1	0	4	0	2	> 0.9999	> 0.9999	> 0.9999
I2	0	1	1	3	0	2	> 0.9999	> 0.9999	> 0.9999
C	0	1	1	4	0	2	> 0.9999	> 0.9999	> 0.9999
P3	0	1	1	5	0	1	> 0.9999	> 0.9999	> 0.9999
P4	0	1	0	6	0	1	> 0.9999	> 0.9999	> 0.9999
M1	0	1	0	4	0	1	> 0.9999	> 0.9999	> 0.9999
M2	0	0	0	4	0	0	> 0.9999	> 0.9999	> 0.9999
M3	0	1	1	4	0	1	> 0.9999	> 0.9999	> 0.9999

Note: + = number of teeth with hypoplasias; – = number of teeth without hypoplasias.

expected changes in health during the shift to a sedentary, agricultural lifestyle. In the Valley of Oaxaca, Hodges (1989) did not identify a meaningful chronological pattern to lesion frequency from the Formative to the Postclassic period. The author relates this lack of patterning to several possible factors, including a more diversified diet than previously expected for agricultural communities; the slow and gradual transition to agriculture over time in Oaxaca, which gave people time to adapt; the capacity for indigenous farmers in Oaxaca to harvest multiple times a year; and climatic variations. Márquez Morfin et al. (2002) further note that there was no uniform increase in all stress indicators over time across four pre-Hispanic sites in Mexico. However, a trend in these data appears to indicate that sites with greater levels of urbanization and social differentiation exhibit generally poorer health

Health at Paso de la Amada in a Broader Context

The health indicators examined for chronological analysis were also compared to skeletal populations from sites elsewhere in Mesoamerica. Because there is no evidence that the prevalence of the assessed health indicators changed significantly over time at Paso de la Amada, all burials were grouped together for comparisons with other skeletal populations across Mesoamerica.

Linear Enamel Hypoplasias

Half of all adults with at least one permanent tooth preserved exhibited one or more hypoplasias at Paso de la Amada. Hodges (1989) examines skeletal data from 14 archaeological sites in the Valley of Oaxaca to assess the impact of agricultural intensification on populations in the region. The results indicate that 70 percent of adults in the

Table 24.7. Fisher's exact test for chronological comparisons of calculus

	Locona		Ocós		Cherla		All Three Periods	Locona-Ocós	Ocós-Cherla
Tooth	+	−	+	−	+	−	P	P	P
Maxillary									
I1	1	0	3	2	2	0	0.6429	> 0.9999	0.5238
I2	1	0	4	1	2	0	> 0.9999	> 0.9999	> 0.9999
C	1	0	2	1	1	2	> 0.9999	> 0.9999	> 0.9999
P3	1	0	2	1	1	0	> 0.9999	> 0.9999	> 0.9999
P4	2	0	1	4	1	1	0.3651	0.1429	> 0.9999
M1	1	0	3	1	1	0	> 0.9999	> 0.9999	> 0.9999
M2	1	0	3	1	0	0	> 0.9999	> 0.9999	> 0.9999
M3	0	0	1	2	2	0	0.4	> 0.9999	0.4
Mandibular									
I1	1	0	3	0	1	1	0.5	> 0.9999	0.4
I2	1	0	3	0	1	1	0.5	> 0.9999	0.4
C	1	0	5	0	1	1	0.375	> 0.9999	0.2857
P3	1	0	3	2	0	1	> 0.9999	> 0.9999	> 0.9999
P4	1	0	5	1	0	1	0.4643	> 0.9999	0.2857
M1	0	0	3	1	0	1	0.4	> 0.9999	0.4
M2	0	0	2	1	0	0	> 0.9999	> 0.9999	> 0.9999
M3	0	0	1	3	0	1	> 0.9999	> 0.9999	> 0.9999

Note: + = number of teeth with hypoplasias; – = number of teeth without hypoplasias.

Formative sample exhibited at least one permanent tooth with a hypoplasia. This prevalence remains relatively constant over time in the Valley of Oaxaca, with 73.8 percent of Classic-period adults and 69.2 percent of Postclassic adults also exhibiting one or more hypoplasias. This is greater than the prevalence of hypoplasias by individual at Paso de la Amada (50 percent). In addition, Hodges (1989) further examines the frequency of hypoplasias on mandibular canines and maxillary central incisors. For the Formative period, 57.4 percent of adults exhibited at least one LEH on the left mandibular canine, compared to 63 percent in the Paso de la Amada sample. In the Valley of Oaxaca, the frequency of LEH on mandibular canines increases slightly in the Classic (64.5 percent) and Postclassic (67.4 percent), but the changes in frequency over time are not statistically significant (Hodges 1989). For maxillary central incisors, Hodges (1989) reports that 36.2 percent of Formative-period adults exhibited at least one LEH on maxillary central incisors, compared to 44 percent of adults at Paso de la Amada.

Márquez Morfin et al. (2002) examined health indicators among skeletal populations from Tlatilco, Cuicuilco, Tlajinga 33 (Teotihuacan), and Cholula. The authors report frequencies of hypoplasias on permanent incisors and canines for both males and females (Márquez Morfin et al. 2002:324). Based on pooling all incisor types from the Paso de la Amada data, about 53 percent of incisors in this sample exhibit hypoplasias. This is a higher prevalence of defects by tooth type than seen at Tlatilco (27.5 percent), Cuicuilco (23.5 percent), and Cholula (19 percent). However, this prevalence is lower than the 83 percent of permanent incisors at Tlajinga exhibiting at least one hypoplasia. In addition, 65 percent of permanent canines at Paso de la Amada exhibit at least one hypoplasia. This compares to 100 percent of permanent canines affected at Tlajinga, 44.5 percent at Tlatilco, 45 percent at Cuicuilco, and 31.5 percent at Cholula. In both cases, the Paso de la Amada sample appears to be between the Tla-

Table 24.8. Fisher's exact test for chronological comparisons of cribra orbitalia and porotic hyperostosis

	Locona		Ocós		Cherla		All Three Periods	Locona-Ocós	Ocós-Cherla
	+	–	+	–	+	–	P	P	P
Porotic hyperostosis	0	1	3	4	0	2	0.65	> 0.9999	0.5
Cribra orbitalia	0	1	3	4	1	0	> 0.9999	> 0.9999	> 0.9999

Note: + = number of teeth with hypoplasias; – = number of teeth without hypoplasias.

Table 24.9. Fisher's exact test for chronological comparisons of long bone periostitis

	Locona		Ocós		Cherla		All Three Periods	Locona-Ocós	Ocós-Cherla
Bone	+	–	+	–	+	–	P	P	P
Clavicle	0	1	0	6	0	2	> 0.9999	> 0.9999	> 0.9999
Humerus	0	1	0	7	0	2	> 0.9999	> 0.9999	> 0.9999
Radius	0	1	1	6	0	3	> 0.9999	> 0.9999	> 0.9999
Ulna	0	1	0	7	0	2	> 0.9999	> 0.9999	> 0.9999
Femur	1	0	1	6	0	4	0.2576	0.25	> 0.9999
Tibia	1	0	0	7	0	2	0.1	0.125	> 0.9999
Fibula	1	0	0	6	0	3	0.1	0.1429	> 0.9999

Note: + = number of teeth with hypoplasias; – = number of teeth without hypoplasias.

tilco, Cuilcuilco, and Cholula populations and the Tlajinga population. The former three sites range in dates of occupation from the Formative (Tlatilco and Cuicuilco) to the Postclassic at Cholula, while Tlajinga dates to Classic-period Teotihuacan. Thus the results for Paso de la Amada are not clearly closer to those of other early agriculturalists than to urban populations of the Classic and Postclassic.

Storey et al. (2002) examine the incidence of enamel hypoplasias on permanent canines from the Maya sites of Copán, Jaina, and Xcaret during the Classic period. The Copán sample exhibited extremely high hypoplasia frequencies, at 90 percent for the total adult permanent canine sample. Approximately 52 percent of adult canines in the Jaina sample and 33 percent of adult canines in the Xcaret sample exhibited at least one hypoplasia, in contrast to 65 percent of adult permanent canines (both mandibular and maxillary) affected by one or more hypoplasias at Paso de la Amada.

Based on these comparisons, the prevalence of hypoplasias at Paso de la Amada appears higher than at many other early sites in Mesoamerica, and even higher than at some Classic-period occupations of known agriculturalists. This seems to indicate increased stress during childhood at Paso de la Amada relative to other Formative and Preclassic sites in Mesoamerica.

Caries

At Paso de la Amada, four out of 14 adults (29 percent) with at least one tooth preserved exhibited at least one carie. Hodges (1989) divides the caries data for Oaxaca into anterior and posterior teeth due to the differential susceptibility of different tooth types to the development of caries. Looking at the Paso de la Amada data the same way, one in 14 individuals (7 percent) had caries on the anterior teeth and four in 14 individuals (29 percent) exhibited caries on the posterior dentition. This is reduced relative to the Oaxaca data at the individual level.

The overall caries prevalence for all tooth types at Paso de la Amada is 6 percent, with two out of 49 anterior teeth (2 percent) affected and five out of 69 posterior teeth (7 percent) affected. In the case of anterior dentition, this frequency is consistent with levels found in the Valley of Oaxaca samples for both sexes in all time periods (Hodges 1989). However, the Paso de la Amada frequency is reduced relative to the posterior dentition for all time periods, which range from 11 percent to 17.9 percent between both sexes (Hodges 1989). Similar to what is documented for the Paso de la Amada teeth, Hodges (1989) did not identify any statistically significant differences over time for adult permanent dentition.

Anderson (1967) describes skeletal remains from the Tehuacán Valley, including caries data, which is reported as a percentage of preserved teeth for all individuals in each time period. Over time, the incidence of caries rises from 4.2 percent in El Riego phase (6500–5000 BC) to 17.2 percent in the Santa Maria phase (900–200 BC) and then tapers off slightly during the later Venta Salada (AD 700–1540) with an 11.5 percent incidence. The overall caries prevalence for all tooth types among adults at Paso de la Amada is 6 percent, which is more consistent with the earlier preagricultural time periods in the Tehuacán Valley.

The caries prevalence for Paso de la Amada is additionally lower than that documented for many later Maya sites throughout Mesoamerica. Xcambó, an agricultural Maya site in the Yucatan that was occupied throughout the Classic period, exhibits an overall caries frequency of 19.5 percent for all adult tooth types, compared to 6 percent at Paso de la Amada (Cucina et al. 2011). Elsewhere in Mexico, the Classic-period skeletal sample from Jaina has a caries frequency of 5 percent (Cucina et al. 2011). For Preclassic and Formative samples in Mesoamerica, several sites have reported caries data. The caries frequency at Cuello in northern Belize ranges from 8 percent for the earliest occupation, around 1200–650 BC, to 12 percent at the end of the Preclassic period (Saul and Saul 1997). White (1988) notes that the caries rate for the Preclassic population at Lamanai is about 20 percent. Moving later in time, the site of Kichpanha in Belize exhibits caries frequencies ranging from 11.1 percent to 28.5 percent throughout its Preclassic- to Classic-period occupation, which is similar to the 17.9 percent frequency documented during the Classic period at Copán (Magennis 1999; Whittington 1999).

Overall, it seems clear that there isn't a pan-Mesoamerican pattern to caries frequencies over time. Certain later sites exhibit lower caries rates than the earliest skeletal samples. Thus, instead of a clear chronological trend of increasing caries frequency with increasingly intensive agriculture, a much more complex pattern emerges. It is likely that a variety of social and cultural elements, including sex, age, and status, also impact caries rates (Cucina et al. 2011). Lukacs (2008) further suggests that shifts in caries frequencies at the transition to agriculture aren't strictly determined by changes in diet. Instead, a variety of factors are potentially at play. With regard to the Paso de la Amada sample, it clearly exhibits lower caries frequency than most of the later skeletal populations in Mesoamerica. This is especially noteworthy given that Paso de la Amada peoples had access to a variety of aquatic resources, which are frequently associated with higher rates of caries (Cucina et al. 2011). The low caries frequency is further consistent with lower values reported in other regions of the world (Cohen and Armelagos 1984; Larsen et al. 1991; Steckel and Rose 2002).

Calculus

Dental calculus was common in the Paso de la Amada sample, with an overall frequency of 66 percent for all tooth types. Hodges (1989) noted statistically significant increases in the frequency of dental calculus on anterior teeth over time in the Valley of Oaxaca. Although there were no statistically significant changes over time in the Paso de la Amada sample, it is noteworthy that the frequency of dental calculus for both anterior and posterior dentition in the Paso de la Amada population is more consistent with later Classic–Postclassic calculus frequency of the Oaxaca groups compared to the Formative populations. The calculus frequencies at Kichpanha range from 17.5 percent to 46.6 percent from the Protoclassic to Late Classic occupations (Magennis 1999), which is less than that seen at Paso de la Amada.

There appears to be an inverse relationship between caries frequency and calculus development in the Paso de la Amada sample. Calculus is relatively common, while the caries frequency is quite low. This pattern is not atypical and is thought to be related to the fact that caries cannot develop as easily when calculus is covering the enamel surface of a tooth (Hillson 1986, 1996). While calculus does appear to prevent significant caries, the relationship is not well understood. Furthermore, calculus has been directly related to periodontal disease and antemortem tooth loss (Hillson 1996).

Porotic Hyperostosis and Cribra Orbitalia

Compared to the roughly contemporaneous populations in Formative Oaxaca, the frequency of both porotic hyperostosis and cribra orbitalia is higher in the Paso de la Amada sample. At Paso de la Amada, three in 10 adults (30 percent) exhibited some evidence of porotic hyperostosis and four in nine adults (44 percent) exhibited cribra orbitalia, which is greater than the 7.9 percent of adults with cribra orbitalia and 5.8 percent of adults with porotic hyperostosis in the Valley of Oaxaca during the Formative period (Hodges 1989). The frequency of both conditions appears to increase slightly over time, but the differences between chronological periods are not statistically significant (Hodges 1989).

Márquez Morfin et al. (2002) report porotic hyperostosis and cribra orbitalia data for adults at Tlatilco, Cuicuilco, Teotihuacan (Tlajinga 33), and Cholula. The 30 percent porotic hyperostosis and 44 percent cribra orbitalia frequencies among adults at Paso de la Amada are most consistent with frequencies documented at Cuicuilco (37 percent frequency of porotic hyperostosis and 35 percent frequency of cribra orbitalia). The remaining sites in this study exhibit lower frequencies, with the lowest overall frequencies appearing at Tlajinga and Cholula, both of which have much later occupations than Paso de la Amada and Cuicuilco.

Both porotic hyperostosis and cribra orbitalia have been documented at rates comparable to that seen at Paso de la Amada at Classic-period Maya sites. Storey et al. (2002) report the incidence of porotic hyperostosis for Copán, Jaina, and Xcaret. Among these populations, 37 percent of Copán adults, 26 percent of Jaina adults, and 39 percent of Xcaret adults exhibited lesions characteristic of this condition.

Periostitis

Hodges (1989:54–55) reports the frequency of periosteal reactions among adults in the Valley of Oaxaca. For the Formative-period sample, the prevalence of periosteal reactions by long bone type varies between 3.3 percent (humerus) and 60.4 percent (tibia). Although the small sample size available at Paso de la Amada makes direct comparisons difficult, overall, the frequency of periosteal reactions (7 percent for all long bones) at Paso de la Amada is less than that seen in Formative Oaxaca. Hodges (1989) notes that the frequency of periosteal reactions on adult long bones exhibited a significant change over time only for femora. Otherwise, the remaining skeletal elements didn't significantly differ between the Formative, Classic, and Postclassic periods.

Because tibiae are frequently the long bones most affected by periosteal reactions, Storey et al. (2002) report the incidence of periostitis for tibiae exclusively in the skeletal samples of Copán, Jaina, and Xcaret. One tibia in the adult long bone sample at Paso de la Amada exhibits periostitis (10 percent), whereas the prevalence of periostitis is higher for Classic-period adults at these sites, with 55 percent of the Copán sample, 48 percent of the Jaina sample, and 68 percent of the Xcaret sample being affected. Similarly, Márquez Morfin et al. (2002) report tibial infection data for Tlatilco, Cuicuilco, Tlajinga, and Cholula. At every site, the frequency of tibial periostitis is much higher than that seen at Paso de la Amada.

Finally, Anderson (1967) notes a single case of periostitis on a tibial shaft from the Venta Salada phase (AD 700–1540). It is unclear how many bony elements were observed in this collection, but the low reported incidence of periosteal infection is consistent with that seen at Paso de la Amada.

CONCLUSIONS

The dataset from Paso de la Amada is unique in its chronological position during the transition to agriculture. Unfortunately, the age of the sample comes with associated preservation problems. As can be ascertained from the burial descriptions, several individuals experienced very poor preservation and cannot be included for systematic pathological analysis. The small available sample of skeletal remains further stymied any in-depth chronological comparison, as there are very few well-preserved individuals from the Locona phase in particular. Based on the Fisher's exact tests, no significant change in the prevalence of health indicators was detected over time within the Paso de la Amada sample.

Comparing the Paso de la Amada frequencies of health indicators to other populations proved more insightful, if a little tentative due to the small sample size and issues inherent in comparing data compiled and analyzed by different observers using different methods of data compilation. Overall, it seems that the Paso de la Amada sample exhibits a complicated pattern of health compared to other sites in Mesoamerica. In some cases, as demonstrated by the frequencies of calculus, porotic hyperostosis, and cribra orbitalia, the Paso de la Amada sample tracks more closely with intensive agriculturalists. For other health indicators, such as the frequency of caries and periostitis, Paso de la Amada is more consistent with other early populations from the Preclassic or Formative periods across Mesoamerica.

As noted by Wood et al. (1992), low prevalence of lesions could be indicative of a frail population that could not withstand the types of pathological insults that create skeletal lesions. Alternatively, the lack of these skeletal lesions could be indicative of relatively good health compared to later groups that had greater population densities and higher prevalence of disease. Given what is known about disease loads in high-density environments and about health at the transition to agriculture, lower frequencies of lesions seems to suggest better health relative to later agriculturalists (Cohen and Armelagos 1984; Goodman 1993; Steckel and Rose 2002; Wood et al. 1992). However, the presence of poor health markers suggests that the Paso de la Amada population was encountering health challenges. In fact, it is entirely possible that the caries rate is lower than that of more intensive agriculturalist populations due to the high prevalence of calculus in this sample (Hillson 1986, 1996), making the low periostitis the only indication of generally better health compared to later intensive agriculturalists in Mesoamerica.

Based on these data, it seems that the Paso de la Amada sample exhibits generally worse health than several other early agricultural groups in Mesoamerica. Starling and Stock (2007) note a similar pattern of health among early Egyptian and Nubian agriculturalists. In this study, the prevalence of linear enamel hypoplasias is greatest among "proto-agricultural" populations, indicating higher stress and poorer health during the transition to a predominantly agricultural lifestyle. Over time, health gradually improved in the region as this transitional period ended and was replaced by more complex social structures and agricultural practices. This pattern is additionally demonstrated in the Tehuacán Valley caries values, which increase from the El Riego phase to the Santa Maria phase and then decrease once agricultural practices are firmly established (Anderson 1967). Due to the broad geographical and chronological distribution of sites used as comparison for the Paso de la Amada sample, the results reported here are somewhat preliminary. Further investigation of diet utilizing stable isotopes and pathological examination of other contemporaneous skeletal samples in the area will help further elucidate this complicated transition.

APPENDIX: SKELETAL PATHOLOGY DESCRIPTIONS

Descriptions of burials not included in Chapter 23.

Mound 6 Burial 13

Time Period	Age Estimate	Sex Estimate
Ocós	25–35	probable female

This individual is a probable female based on cranial and pelvic morphology. Based on the auricular surface, this individual was 25–35 years old at death. This individual probably dates to the Ocós period and was found with a jade bead in the thoracic region. The cranium is well preserved, and it appears that some microporosity in the orbits was healed at the time of death, indicating cribra orbitalia. There is also microporosity on the posterior thirds of both parietals, above the temporal lines. This microporosity is also evident on the superior occipital. This porosity suggests porotic hyperostosis that was largely healed at time of death. Elsewhere on the cranium, the sigmoid sulcus of the right temporal was very deep, with two well-circumscribed pits at its deepest projection.

There is significant pathology evident on the lower cervical vertebrae and upper thoracic vertebrae. Portions of three cervical bodies exist. These fragments exhibit minor lipping on the anterior side of the centra. The pre- and post-zygopophyses appear largely normal, and there is no significant degradation of these articulations. There is porosity and clear activity on the inferior side of the bodies in the form of pits and minimal syndesmophytes. Moving to the thoracic body fragments, approximately nine bodies are present based on fragments of the anterior side. All of these exhibit very significant osteophytic growth on the anterior side. The two largest fragments, each of which is approximately 50 percent preserved (anterior halves of the bodies), are in sequence (that is, two successive thoracic vertebral bodies are preserved). The osteophytic outgrowths clearly mirror one another in that they form a pseudarthrosis. The greatest horizontal extension of osteophytic growth extends approximately 15.5 mm beyond the estimated original margins of the body. There appears to be relatively little evidence of syndesmophytic activity within the original margins of the bodies, although some slight vertical osteoblastic activity was apparent at death. The basivertebral foramina are visible and appear largely normal, if somewhat enlarged relative to a normal, healthy thoracic vertebra. The osteophytic addition appears to have been active at death based on the disorganized, proliferative appearance of the osteoblastic activity. The full extent of the abnormal bony addition cannot be assessed on the bodies, as only the anterior halves are preserved. The vertical surfaces of the anterior thoracic bodies are sclerotic in appearance, with only minimal osteophytic development. There appears to be some degree of vertebral compression as well, as the inferior thoracic vertebral body is relatively reduced in vertical height compared to the superior centrum. These pathological patterns are mirrored to varying degrees on the remaining body fragments.

In addition, nine thoracic neural arches were preserved; they increase in pathological involvement inferiorly. Moving inferiorly, the left post-zygopophyses become pathological. The level of severity ranges from moderately active porosity on the articular surface to significant lipping and lateral growth, making the left facet at least twice as large as normal in the most severe cases (T7–T10). The bony addition is visible from the posterior side of the vertebrae and projects significantly laterally from the spinous process. In the most inferior case, it appears as though the original articular facet was destroyed antemortem. And there was a shift to the left, where a new articular region was formed. This facet is entirely degraded and there is no remaining original cortical articular bone. Instead, it is a depressed indentation of porotic bone. There is also a fragment of lower thoracic vertebral neural arch with the left pre-zygopophysis preserved. It is additionally porotic and exhibits active destruction of the articular surface that mirrors the activity of the post-zygopophyses. The changes in the vertebral column are consistent with a diagnosis of spondyloarthropathy and osteoarthritis.

The left radius exhibits very minor lipping on the proximal epiphysis. There is an area of irregularity on the lateral side of the diaphysis, just distal to the level of the radial tuberosity. This area is very well integrated with the surrounding cortical bone and was fully healed at death. This appears to be a well-healed periosteal lesion.

Finally, there is a single proximal manual phalanx with eburnation and porosity on the distal articular surface. There is also a semicircular area of lipping inferior to the articular surface on the manual side, immediately inferior to the area of eburnation.

In terms of dental remains, 11 maxillary teeth and 14 mandibular teeth are preserved. Three maxillary teeth and one mandibular tooth were lost antemortem. There is significant calculus development on all teeth, preventing examination for linear enamel hypoplasias. There are two caries present on the maxilla, both on interproximal wear facets of molars. There is evidence of periodontitis on both the maxilla and the mandible. There is a single abscess on the mandible, anterior to the left central incisor.

Pozo A Burial 1

Time Period	Age Estimate	Sex Estimate
Ocós	45+ years at death	male

This burial dates to the Ocós period. This individual is an old adult male who is relatively well preserved. There is well-circumscribed microporosity on the posterior parietals and the superior portion of the occipital, centered around the lambda, indicating porotic hyperostosis. As the cranium is reconstructed, it is difficult to assess if there is any significant diploic thickening. This region was well healed at death. There is no evidence of disease on the remaining cranium.

There is slight lipping on the inferior margins of both glenoid fossae of the scapulae. The areas of muscle attachment inferior to the glenoid are noticeably more robust on the right side. The left superior facet on the manubrium is also larger and is more pronounced than on the right side. The first ribs are preserved, but there is no evidence of pathology that would correlate with the differences on the manubrium. There are also clear size and robusticity discrepancies between the arms. The right arm overall appears more robust. Aside from the size difference, there are no abnormalities evident on the humeri. The distal metaphysis of the left ulna exhibits a clear change in angulation and shape. There is some well-circumscribed porosity in this region as well; it is well integrated with the surrounding bone and largely quiescent. A raised ridge of bone on the lateral side of this bone runs roughly parallel to the change in angulation. It appears that this was a simple spiral fracture that was not properly reduced and that healed abnormally, shifting the distal end laterally and anteriorly. The distal articulation of the radius changed secondary to the ulnar fracture. The ulnar notch on the distal radius projects more superiorly and medially than normal. It is additionally surrounded by a raised rim of bone. Finally, the distal radial epiphysis has a raised, bony area in the middle of the epiphysis that is poorly integrated with the surrounding bone. Thus the difference in overall size and robusticity of the arms is likely due to differential use patterns, with the individual utilizing the right arm more intensely, possibly as a result of pain in the left limb.

There is lipping on the anterior side of most vertebral bodies, from the sixth cervical inferior to the thoracic vertebrae. C1 additionally exhibits slight lipping on the superior articular facets. There is porosity and minor syndesmophytes on the superior body of C7. The remaining portions of the pelvic girdle are largely free of pathology. There is no obvious lipping on the lumbar vertebrae or the sacrum. There is evidence of degenerative joint disease in both acetabula in the form of exostoses on the lunate surface and lipping. On the right os coxa, the definition of the lunate surface is lost almost entirely. There are significant bony exostoses on the articular surface on the inferior portion of the acetabulum. These are poorly integrated jagged peaks that almost look like trabecular bone but are clearly superficial to the cortical bone. The regions of the original margins of the lunate surface are slightly visible. They are microporotic and have clearly been worn down.

There is some lipping on the proximal articular surfaces of the manual phalanges, especially the middle phalanges. Some hand and feet bones were previously removed for mtDNA sampling. There are no clear side differences in terms of size or shape of the carpals, metacarpals, or phalanges.

In terms of dental pathology, there are multiple linear enamel hypoplasias on the anterior teeth, with each canine exhibiting multiple hypoplastic episodes. There is minor calculus development on both the maxillary and mandibular teeth. The porosity of both the maxillary and mandibular alveolar bone indicates that this individual exhibited periodontitis prior to death.

Pozo B Burial 1

Time Period	Age Estimate	Sex Estimate
Cherla	25–35 years at death	female

Burial B-1 is characterized by fragmentary skeletal elements. Based on a partially preserved left os coxa and cranium, this individual was female and was likely a young to middle-aged adult at time of death. The cranial remains are represented by only incomplete portions of the parietals, occipital, temporals, left zygomatic, right maxilla, right sphenoid, and mandible. There is no evidence of any pathological condition on the skull.

Ardern (2003) notes an abnormality on the proximal right humerus that is described as "extra bone growth on the surface [that is] slightly twisted" (48). Further examination of this bone indicates that the additional growth is a very pronounced deltoid tuberosity. This feature is normally present on the proximal humeral diaphysis and varies in expression between individuals depending on usage of the associated musculature (Ortner 2003). The "twisted" appearance noted by Ardern (2003) is an artifact of this feature's normal position on the bone, which is enhanced by the heightened expression of this muscle attachment. In addition, the ridge of bone that Ardern (2003) identified on both the right radius and ulna likely refers to the interosseous crests on both bones, as there is no clear evidence of any abnormal pathology on either element.

There are postmortem gnaw marks on the inferior long bones, including the right femur, fibula, and tibia. In addition, there are postmortem cut marks on the proximal, anterior diaphysis of the left femur.

In addition to the remains definitively associated with this burial, extra cervical vertebrae (C1–C4) were present in varying states of preservation. These bones do not belong to Individual B-1. There are also elements from a younger individual, including an unfused distal ulna diaphysis. The origin of these remains is unclear, although it is possible that the immature elements belong to Individual B-2, but this association could not be conclusively made.

With regard to dental remains, Ardern (2003) states that there were no maxillary teeth associated with this individual. However, several maxillary teeth were found with the remains, including all four incisors, both canines, the right fourth premolar, the left third molar, and all three right molars. The maxillary dentition exhibits no evidence of caries, although there are at least vestiges of dental calculus on the left canine, both right incisors, right canine, right fourth premolar, right first molar, and right second molar. Only the distal right alveolar bone is visible, and there is no evidence of a maxillary abscess or periodontitis. There are linear enamel hypoplasias on the left maxillary canine and second incisor, as well as on the maxillary right incisors, canine, and first molar. The mandibular dentition exhibits a similar pattern of pathology as that seen on the maxillary teeth. There is a single carie on the right second molar. Calculus is evident on all teeth aside from the left third molar. There are no abscesses on the mandible; nor is there any evidence of dental modification.

In addition to the teeth definitively associated with this burial, five extra teeth were found with this individual's skeletal remains. These teeth are all mandibular and include the left first incisor, left second incisor, left canine, left third premolar, and right canine. These teeth exhibit very little wear and largely appear to be around the apex closed stage of dental development. The level of wear and development is consistent with Individual B-2, although Ardern (2003) notes that these teeth were all absent from that individual. Due to the uncertainty in the association of these teeth, they were not considered in the present analysis.

Pozo B Burial 2

Time Period	Age Estimate	Sex Estimate
Cherla	15 years +/- 36 months	-

The majority of long bone epiphyses of this individual, including those of the proximal humerus, proximal and distal radius, distal fibula, and proximal ulna, were not fused at death. The left distal humeral epiphysis and the distal tibial epiphysis were in the process of fusing at time of death. Dental remains further substantiate the conclusion that this individual is a subadult, as the third molars are unerupted and there is minimal wear all three present second molars. On the basis of this information, Pozo B, Burial 2 represents an individual of 15 years (plus/minus 36 months) at time of death. Sex was not assigned to this individual due to the immature status of the remains.

The cranium is fragmentary and much of the anterior vault and cranial base are missing from the collection. There is no evidence of cribra orbitalia on the preserved orbit fragments; nor is there any abnormal porosity or thickening of the cranial vault. Postcranially, this individual does not exhibit any significant pathology aside from the distal left humeral diaphysis. As noted by Ardern (2003), there is a bony growth on the medial side of the diaphysis, approximately 70 mm from the distal end. The area surrounding this spicule of bone is characterized by a slight raised ridge approximately 19.6 mm long in the superior–inferior direction. The spicule itself is 7.82 mm long (proximal–distal length) and projects 3.54 mm off the normal diaphyseal surface. The very tip of this bony projection appears to have been eroded away postmortem, based on the lighter coloration and the clear exposure of inner bony structure, which has no clearly defined organization. As a result, it is possible that this projection extended further from the cortical surface of the diaphysis in life. The bone is dense and striated away from the original surface of the bone. Overall, it appears that this bony outgrowth is an example of myositis ossificans.

The teeth exhibit multiple indicators of dental pathology. On the maxilla, one small carie was present on the left canine and on both first molars. No calculus was evident on the teeth, and contrary to Ardern (2003), the maxillary and mandibular alveolar bone does not exhibit any significant pathology. There are linear enamel hypoplasias evident on the following teeth: the mandibular left M1; the maxillary left M2, M1, and P3; and the maxillary right C, P3, P4, and M1.

Pozo B Burial 3

Time Period	Age Estimate	Sex Estimate
Cherla	18–23 years at death	possible female

This individual is represented by the right os coxa, the left talus, and the right femoral diaphysis. Ardern (2003) notes that this is likely not a primary interment due to the lack of skeletal elements preserved and the lack of burial goods. It is unclear if these remains all belong to the same individual. The age is based on the partially fused (not fully fused) iliac crest and a partially preserved auricular surface, both of which indicate a young adult. Ardern (2003) suggests that this individual is likely male. However, the presence of a shallow preauricular sulcus and the greater sciatic notch are more indicative of a female individual. This diagnosis remains tentative due to the young age of the individual in question. In addition, the talus is large and consistent with that of a male based on results from discriminant functions (Steele 1976).

The talus and femoral diaphysis do not exhibit any pathological conditions. The right os coxa exhibits a small abnormal region in the acetabulum, just above the ischial border. The area itself is depressed in relation to the normal surface of the cortical bone and is characterized by woven bone within the depressed region that is dense and sclerotic in appearance. There is some microporosity in the area as well. The inferior margins of the overall area are well defined with smooth margins, although there is postmortem damage on part of the superior margin, preventing systematic analysis of this region. The pathological region accounts for less than a quarter of the inferior portion of the acetabulum. There is no eburnation evident in the area. It appears that this was an active region of healing at time of death.

Pozo C Burial 1

Time Period	Age Estimate	Sex Estimate
Ocós	45+ years at death	male

Burial C-1 is an old adult male dating to the Ocós period. There is evidence of porotic hyperostosis on the external table of the cranium in the form of microporosity on the parietals and occipital. The fine porosity (less than 1 mm in diameter) is located around the sagittal suture and extends onto the superior occipital. In addition, both orbits have partially preserved microporosity that is well healed, likely indicating childhood cribra orbitalia that had healed with advanced age. The remaining portions of the cranium do not exhibit any pathological conditions, aside from the teeth, which are described below.

Several areas of the postcranial skeleton exhibit pathology. Both scapulae exhibit lipping around the glenoid, with the left more severely affected than the right side. The arm bones are largely preserved and differ markedly in terms of muscular attachment areas. The left arm bones exhibit greater robusticity in areas of muscle attachment than those on the right side. The deltoid tuberosity of the left humerus is significantly larger than that of the right. In addition, the midshaft diaphyseal measurements for all left arm bones are at least 3 mm greater on average than those for the right. The lateral end of the left clavicle is also enlarged relative to the right clavicle. These changes are likely related to the defect found on the distal right radius. The metaphyseal region of the right radius is characterized by abnormal osteoblastic activity on all sides of the bone, immediately inferior to the distal articular facet, which is not preserved. On the posterior side, the large area of osteoblastic activity protrudes significantly from the normal cortical bone. The addition exhibits both well-integrated sclerotic bone and interspersed areas of active woven bone. The superior margins of the overall region are largely well integrated, although the localized areas of woven bone are characterized by poorly integrated margins. The woven bone regions are found on the medial side of the posterior distal radius. There appears to have been both osteoblastic and resorptive activity in this area of the radius. The bulbous, sclerotic appearance extends from the posterior side of the bone to the medial and anterior sides. On the anterior side, the normal cortical bone is in evidence and the additive activity appears to have been less active in the region. On the anterior, distal-most portion of the preserved radius, there is a lipped region on the margins of where the articular surface would exist if it were present. This suggests that there were also changes to the articulation, although any definitive assessments of that area are impossible. This lipped area is additionally porotic in appearance. The overall appearance of this defect indicates a traumatic event and subsequent healing process. Beyond the radius, there are no significant pathological indicators on the right arm. The distal right humerus has periostosis that is dense and sclerotic in appearance. This is present only on the posterior aspect and extends superiorly to midshaft. The right ulna is represented only by diaphyseal fragments that do not appear pathological. The right second metacarpal also exhibits pathological change on the proximal end. There is a bony outgrowth on the dorsal side of the metacarpal, approximately 1.2 cm from the proximal articular surface. The distal margins of this region are smooth and well integrated. Proximally, the bony addition juts out from the normal cortical bone at a right angle. The medial side exhibits an undulating, well-integrated bony surface, while the lateral side is smooth. The proximal facet itself exhibits postmortem damage around the margins, preventing systematic analysis.

The disparate appearance of the upper limbs is not mirrored on the lower limbs, which are similar in terms of size and areas of muscle attachment. Ardern (2003) reports bowing of the left fibular diaphysis. Further examination of this bone suggests the possibility of some very minor alteration in shape. However, there is sediment adhered to the surface, which could distort the shape somewhat. The articular ends of the left fibula are not preserved, preventing an assessment of the whole bone. There is also minor lipping on the proximal articular facets of the distal pedal phalanges.

In addition to the appendicular skeleton, the vertebrae exhibit pathological changes. In this case, the changes are likely age-related degeneration of the intervertebral joints. Most of the cervical and the first nine thoracic vertebrae are largely present. In addition, the neural arches of the remaining thoracic vertebrae and first three lumbar vertebrae are preserved. The atlas exhibits significant lipping. In particular, the anterior facet for the dens is enlarged with lipping around all margins. The axis is further characterized by lipping on the inferior margins of the body. The remaining cervical vertebrae exhibit large amounts of osteophytic growth along the margins of the vertebral bodies. There is compression of several cervical bodies (C3–C5). The pre-zygopophyses are lipped on the superior side. The cervical vertebrae are the most significantly affected, although comparisons with the inferior vertebrae are problematic due to the absence of most vertebral bodies. The lipping along the body margins is also present, although less severe on the superior thoracic vertebrae. The pre- and post-zygopophyses are not significantly involved, moving inferiorly from the cervical region. Overall, the vertebral changes are likely related to the advanced age of this individual and represent osteoarthritis.

With regard to the dentition, there is significant resorption on both the mandible and the maxilla. On the maxilla, only the right first molar is present. All other maxillary molars were lost antemortem. Of the 10 preserved maxillary teeth, there is significant attrition, rendering assessment of other dental pathologies largely impossible. There is clear periodontitis present in the observed alveolar bone, which was actively resorbing at time of death. Of the mandibular teeth, only the right lateral incisor, the left second molar, and the left third molar remained at death. All other teeth were lost antemortem based on the advanced resorption of the mandible. As with the maxilla, all teeth were in advanced stages of wear, except the third molar, which still had enamel preserved on all surfaces.

Pozo C Burial 2

Time Period	Age Estimate	Sex Estimate
Ocós	25–35	female

Individual C-2 was a young adult female at time of death, based on preserved os coxae and cranial remains. Overall, this individual is very well preserved, with most of the skeletal remains at least partially present. The cranial remains are largely devoid of pathology. There does not appear to be any evidence of cribra orbitalia or porotic hyperostosis.

Postcranially, the right ilium and sacrum exhibit matching abnormalities. On the right ilium, there is a pit in the retroauricular area, immediately posterior to the auricular surface. This region is characterized by a well-integrated, smooth appearance. It is not bilaterally present. On the right side of the sacrum, there is a matching pitted region that mirrors the appearance and size of the pit on the right ilium. This ovular depression is posterior to the auricular surface and matches up with the depression on the ilium when the bones are in articulation. This abnormality in shape was not an area of bone activity at death.

On the left proximal femur, there is an area of abnormality on the medial and lateral sides of the proximal diaphysis. On the posterior side, the margins of this abnormality are well integrated, while the anterior side exhibits more uneven, less well-integrated margins. The surface texture of the abnormality is striated and porous, likely indicating osteoblastic activity at death. The area extends approximately to midshaft on the medial and lateral sides of the diaphysis. It is lighter in color and clearly extends above the normal surface of the cortical bone. A similar, although less extensive, abnormality is present on the right femur. In both cases, this appears to be bilateral periostosis. It is not present on any other long bone. Finally, Ardern (2003) notes some abnormalities of shape on the left metatarsals. These did not appear significantly different from normal metatarsals in this regard.

The maxillary teeth are largely present, and only the left third premolar is absent due to postmortem loss. Attrition is moderate and consistent with the age of this individual. There are no caries or abscesses observable. There is calculus formation on almost every tooth, largely localized on the lingual and buccal surfaces. In many cases, only vestiges of calculus remain. There is also evidence of periodontitis and resorption of the alveolar bone. There are linear enamel hypoplasias on the anterior maxillary dentition, with at least one hypoplasia evident on the left maxillary canine, left lateral incisor, left central incisor, right central incisor, and right lateral incisor. Calculus occludes some areas of the enamel crowns, making this an incomplete assessment of hypoplasias. The mandibular teeth exhibit a similar pattern of dental pathology. The mandibular incisors were lost postmortem (the right incisors due to chemical sampling after the publication of Ardern [2003]), but all other teeth are preserved. There are no caries observable. There is calculus on almost all preserved teeth and evidence of periodontal infection comparable to that on the maxilla.

Pozo C Burial 3

Time Period	Age Estimate	Sex Estimate
Ocós	birth +/- 2 months	-

Individual C-3 is a neonate found at the feet of Individual C-2 (Ardern 2003). The estimated age of birth plus/minus two months is based on the development of a deciduous maxillary right central incisor, which has a crown that is approximately three-quarters complete. Lack of significant cranial and postcranial fusion supports this age range. Overall, the fragility of this specimen resulted in very fragmentary remains. Observable areas include the cranial base, left orbit, petrous portions of the temporal, sphenoid, scapulae, vertebral fragments, long bone fragments, and central incisor. There is no clear evidence of any pathological condition on the skeletal or dental remains of this individual.

Pozo D Burial 1

Time Period	Age Estimate	Sex Estimate
Ocós	30–40	male

On the basis of a left preserved auricular surface, this individual was approximately 30–40 years of age at death. Robust cranial features and a narrow greater sciatic notch indicate a sex of male. This individual is relatively complete, and Ardern (2003) notes a greater overall robusticity of this individual compared to other Paso de la Amada burials. Assessment of the skeletal remains did not reveal any significant pathological conditions. There is very minor lipping of the fourth lumbar vertebral body. In addition, the tubercle on the right scaphoid of the hand is extended and a bony knob is evident. This is significantly enlarged compared to the left scaphoid. In addition, minor osteophytic development is present on the joint margins of the manual phalanges of both hands, potentially indicating minor osteoarthritis at death. However, there is no significant joint degradation elsewhere on the skeleton.

The majority of teeth are preserved and exhibit wear consistent with middle adulthood for this population. The maxillary teeth are completely present, except the right third premolar, which was lost antemortem based on associated remodeling of the alveolus. There are caries present on the maxillary left first molar. In addition, there is calculus on many of the teeth and active periodontitis. There is a single observable hypoplasia on the upper right central incisor. The labial surfaces of most teeth were significantly polished, with many obscured by the glue and acetone mixture used to preserve and reconstruct the remains. The mandibular teeth are largely present, except for the lower right first and second molars, which were likely removed for isotope sampling after the publication of Ardern (2003). Both third molars erupted at an angle and impacted into the distal surface of the second molars. Caries were evident on both mandibular third molars, and calculus was present on the anterior dentition. There was minor periodontitis evident in the form of porotic alveolar bone with convex borders between teeth. No hypoplasias were observable on the mandibular dentition.

Pozo G Burial 1

Time Period	Age Estimate	Sex Estimate
Locona	25–35	female

Burial G-1 is a very well-preserved adult female who was 25 to 35 years of age at death. Nearly all skeletal elements are preserved, and the skull has previously been reconstructed (Ardern 2003). There is no clear evidence of porotic hyperostosis on the ectocranial surface; nor is there porosity indicative of cribra orbitalia in the orbits. The endocranial surface was difficult to observe due to the reconstructed cranium. There was no other skeletal pathology evident on the skull.

The upper extremity long bones are all present and well preserved. They do not exhibit any of the pathology that characterizes the lower limbs. With regard to the legs, both the left and right femora, tibiae, and fibulae exhibit significant bilateral periosteal activity. Beginning on the left side, there is slight evidence of periostosis on the anterior diaphysis, on the distal third of the bone. The posterior side of the left femur is unobservable due to postmortem rodent gnawing. The observable defect on the anterior side is characterized by woven bone, with dense sclerotic reaction as well. Toward the medial side of the defect, there is significant evidence of healing, and the margins are largely well integrated with the surrounding normal cortical bone. The left tibia has two well-healed areas of periosteal activity on either side of the tibial tuberosity on the anterior surface of the proximal diaphysis. These are small, ovoid regions that are well integrated and appear to have been largely inactive at death. The main defect on the tibia takes up approximately two-thirds of the anterior diaphysis. The periosteal activity is well integrated around the area of the anterior crest. On the medial side, there is some porosity and striations, indicating active osteoblastic activity at death. The region is dense and sclerotic. The superior and inferior margins of this activity are largely well integrated. The defect extends to the border of the distal metaphyseal region but does not extend inferiorly onto the articular area. At its widest, the periosteal activity has a circumference of 8 cm. Finally, the left fibula also exhibits evidence of periostosis. The majority of the abnormal activity was largely inactive at death. The defects are well integrated and largely healed. The abnormal areas of activity extend around the circumference of the bone, with the interosseous crest being the least affected area. The medial side of the fibula adjacent to the interosseous crest is the only region with significant evidence of activity at time of death, in the form of striations. The distal third of the bone is most affected by activity at death, which again seems to extend around the entire circumference of the bone. It did not extend to the epiphyses.

In addition, the right lower limb exhibits the same periosteal reactions as those seen on the left side. In fact, the right side appears to be more severe in expression overall. As seen on the left femur, the periosteal activity on the right femur is restricted to the distal portion of the bone. On the anterior side, there are two clear areas of periostosis. The superior-most of these is on the anteromedial side of the bone and was largely healed at time of death. It extends around the medial side of the bone and borders the linea aspera on the medial side. The distal area of activity extends around the lateral side of the bone and was healing at time of death. This latter area of pathology is characterized by dense, sclerotic bone with well-integrated margins. The posterior surface of the right femur exhibits periosteal activity and continued periostosis, extending approximately to the midpoint of the diaphysis, framing the linea aspera on either side. The entire popliteal surface was affected and largely healed at death. The defects on the right tibia are spaced over the proximal and distal diaphyseal areas. On the proximal posterior end, the periosteal reaction borders the anterior crest and extends medially, continuing on to the posterior aspect. This entire region is well integrated and was clearly healing at time of death. Porosity and striae are concentrated on the anterior crest in this area. On the distal end, another such disturbance is found on the anterior surface of the bone; it is similar in terms of healing and activity at death. The posterior popliteal surface is affected as well, matching the progression and activity found on the right femur. This pathology extends anterior onto the anteromedial surface of the bone, where a fully healed lesion exists. Finally, the right fibula exhibits significant periosteal addition around the entire circumference of the diaphysis at midshaft. Both the superior and inferior margins are well integrated. There is a mix of microporosity and striations over the surface of this defect; it is less pronounced on the posteromedial side, which appears more healed than the anteriorly positioned porotic regions.

All 32 adult teeth were preserved, although two molars had been removed for isotopic sampling in 2006. The level of wear is consistent for an adult of this population. The teeth are characterized by calculus deposits on almost every tooth. There is also evidence of periodontitis and minor periostosis of the bone surrounding both the maxillary and mandibular dentition. There are a few hypoplasias on both the maxillary and mandibular anterior dentition, as well as three caries, all found on molars.

Pozo O Burial 1

Time Period	Age Estimate	Sex Estimate
Ocós	adult	-

This individual is characterized by highly fragmentary remains. The skeletal fragments are definitely cranial vault pieces, including some definitive portions of the petrous area, zygomatic process, and parietals. Sex estimation is impossible due to the incomplete nature of this individual. Several dental fragments were present, and the teeth are all permanent. There are definite remnants of mandibular molars, on which the degree of wear is partially observable. Wear is consistent with adulthood in this population. However, any assessment beyond general adulthood is impossible. There are five dental fragments present with this individual, in addition to a molar that was removed for chemical study in 2006. There are both root and enamel fragments present, possibly representing five teeth total. A maxillary left fourth premolar is definitively present, in addition to the first and second mandibular right molars. Finally, there are two roots of anterior teeth that are consistent in shape and size with mandibular canines, although positive identification is difficult. There is no observable pathology on this individual.

Pozo O Burial 2

Time Period	Age Estimate	Sex Estimate
Ocós	adult	-

This individual is comprised of only a mandible, which was not available for analysis in the summer of 2011. Ardern (2003) notes that it is considered a burial due to the presence of two artifacts found with the mandible. Unfortunately, there is no indication of its preservation status or appearance in Ardern (2003). Due to the lack of information, this individual was omitted from any systematic health status analysis.

Pozo R Burial 1

Time Period	Age Estimate	Sex Estimate
Cherla	adult	-

As noted by Ardern (2003), Individual R-1 is highly fragmentary. As a result, there is little skeletal material to analyze for paleopathology. The cranial remains represent less than 5 percent of the total cranium and are largely from the petrous portions of the temporals and the cranial vault. There are additionally some postcranial remains left; none of them are pathological. In addition, there are maxillary teeth preserved. The upper left canine and fourth premolar are present, with sufficient enamel preserved to assess wear, which is consistent with adulthood. The right side is represented by the first and second incisor roots, canine, first molar, and second molar. The enamel crowns of the right central and lateral incisors appear to have been lost postmortem and are possibly present in the form of enamel fragments that are too small and incomplete to be reconstructed. On those teeth with enamel preserved, there is no evidence of caries or dental calculus. The left canine exhibits two linear enamel hypoplasias.

Pozo S Burial 1

Time Period	Age Estimate	Sex Estimate
Cherla	adult	-

As was seen with Burial R-1, this individual is very fragmentary, preventing significant insight into the condition of the skeletal remains at time of death. Ardern (2003) notes that two enamel “caps” were found with the burial. However, these were removed for chemical study prior to the summer of 2011. The remaining fragments represent both cranial and postcranial elements. Parts of both temporal bones are preserved, in addition to a small fragment of the orbit and cranial vault. Those identifiable remains from the postcranial skeleton are all long bone fragments, none of which exhibit any pathological conditions.

Pozo T Burial 1

Time Period	Age Estimate	Sex Estimate
Locona	adult	-

Individual T-1 is highly fragmentary and largely represented by long bone fragments. T-1 was an adult at time of death, based on the wear facets on the maxillary third molars and the overall size of the long bone fragments. Ardern (2003) states that no cranial remains are present for this individual. However, some cranial and dental elements were identified. There are portions of the cranial vault and petrous area. No pathology is identifiable on these remains. In addition, there are long bone fragments and rib fragments, all of which are nonpathological. Four dental fragments were present, in addition to a molar that was removed from the collection in 2006. The left maxillary third molar is preserved and exhibits a single carie on the occlusal surface. No other pathology is evident. The left maxillary second and third molar crowns are additionally present. Finally, an isolated fractured root was identified and appears to be that of an anterior tooth. There is no pathology on these dental fragments.

Pozo X Burial 1

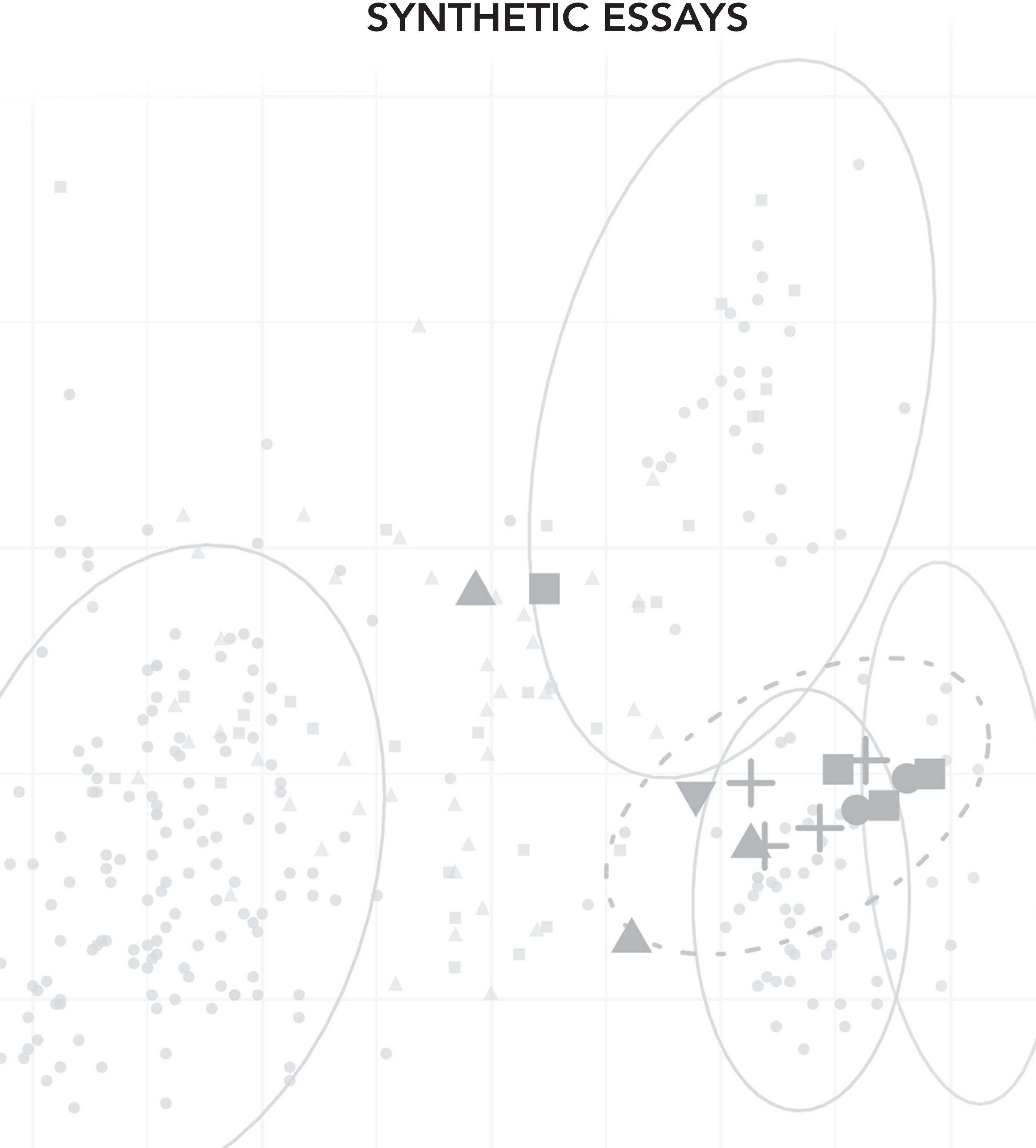
Time Period	Age Estimate	Sex Estimate
Locona	15 years +/- 36 months	-

This individual was a subadult at time of death on the basis of epiphyseal fusion, dental development, and dental eruption. Ardern (2003) notes that this individual is male on the basis of mandibular traits. However, the young age makes assigning a sex problematic. In addition, both the skull and the greater sciatic notch indicate that the likely sex of this individual was female. Due to the age and incomplete nature of the pelvis, no definitive sex was assigned to this individual.

The cranium of this individual was previously reconstructed. The orbits and external cranial vault appear normal, and there is no evidence of cribra orbitalia or porotic hyperostosis. The remaining cranial remains do not exhibit any clear pathological conditions. Postcranially, most major parts of the body are represented by fragmentary skeletal remains. Portions of the scapulae, ilia, upper vertebrae, ribs, carpals, metacarpals, manual phalanges, tarsals, metatarsals, pedal phalanges, and all long bones were at least partially present for this individual. There is no evidence of any significant pathological changes on the skeletal remains.

With regard to dental remains, all permanent teeth are present. The maxillary teeth are all in occlusion except for the third molars, which have not yet erupted. Wear is minimal on all teeth, consistent with a young individual at time of death. There are no caries on the maxillary teeth or significant indications of periodontitis on the observable alveolar bone. Calculus is present on the maxillary dentition and is most clearly present on the left teeth. The mandibular teeth exhibit similar patterns of development, wear, caries, and calculus. All teeth are present, and the third mandibular molars are observable in the crypts. There is minimal attrition and no caries, abscesses, or periodontitis. Thin lines of calculus are present on the anterior teeth.

PART VI
SYNTHETIC ESSAYS



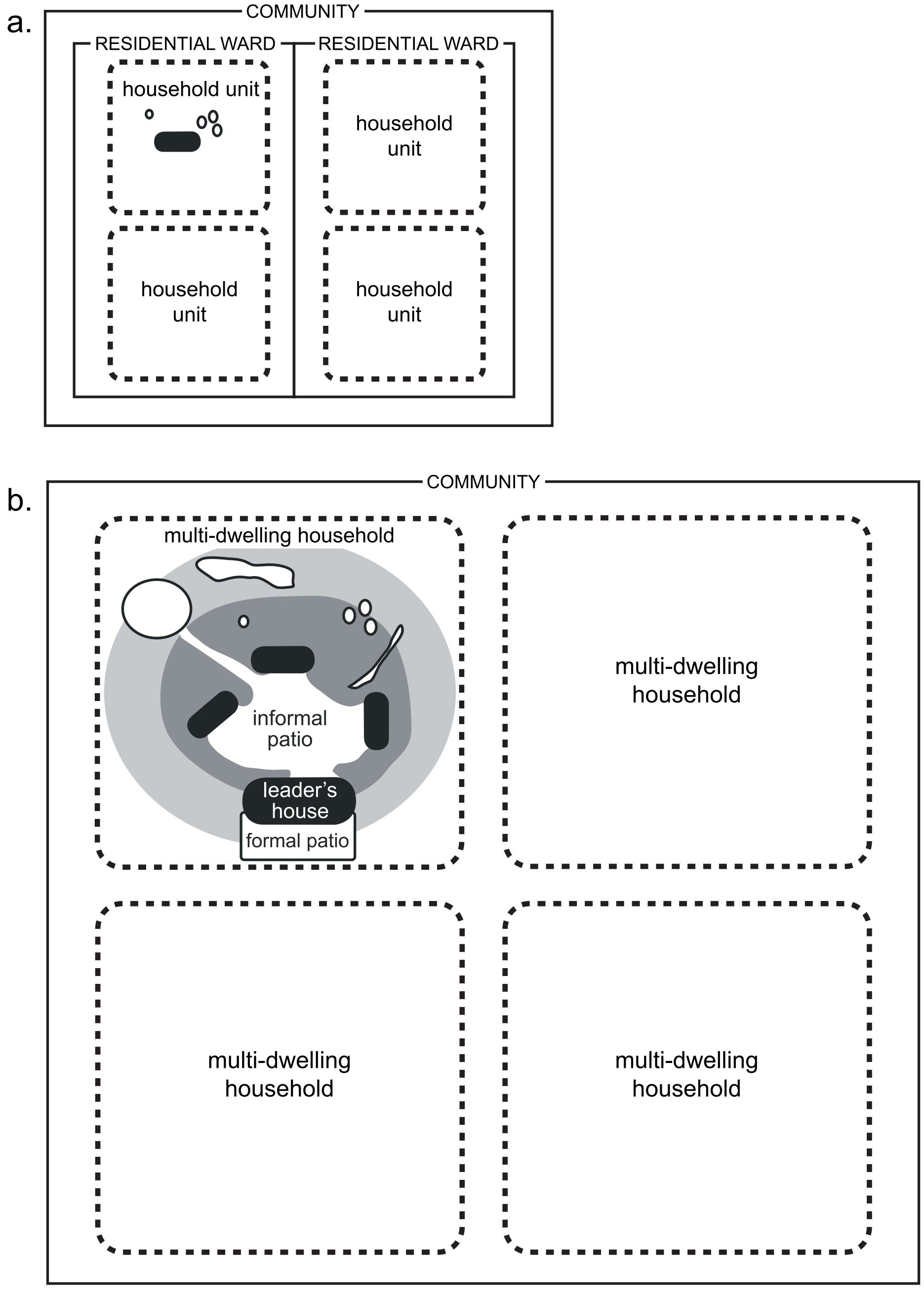


Figure 25.1. Community organization in the Initial Formative: (a) as conceived for the Valley of Oaxaca by Flannery and Winter (1976:Figure 2.18; see also Flannery 1983:45); (b) as proposed for Paso de la Amada in Chapter 7 of this monograph. Blackened forms are houses; pit features are shown with white fill. *Illustrations in this chapter by R. Lesure.*

CHAPTER 25

Social Inequality at Paso de la Amada: Insights from the Study of Household Refuse

Richard G. Lesure, Michael Blake, and John E. Clark

THE OVERARCHING research problem that guided work at Paso de Amada was the origins of social inequality. At the site level of analysis, sources of evidence relevant for the study of inequality include mortuary patterns, residential architecture, and domestic artifact assemblages. When the program of house-mound excavations at Paso de la Amada was conceived, we hoped to expand the available evidence in both the second and third of those categories. As a model for what might appear in the excavations, we had Mound 6, with its series of superimposed residences situated directly under the center of the mound. Further, we envisioned the inhabitants of individual dwellings as constituting autonomous social units, along the lines diagramed schematically in Figure 25.1a. Although division of highland sites into neighborhoods or wards was well-known (Marcus 1989:168), complexity of the basic unit of residence has been envisioned as characteristic of the later Formative, as suggested by Flannery (2002) and exemplified at highland sites in Central Mexico such as Loma Torremote (Santley 1993) and Tetimpa (Plunket and Uruñuela 1998).

Excavations at Paso de la Amada revealed considerable variability in the depositional history of the mounds, frustrating our efforts to identify remains of complete structures for comparison with those at Mound 6. We did find evidence for both larger and smaller residences, some on platforms and others constructed at ground level. Our investigations also raise the possibility of multi-dwelling co-residential groups, interpreted in Chapter 7 as multifamily households. The large buildings were residences of household heads. Each would have been associated with a cluster of smaller, ground-level residences, occupied by other household members. This proposal complicates the analysis of residential differentiation, since we are no longer envisioning each dwelling as the residence of an autonomous social unit.

Initial expectations for the artifact assemblage were that differences in household refuse should track the construction history of residences. Specifically, as the platform for the elite residence at Mound 6 steadily expanded from the early Locona through Ocós phases, we expected to find evidence for increasing inequality. We were not sure what to expect in the Cherla phase, when the construction of successive residences at Mound 6 ceased. A high priority for excavation was Mound 1. In reanalyzing materials from Ceja's excavations, Clark identified that mound as a likely elite residence of the Cherla phase.

The initial results of the artifact analyses were a surprise. Evidence for differential access to ornaments, imported exotics, and obsidian appeared only in the Cherla phase once construction at Mound 6 had ceased (Lesure 1995, 2011a, 2015). Evidence of differences among household assemblages was weak in the Locona and Ocós phases. If anything, samples of domestic refuse from the Ocós phase—when the residence at Mound 6 towered above others—exhibited greater homogeneity than those of the preceding Locona phase (Lesure 2011a; Lesure and Blake 2002). In this chapter, we review the available evidence in detail.

HOUSEHOLD REFUSE ASSEMBLAGES AND EMERGENT INEQUALITY

This chapter considers differentiation among household refuse assemblages as a clue to the nature of social inequality at a large Initial Formative village. Artifacts selected for scrutiny include aspects of the ceramic assemblage that inform on food service and feasting, ornaments and other objects of imported materials, labor-intensive craft products, and ritual implements or features. This section sketches the logic justifying these as likely domains for differentiation in a situation of emergent inequality. In the next section, on comparable archaeological cases from Mesoamerica, we further specify our list of artifact classes.

The aggrandizer model for the emergence of hereditary inequality proposed by Clark and Blake (1994) is briefly introduced in Chapter 1 (see also Clark 2004a, 2007; Davis-Salazar 2007; Hayden 1995; Hayden and Gargett 1990; Hill and Clark 2001; Rathje 2002). We focus here on aspects that help explain our choice of material correlates. Aggrandizers maintain followers by sponsoring feasts and sending a flow of gifts down the ranks. Gifts include valuables that are difficult for ordinary people to obtain, either because they are non-local exotic items or because they are crafts produced by specialists (or both). Aggrandizers ensure their own privileged access to craft goods by sponsoring the specialist producers. The resulting valuables legitimize status and become necessary components of marriage transactions.

As successful aggrandizers in a network of communities increasingly interact with only each other, the flow of gifts to the lowest ranks becomes a trickle. Transfers of bridewealth are increasingly differentiated by rank. High-status marriages involve lavish gifts that are impossible for ordinary people to assemble. Aggrandizers also sponsor and organize collective building projects, such as, in the case of Paso de la Amada, the ballcourt (Clark 2004a; Hill and Clark 2001; Rathje 2002). Of more relevance in terms of potential impact on household artifact assemblages is that aggrandizers are likely to assume the role of ritual performers. Davis-Salazar (2007:200–2), drawing on Rappaport (1999), suggests that the conflation of present and past in ritual (in its self-referential and canonical dimensions, respectively) opens an important arena for tradition-generating manipulation. By officiating at and performing in rituals, aggrandizers gradually remake orthodoxy, paving the way for the emergence of institutionalized and eventually hereditary inequality.

In the Initial Formative of the Mazatán region, the Barra phase is postulated to have been the era of intracommunity competition among aggrandizers in a setting still basically egalitarian. From early in the Locona phase, the aggrandizers housed at Mound 6 were able to achieve hereditary transfer of prestige and authority. The basic expectation for household artifact assemblages is that we would find evidence for the following at Mound 6:

1. Greater involvement in the serving of food and sponsorship of feasts

2. Privileged access to interregional exchange systems

3. Heightened (or even exclusive) involvement in the production of labor-intensive craft products

4. Greater involvement in ritual, including likely exclusive control over certain sacred acts, objects, or knowledge

This is not an exhaustive list of expectations for the aggrandizer model but rather a list of those that seem specifically relevant to differentiation in household refuse. Other models would yield similar sets of expectations—a point that, for our purposes here, is a positive one. For example, in the epigenetic model of Friedman and Rowlands (1978), a feedback relation is established between feasting and the circulation of valuables. Lineages enhance their prestige by sponsoring feasts, generating an in-flow of valuables as bridewealth. They give away valuables, thereby creating debts, which they then call in to sponsor feasts, which again enhance prestige. Feedback between these activities generates emergent forms of social inequality. Specifically, one lineage, long dominant in the spheres of feasting and exchange, becomes a permanent mediator between the community as a whole and the supernatural, perhaps by claiming genealogical proximity to supernatural spirits. This results in the formation of hierarchical relationships among kin groups, including new economic relations. In return for service as a mediator with the supernatural, the head of the dominant lineage claims the status of chief and the authority to mobilize tribute and labor from commoner lineages. In terms of expectations for potential domains of differentiation in household refuse, this model yields the same four expectations noted above.

Of course, given the complexity of linking argumentation involved in applying a general model to a particular archaeological case, any possible lack of fit between expectations and observed archaeological patterns can have a variety of sources. We offer three examples. First, minor variations in practice could conceivably result in quite different material records. For instance, aggrandizers could give away vessels at feasts, leading to comparatively homogenized distributions, even where fancy pots were made by sponsored craft specialists. Second, the model posits increasing concentration of valuables in the hands of the emerging elite, yet one of its fundamental tenets is a flow of valuables from aggrandizers to followers. In other words, every household should get some valuables, at least at first. As the system develops, however, we would certainly expect access to gradually diminish in lower-status households. Third, the model posits sponsorship of craft specialists by aggrandizers. The physical location of that work has no particular theoretical importance, but it is quite significant in terms of archaeological visibility. There are grounds for expecting craft activities to have been going on at Mound 6 itself or in an associated cluster of dwellings. However, sponsorship would not necessarily have required propinquity. We revisit these concerns about equifinality at the end of this chapter.

A second general area for concern is that the richer, the more interesting, and the more practice-oriented a model of emerging inequality becomes—and we may include both the aggrandizer and epigenetic models here—the more specific provisions it makes in terms of structure, worldview, and institutional arrangements. The aggrandizer model assumes patrilocality, a tendency toward patrilineal descent, and male aggrandizers (Clark and Blake 1994:18). The epigenetic model posits exogamous lineages as fundamental social units, specific cosmological provisions linking prosperity to supernatural sanction, socially constructed understandings of the interplay of obligation and credit surrounding the sponsorship of feasts, and a relation between marriage and the circulation of valuables (Friedman and Rowlands 1978; see Lesure 1995:14–16). In this chapter we set aside the issue of whether specific provisions of these models are applicable to Paso de la Amada; our focus is on the more general expectations noted above.

MESOAMERICA IN THE SECOND MILLENIUM BC: HOUSEHOLD REFUSE AND SOCIAL INEQUALITY

A review of other studies of differentiation in household refuse during the second millennium BC allows us to further specify the set of expectations introduced in the last section. We also consider how domestic refuse relates to other sources of evidence on social inequality—residential architecture and mortuary evidence—in concrete cases roughly contemporaneous with Paso de la Amada.

Studies of differentiation in household refuse at Mesoamerican sites of the second millennium BC remain fairly rare. In Figure 25.2, Paso de la Amada is compared to other cases in terms of chronology and available sample size. The rows are individual sites, with phase names and relevant data in boxes within each row. To study differentiation in household artifact assemblages, one obviously needs samples of refuse from multiple residences. One aspect of sample size is therefore the number of different "locations" sampled. Some further indication of the sample of artifacts from all locations—either total sherd count or total rim count—is provided if available. In our experience, rim counts are usually 5 to 10 percent of any given collection of sherds. The sherd count for Coapexco is the total recovered from the site (Tolstoy 1989a:Table 6.2), while that from Puerto Escondido is the number of analyzed sherds from all Early Formative deposits (Joyce and Henderson 2017:272). We first briefly introduce the sites considered and then turn to patterns of *differentiation* in household refuse.

During the Locona phase, Paso de la Amada was a dispersed settlement extending across 140 ha. The full occupation was from approximately 1900 to 1300 BC, though in terms of available samples of refuse, our coverage is from 1700 to 1300 BC. The samples are distributed across three phases: Locona, Ocós, and Cherla. For the Soconusco region, the initial Middle Formative site of La Blanca, the next earliest case in this region for which a comparable study is available, is included in the figure (Love and Guernsey 2011). In other regions, Middle Formative cases are not included; there would be numerous additional cases to be added.

The site of San Lorenzo, on the southern Gulf Coast, was occupied from 1800 BC. By its apogee, from 1200 to 1000 BC, it extended across more than 700 ha (Arieta Baizabal and Cyphers 2017:17; Cyphers and Di Castro 2009:23; Cyphers and Murtha 2014:73). Not much is yet published on differentiation among household refuse assemblages. We draw on Wendt (2003), who compared materials from a house lot at Remolino, 5 km from San Lorenzo, to samples from three locations at San Lorenzo itself, one on the upper plateau (B3-5) and two on lower terraces (D5-9 and D5-31).

Cases in the Valley of Oaxaca include both the large village of San José Mogote, which grew from less than 10 ha in the Tierras Largas phase to 70 ha by the end of the millennium (Flannery and Marcus 2005:7, 10), and two small villages, Tierras Largas and Tomaltepec (Whalen 1981; Winter 1972). The Middle Cruz–phase occupation at Etlatongo (1400–1000 BC) was about 26 ha (Blomster 2004:66). Refuse comparisons in this case are between a community midden quarried for fill and materials from two other areas, both possible locations of "higher-status" residences (Blomster 2004:85–96, 111–14).

Coapexco was a large village of 44 ha (Tolstoy 1989a). Fifty-four surface concentrations of artifacts were identified as traces of individual households; extensive excavation of the shallow deposits confirmed a strong correspondence between surface debris and actual house locations. Through ceramic seriation, the deposits were divided into five periods, with an estimated maximum of 17 locations occupied contemporaneously (Tolstoy 1989a:Table 6.1). Puerto Escondido is a deeply stratified village site, originally consisting of four earthen mounds. Occupation extended from the Initial through Middle Formative periods (Joyce and Henderson 2001, 2007).

The Oaxacan studies find no significant, status-based differences among residences during the Initial Formative (Tierras Largas phase). In the other regions, evidence is lacking for the Initial Formative.

In all cases, there is at least modest evidence for differentiation among household artifact assemblages at some point during the Early Formative (1400–1000 BC). The two general categories most commonly exhibiting differential distribution among residential locales are objects of non-local (imported) material and decorations on pottery. In the San José phase in Oaxaca, imported items include greenstone, mica, marine shell, and stingray spines (Marcus and Flannery 1996:101–4; Whalen 1981:59; Winter 1972:188, 191). At San José Mogote, there are differences as well in the distribution of imported pottery (Flannery

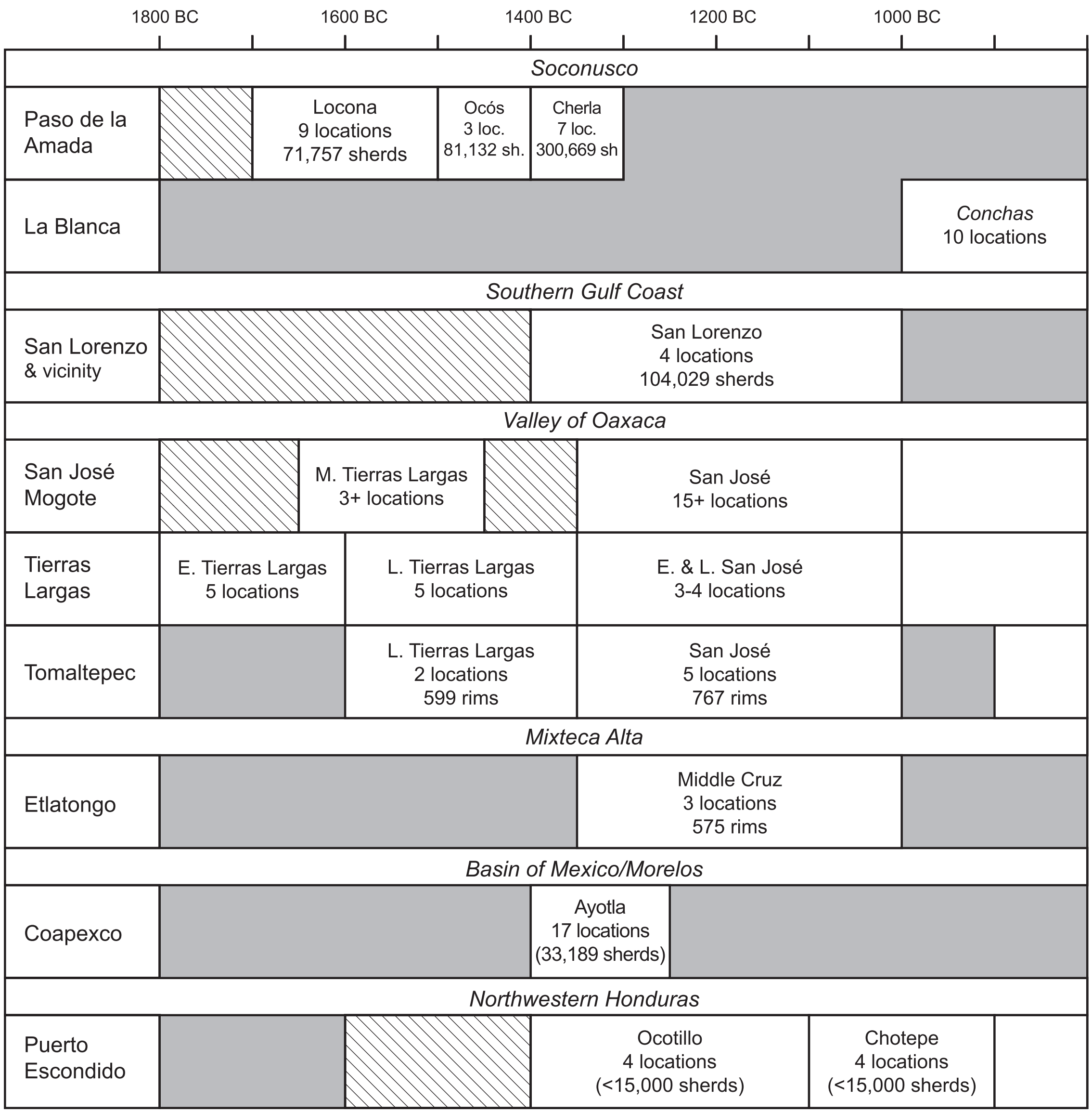


Figure 25.2. Studies of differentiation in household refuse in early Mesoamerican sites, mostly of the second millennium BC. "Locations" refers to the number of individual houses or occupation areas sampled; where available, the total number of sherds (or rims) from those areas is noted. Data from Blomster 2004; Flannery and Marcus 2005; Joyce and Henderson 2001, 2007, 2017; Love and Guernsey 2011; Tolstoy 1989a; Wendt 2003; Whalen 1981; Winter 1972.

and Marcus 1994:338; Marcus and Flannery 1996:104). Etlatongo seems generally similar, with one of the two "higher-status" samples yielding numerous fragments of marine shell (Blomster 2004:94). At San Lorenzo and vicinity there are differences in the distribution of greenstone, mica, multi-drilled ilmenite blocks, and magnetite artifacts (Wendt 2003:Tables 6.11–6.12). At La Blanca, Love and Guernsey (2011:179) find a high frequency of greenstone to be the most reliable criterion for distinguishing high-status households.

A recurring pattern in the Oaxacan villages is differential involvement of households in craft production (Marcus 1989:175–77). At Tierras Largas, villagers produced shell ornaments. There was some household specialization in the production of bone and possibly stone tools (Winter 1972:189–92). At San José Mogote, multiple households worked marine shell into ornaments, but they seem to have obtained raw material from different sources: members of one house favored shell from the Pacific, while those of another worked more with Atlantic shells (Marcus and Flannery 1996:102). Iron ore was worked into mirrors in one residential ward at San José Mogote (Flannery and Marcus 2005:81–87; Marcus and Flannery 1996:102–3).

Obsidian was differentially distributed in domestic refuse at San Lorenzo and vicinity, but differences might have been basically functional (Wendt 2003:377). At Middle Formative La Blanca, the top-ranked households for obsidian frequency are the same ones as those for frequency of greenstone (Love and Guernsey 2011:180). Whalen (1981:58–59) initially suggested status differences in access to obsidian at San José–phase Tomaltepec, but Parry (1987:23–25), in a more detailed consideration of a larger sample from several sites, found no evidence for differential access.

In the Valley of Oaxaca, the Soconusco, and the Gulf Coast, the mixture of sources of obsidian in household refuse deposits has been used to infer aspects of the organization of exchange and distribution. If individual households maintained independent acquisition networks, one would expect considerable variation among households in the proportions of obsidian from the different sources. Where, instead, a leader managed obsidian trade by obtaining raw material and redistributing it to followers, one would expect greater consistency in the percentages of types from one house to another (Pires-Ferreira 1976; Pires-Ferreira and Flannery 1976; Winter and Pires-Ferreira 1976; see also Parry 1987:21–22). Clark and colleagues have applied the same logic to Initial Formative Soconusco cases, considering patterns of distribution both among and within sites (Clark 1994:277–91; Clark and Lee 1984; Clark and Salcedo 1989). Data from the excavations reported in this book seem consistent with previous data from Paso de la Amada and thus also with a community-level mechanism for household procurement, such as redistribution by a chief (see Chapter 10).

Variation in the frequency of schematized supernatural imagery incised or excised on pottery is identified at San Lorenzo, in the Valley of Oaxaca, at Puerto Escondido, and perhaps at Etlatongo (Blomster 2004:126–28, 2017:155–56; Joyce and Henderson 2017:270; Marcus and Flannery 1996:95–96; Pyne 1976; Wendt 2017). No such differences are reported from Coapexco, but it is worth remembering the differential distribution of Olmec-style motifs observed in the Tlatilco burials (Tolstoy 1989a:109–12). Interpretation of the social factors behind spatial differences in the use of specific motifs or Olmec-style motifs varies, and is likely that different factors were operating in the different cases. At San Lorenzo and vicinity, status differences appear to be a likely factor (Wendt 2017). In several other cases, frequency of pots with Olmec-style motifs does not correlate with other indications of high status (Flannery and Marcus 1994:136; Tolstoy 1989a:118). For Tlatilco, Tolstoy (1989a:118–21) suggested rather large-scale kin groups (perhaps moieties) differentially involved in long-distance exchange contacts. Joyce and Henderson (2017) argue along somewhat similar lines for Puerto Escondido, but with groups of smaller scale: households instead of moieties. For the Valley of Oaxaca, several investigators suggest that specific motifs served as emblems for social groups: in small villages, one or the other of the two most common motifs predominates, whereas at the large village of San José Mogote, the two motifs were differentially distributed by neighborhood (Flannery and Marcus 1994:136; Marcus 1989:169; Pyne 1976). Differential distribution of Olmec-style motifs is not directly relevant to the Paso de la Amada case, since occupation of the site predates the significant occurrence of such imagery in the Soconusco.

Other sorts of differences among refuse assemblages are identified in several cases. Elevated percentages of fine wares in relation to coarse wares, or serving vessels in relation to cooking/preparation/storage vessels, are in several instances noted in the refuse of higher-status residences (see Blomster 2004:94, 126–28; Flannery and Marcus 1994; Whalen 1981:59). Differential distribution of a variety of ritual objects in ceramic—spatulas, cylinder seals, hollow figurines, possibly masks—is suggested by Blomster (2004:94, 111–13) for Etlatongo. Differential distribution of figurine fragments is noted also at San Lorenzo and vicinity (Wendt 2003:Tables 6.11–6.12). At Middle Formative La Blanca, however, ceramic ritual implements, including solid figurines, altars, and censers, were available to all households and do not exhibit convincing differentiation (Love and Guernsey 2011:181–83). In that last case, the quatrefoil altar (Monument 3) in Operation 32 suggests that certain ritual features and activities were the exclusive purview of elite households or perhaps specifically the ruler (Love and Guernsey 2007, 2011:175, 183). Marcus and Flannery (1996:104; Flannery and Marcus 2005:468) suggest status-related differences in access to deer meat at San José Mogote, with some households receiving meaty leg portions from other households. Important evidence is the bone concentration at House 16, in which among 13-plus deer specimens, 10 were fragments of femurs, tibiae, or ulnae (Flannery and Marcus 2005:335–36).

For three of the cases—Central Mexico, the Valley of Oaxaca, and San Lorenzo—differences in the contents of household refuse can be compared to mortuary patterns and/or elaboration of residential architecture. In the Central Mexican case of Coapexco, excavated structures vary somewhat in size, from 4 x 3.3 m to 6 x 5.6 m. Based on daub fragments, some houses appear to have been painted red (Tolstoy 1989a:90). Differences in associated artifacts are quite modest. Better-made grinding stones correlate with higher frequencies of slipped pottery (Tolstoy 1989a:97). The modest differences among refuse assemblages contrast with strong evidence for social differences among the burials at Tlatilco, based on presence or number of a variety of objects, including iron ore mirrors (most important), necklaces, greenstone objects, conch shells, other shell objects, cylinder seals, masks, whistles, and rattles (Tolstoy 1989a:109–13; see also Joyce 1999). One might wonder whether differentiation in refuse may also, in other cases, yield a more egalitarian picture than mortuary remains. Still, chronology (and thus likely continuing social transformation) may be an issue here: the Coapexco refuse is *earlier* than most of the Tlatilco graves (see Tolstoy 1989b:Figure 12.2).

In Oaxaca, burial patterns in the San José phase seem consistent with the degree of differentiation observed in household refuse of that same phase (see Flannery and Marcus 2005; Whalen 1981, 1983). Different levels of investment in and elaboration of residential architecture are likewise modest in the Oaxacan villages. At San José Mogote, House 13 measured 3 x 5 m. It was "relatively poorly made, with slender posts and no coating of whitewash" (Marcus and Flannery 1996:103). The higher-status House 17 (the dimensions of which could not be determined) was a better-made residence with an attached lean-to (Marcus and Flannery 1996:103–4). Thus all three site-level sources of evidence on inequality—mortuary patterns, investment in residences, differentiation in domestic refuse—seem consistent in these cases. Both independently and collectively, they support the suggestion of "a gradient in prestige from low to high, without a division into social strata" (Marcus and Flannery 1996:103). That characterization could be extended to the contemporaneous Central Mexican cases, including Coapexco and Tlatilco.

Residential areas at San Lorenzo were organized concentrically around the plateau. Members of the ruling elite lived on the plateau, with minor elite on terraced slopes and commoners in the surrounding countryside (Cyphers and Murtha 2014:85). Differentiation in residential architecture was greater than what is observed at contemporaneous sites in the highlands. High-status residences were large and complex, in some cases with interior patios (Arieta and Cyphers 2017:62). The most impressive elite residential complex, the Red Palace, included special construction materials and numerous interior features in stone (Cyphers 1997a:101, 1997b:98–99). No study of domestic refuse from the Red Palace is available. The samples considered by Wendt (2003) therefore do not include the highest ranks of San Lorenzo society. In a comparison of two cases from the residential terraces—the lower-status D5-9 and the higher-status D5-31—there appears to be a positive correlation between effort expended in construction and the presence of artifacts related to high status, including magnetite artifacts, multi-drilled ilmenite cubes, mica fragments, decorated pottery, bottles, and figurines. Mortuary data are not available.

This review of published studies of residential differentiation during the second millennium BC provides suggestions on what we might look for at Paso de la Amada. It also highlights an aspect of the Paso de la Amada assemblage for which there is no published precedent. Let us take up that last point first. For the Initial Formative, corresponding to the Locona and Ocós phases in the present study, there are no cases exhibiting anything approaching the degree of differentiation in residential architecture observed at Paso de la Amada. We can draw on general theory to develop expectations for residential artifact assemblages at this time, but no published Mesoamerican cases are strictly comparable.

As for the artifact classes in which differentiation has been observed, consistencies among the cases reviewed here allow us to specify the generalized list provided above. In the sections that follow, we first examine the ceramic assemblage for evidence of differential involvement in food service or feasting. Results from comparable studies are variable. Second, we consider ritual objects and features. Some previous studies report differentiation in household ritual objects, while others report no differentiation. At San Lorenzo and La Blanca, certain rare ritual features were associated with high-status residences. Third, we look at obsidian, an imported good available in large quantities to all households. Some previous studies find obsidian to be more frequent in high-status contexts. Fourth, we examine imported exotic materials and labor-intensive craft products, together with evidence of their manufacture. In previous studies that find evidence of differentiation in residential artifact assemblages, these classes of artifact are almost always involved. In fact, from the studies just reviewed, we can derive a specific list of exotics that holds also for Paso de la Amada: greenstone, mica, and iron ore mirrors. (Shell would be of interest as well, but soil conditions at the site were terrible for the preservation of that material.) Finally, we look briefly at ornamentation generally. That topic has more rarely been a focus of previous studies.

PASO DE LA AMADA: LOCATIONS AND SAMPLES

The assemblage of Paso de la Amada stands out among those of other published sites from the second millennium BC in that it is particularly early and particularly large. The number of distinct locations from Paso de la Amada available for comparison is comparable to those of most other studies.

Still, the Paso de la Amada assemblage presents numerous frustrations and challenges. The overriding problem is unevenness of coverage. There is unevenness in the number of locations among the phases (only three in Ocós compared to nine in Locona). The more serious issue, however, is unevenness among locations for a given phase. The Cherla assemblage is most lopsided, with a huge sample from Mound 1 and much smaller samples from all other locations. The Ocós assemblage, though derived from relatively few locations, is the most even in terms of distribution among those. Another issue is that only certain categories of data for certain samples are available from Mound 6. We use data assembled by Clark (1994) and Lesure (1995; Lesure and Blake 2002) for their dissertations. The Mound 6 Locona samples in approximate stratigraphic order from early to late are: the floor of Structure 6-4, Level 10 (0601A); the layer directly above that, Level 9 (AU87 and AU88); Level 9 from the exterior of Structure 6-4 (AU94); Unit I24, Levels 6–8, a screened sample of the fill above Structure 6-4 (AU44); Locona fill and midden from Unit K21, Levels 6 through 23 (AU95–97); Basurero 2, a trash pit associated with one of the structures above 6-4

(0602A); and the fill between the floors of Structures 6-1 and 6-2 (AU40). The Ocós sample consists of three trash-filled pits dug from one or another platform surface of that era (0603A, 0604A, and 0605A).

The designation of "elite" and "non-elite" in this chapter is heuristic. There may well have been a ranking of residential groups rather than a simple division between elite and non-elite. A basic idea behind the analyses was to use architectural evidence as a basis for designating elite and non-elite contexts and to search for corresponding differences in associated refuse. The identification of residential groups composed of a large leader's residence with a cluster of smaller dwellings complicates the classification of individual structures as elite and non-elite. The residential group leader's house at Mound 32 was a large building atop a platform. The platform was impressive (30 m long), but it may have been smaller than the corresponding contemporaneous building at Mound 6, and at any rate its construction did not initiate a series of platform expansions as observed at Mound 6. The Locona samples from Mound 32 are from the residence of the leader of a *non-elite* residential group, whereas the Mound 6 samples are from the leader's residence in an *elite* residential group. (It could well be that the Locona residential group at Mound 32 was somewhere in the middle in terms of rank.)

For the Cherla phase, we do not have architectural evidence for designating elite and non-elite residential groups. We have used association among three artifact classes—greenstone ornaments, iron ore mirrors, and clay earspools—as a basis for distinguishing elite and non-elite contexts (see Chapter 17).

Our contextual interpretations, along with other characteristics of the refuse samples considered in this chapter, are summarized in Table 25.1. In the table, as in most of the analyses for this chapter, Early Locona and Late Locona samples are included with "Locona." The reader can refer to Chapter 2 for discussion of the Lumped Refuse Samples (used for many of the analyses in this chapter) and ceramic analyses to Levels A through E. The ceramic study in this chapter mostly considers units analyzed to Levels A or B or solely A, as appropriate, depending on the nature of the information required. In one case, the larger assemblage of units analyzed to A, B, and C is considered.

For the Locona phase, Mound 6 is the only context designated "elite." The platform on which the group leader residence was constructed grew steadily throughout the Locona phase and into Ocós; the Mound 6 group leader was probably also the village chief. The Locona refuse sample from Mound 32 is separated from the other non-elite Locona samples in some of the analyses. It includes the statuette (Figure 16.8) and is interpreted as refuse generated by occupants of a household leader's residence. It therefore has some similarities to the Mound 6 samples in terms of social context—similarities that we find reflected particularly in the ritual assemblage. The other Locona-phase samples are from a location directly associated with ordinary residences, from a toft that received refuse from multiple houses of a single residential group, or from a location with unknown social context.

For the Ocós phase, we have three trash-filled pits from Mound 6 and extensive samples from toft zones at Mounds 12 and 32. Note that the platform at Mound 32 was simply a "mound" by this time; see Chapters 5 and 7 for discussion.

For the Cherla phase, we have the huge redeposited refuse sample in the lower layers of the platform fill, interpreted as including refuse generated by occupants of the underlying Structures 1-2 and 1-3; see Chapter 3 and 7 for discussion. The Cherla trash pit in Mound 13 yielded standardized frequencies of earspools comparable to Mound 1, plus a greenstone bead and an iron ore mirror; for interpretation of this as an elite context, see Chapter 17. The other Cherla samples are all trash-filled pits with no known architectural associations.

METHODS OF ANALYSIS

We give some consideration to features such as offerings in the discussion of ritual, but the primary focus of this chapter is artifacts from the refuse assemblages summarized in Table 25.1. In study of the pottery, we consider mainly percentages of specific vessel forms or types. Analyses of the other artifacts are based on standardized frequencies. Problems with standardization by volume excavated are discussed in Chapter 2. Our preferred method of standardization is by associated weight of sherds. This is not a perfect solution. In several cases, we have tried standardizing against summed rim proportions of all types of vessel or specifically of open bowls; that option is available only for samples with ceramic analysis to Level A.

Most analyses are based on the expectation that "elite" contexts will yield higher standardized frequencies (of ritual objects, imported exotics, and so on). This approach is common in archaeological studies of household artifact differentiation, including the comparable studies from Mesoamerica reviewed above. However, its ethnoarchaeological support is debated (Deal 1998; Hayden and Cannon 1984:208–9). Hayden and Cannon (1984:188) recommend diversity as an alternative—that is, presence/absence of artifact types rather than relative frequencies. Deal (1998) likewise recommends that archaeologists consider comparing ceramic assemblages using diversity measures, though his excitement is more tempered than that of Hayden and Cannon.

Analyses based on diversity are problematic for Paso de la Amada due to particular characteristics of our collection. We suspect that the spectacular diversity of the Mound 1 collection is in part related to the elite status of the people who generated it, but that collection is also huge (a bigger sample size is expected to yield higher diversity) and does have Locona-Ocós admixture. (Chronological mixing adds spuriously diversity.) Presence/absence measures are

Table 25.1. Summary of refuse samples by phase and location, with information on status and context[a]

Phase and Location	Number of Lumped Refuse Samples	Total Weight of Sherds (kg)	Rims in Samples with Ceramic Analysis to Level A	Status of Residential Group	Type of Associated Residence	Brief Description of Deposit Types and Contexts within Settlement Cluster
Locona						
Mound 6	7	110.0	259	elite	leader's residence	floor, fill, and midden contexts
Mound 32	1	24.6	253	non-elite	leader's residence	midden immediately beside platform
Mound 12	5	266.1	1306	non-elite	ordinary residence	from occupation surfaces with post holes and pits in toft zone
Other						
Mound 1	2	46.9	261	non-elite	ordinary residence	three trash-filled pits
Mound 13	1	13.5	64	non-elite	unknown	refuse redeposited as platform fill
Mound 14	1	35.1	200	non-elite	unknown	midden or trash-filled pit
Mound 21	1	11.7	290	non-elite	unknown	toss midden
Mz-250	1	43.2	333	non-elite	toft zone	two trash-filled pits
Pit 32	2	89.7	672	non-elite	toft zone	two trash-filled pits
Ocós						
Mound 6	3	78.39	570	elite	leader's residence	three trash-filled pits
Mound 12	4	493.2	1107	non-elite	toft zone	pits and ditches in toft zone
Mound 32	2	135.7	1221	non-elite	toft zone	toss midden and trash-filled pit
Ocós-Cherla						
Mound 1	1	108.9	0	mixed	mixed	occupation surface beneath platform
Mound 12	1	236.0	242	uncertain	toft zone	occupation surface beneath platform
Cherla						
Mound 1	26	2162.7	1008	elite	probably mostly toft zone; small sample from leader's residence	mostly refuse redeposited as platform fill; one small trash concentration beside Structure 1-2
Mound 13	1	43.2	222	elite	unknown	trash-filled pit
Other						
Pit 29	1	8.8	71	non-elite	unknown	trash-filled pit
Mound 11	1	29.1	246	non-elite	unknown	trash-filled pit
Trench 1B	1	41.3	261	non-elite	unknown	trash-filled pit
Mound 32	1	11.0	108	non-elite	unknown	trash-filled pit
Trench 1T	1	37.6	314	non-elite	unknown	trash-filled pit

[a] On residential groups, residences of group leaders as heads of multifamily households, and application of those models to excavation locations, see Figures 7.10 and 7.11, with associated discussions.

more sensitive to the effects of chronological mixing than are comparisons based on standardized frequencies.

Some of the objects considered in this chapter are rare and are therefore absent altogether in some or even numerous samples. For that reason, except for the analysis of ceramic vessels and obsidian, we use the Lumped Refuse Samples rather than the original refuse samples (see Chapter 2). In some instances, the only viable means of analysis was to pool all the samples for a given context and a given phase. In such cases, there is no available statistical measure of significance. One can try to increase confidence in the results by using different methods of standardization or by looking for a consistent pattern across multiple artifacts. For the more common artifacts, we have calculated percentages or standardized frequencies by sample. The distributions are generally skewed, and we have examined medians and quantiles (rather than means and standard deviations). We have used the nonparametric Wilcoxon rank sum test to assess significance of patterning (usually between pairs of locations in any given phase). The conventional practice of treating as significant only differences associated with p values less than 0.05 seems overly stringent for very noisy archaeological data. We treat p values less than 0.10 as "significant" (‡ in the tables) and p values between 0.10 and 0.20 ($0.20 > p \geq 0.10$) as "weakly significant" († in tables).

Hayden and Cannon (1984) introduced two widely used tools in the study of modern and historical inequality—the Lorenz curve and the Gini index—to archaeological analysis. Others have followed their lead (e.g., Earle 2015; Kohler and Smith 2018; Smith et al. 2014). In preparing this chapter, we attempted to adapt Lorenz curves and Gini indexes to the study of residential differentiation at Paso de la Amada. The results would require lengthy explanation in a chapter already too long, do not yield insights any different from our other analyses, are plagued by variability in sample size, and cloak often tenuous subsidiary argumentation in a few simple-looking numbers. In the end, we have decided not to describe that effort here.

CERAMIC VESSELS AS EVIDENCE OF FOOD SERVICE AND FEASTING

We expect elite residential groups to have been more involved in or attentive to the serving of food than their non-elite counterparts. They should have been particularly involved in sponsoring feasts. Evidence for a greater involvement in food service might include higher frequencies of serving vessels relative to preparation vessels and/or higher frequencies of elaborately decorated vessels. Greater involvement in large-scale feasts might be evidenced by presence of unusually large vessels for either preparation or service.

In this section we look into those possibilities and find no convincing evidence of differential involvement in food service or feasting in the ceramic assemblages of residential groups at Paso de la Amada in any of the phases under consideration.

Analyses are presented in three tables. The bottom two rows of each table provide information about the sample (Levels A and B, or A only) and the general type of analysis. In pooled analyses, used for rare artifacts, statistics were calculated by pooling all the samples from a given location and phase. In analyses by sample, the value given is the median of the samples from a given location and phase. Only in the latter type of analysis is a measure of significance available, as described in the methods section above. Absence of the appropriate symbols means that the comparisons in question are not significant ($p \geq 0.20$).

A recurring theme in the results is that the most salient patterns are diachronic—general changes in the ceramic assemblage rather than synchronic differentiation among residential groups or households.

It is possible that the lack of significant results is related to the small number of samples from Mound 6 (just two for the Locona phase). Perhaps the addition of more analyzed samples from that mound would yield stronger patterns. Yet a general consistency in the results of the various analyses points toward lack of differentiation in this particular domain. Results for differentiation in ritual objects, reported in the next section, are different.

Table 25.2 provides two attempts to compare locations in terms of the overall orientation of the vessel assemblage to the serving of food: an open versus restricted form index (see note in the table for a specific definition) and slipped tecomates as a percentage of all tecomates. We expect both to be higher in assemblages oriented toward service and feasting, and previous studies have reported findings along those lines for some Early Formative sites (Blomster 2004:94; Whalen 1981:59). At Paso de la Amada, the "elite" cases generally do not yield the highest values in these analyses. None of the differences among locations in any given phase is significant. The temporal patterns come out quite clearly though: a rise in the open-to-restricted index and a decline in the percentage of slipped tecomates.

The rightmost column in Table 25.2 takes up the issue of differential decoration of serving vessels. Here, percentages of modified-rim bowls (BR codes in Figure 8.1) among all bowls are compared among locations. Again, there is strong temporal pattern: a sharp rise in modified rims early in the Locona phase, a gentle decline into Ocós, and a sharper decline into the Cherla phase. Differences among locations in Locona and Ocós are not significant. In Cherla, the non-elite locations are actually higher than the elite Mound 1, with weak significance.

The search for differential investment in the decoration of serving ware is pursued further in Table 25.3. In the rightmost column of this table, the only one that represents an analysis by sample, we have managed to produce data in which Mound 6 emerges as significantly higher than one or more other locations. A careful assessment of the table, however, leaves this unconvincing as a case of differential occurrence of decorated pottery between elite and non-elite contexts. The apparent synchronic differences among locations appear to be the result of differing original frequencies of the types, gradual change in those frequencies, and the "noise" of mixing in the deposits.

In the collection reported here, Amada Black-to-Brown is probably the most striking individual type. It consists of

Table 25.2. Statistics from the ceramic assemblage expected to be high for serving-oriented assemblages[a]

Phase and Location	Number of Samples to Level A (+ those to Level B)	Open versus Restricted form Index[b]	Slipped Tecomates as Percentage of All Identified Tecomates[c]	Modified-Rim Bowls as Percentage of All Bowls[d]
Early Locona				
Mound 1	1	25.6	75.6	18.2
Locona				
Mound 6	2	39.2	57.7	40.4
Mound 32	1	43.8	*57.9	*47.9
Other locations	10 (+4)	*45.7	50.0	34.1
Mound 12	3 (+2)			
Other	7 (+2)			
Late Locona				
Other locations[e]	13	42.2	36.7	30.4
Ocós				
Mound 6	3	40.6	26.0	*36.2
Other locations	13 (+1)	41.0	25.6	31.0
Mound 12	10 (+1)	40.7	25.0	31.0
Mound 32	3	*42.2	*26.2	33.6
Cherla				
Mound 1	6 (+8)	51.6	16.0	10.1
Mound 13	1 (+1)	51.5	*22.6	†15.2
Other locations	5	*52.7	19.8	*†16.2
Ceramic analysis level		A and B	A and B	A and B
Analysis type		by sample	by sample	by sample

[a] An asterisk marks the highest value in each set. Wilcoxon rank sum test used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡).

[b] Index calculated as rim count of open bowls divided by the summed rim count of open bowls and all restricted forms (jars, tecomates, and restricted bowls); the value given is the median among the samples.

[c] Calculated as slipped and decorated tecomates as a percentage of all identified tecomates plus plain jars ("unspecified tecomates" excluded); the value given is the median among the samples.

[d] Calculated as all BR forms, (except BR9) as a percentage of all bowls, censers excluded; the value given is the median among the samples.

[e] From P32 and Mounds 1, 12, and 13.

large, egg-shaped tecomates with tiny mouths and a complex decorative scheme involving zones of fabric or thread stamping and burnishing that form a pattern of interlocking spirals and other elements (Figures 8.25–8.27). It is basically an Ocós-phase type appearing initially in late Locona. Gallo Pink on Red (Figure 8.15) is a Locona-phase type that includes tecomates with curvilinear motifs (the predecessors of the Amada Black-to-Brown motifs). There are also bowls decorated with simple motifs formed with bands of pink paint. One problem is that this type is hard to recognize in eroded collections. Cotan Red is most characteristically a Barra-phase type that continued into the early

Table 25.3. Rim frequencies of three elaborately decorated pottery types[a]

Phase and Location	Cotan Red			Gallo Pink on Red			Amada Black-to-Brown			Cotan + Gallo + Amada	
	N	Rims per 100 Identified Rims	As Percent of Summed Rim Proportions	N	Rims per 100 Identified Rims	As Percent of Summed Rim Proportions	N	Rims per 100 Identified Rims	As Percent of Summed Rim Proportions	As Percent of Summed Rim Proportions	Median Percent of Summed Rim Proportions by Sample
Early Locona											
Mound 1	10	11.49	12.24	0	0	0	0	0	0	12.24	12.24
Locona											
Mound 6	7	*3.49	*2.79	2	*0.97	*0.99	0	0	0	*3.78	*3.19
Mound 32	0	0	0	0	0	0	0	0	0	0	0
Other locations	4	0.46	0.15	4	0.46	0.95	0	0	0	1.10	‡ 0
Late Locona											
Other locations[b]	5	0.34	0.38	2	0.13	0.15	13	0.87	1.28	1.81	1.74
Ocós											
Mound 6	3	*0.56	*0.71	3	*0.56	*1.26	1	0.19	0.03	*2.00	*2.17
Other locations	2	0.11	0.04	2	0.11	0.12	13	0.70	1.06	1.22	1.23
Mound 12	2	0.20	0.08	0	0	0	8	*0.81	*1.17	1.24	†0.62
Mound 32	0	0	0	2	0.23	0.25	5	0.58	0.94	1.19	1.49
Cherla											
Mound 1	3	0.12	0.22	2	*0.08	0.07	2	0.08	0.07	0.37	0
Mound 13	2	*0.62	*1.12	0	0	0	1	*0.31	0	*1.12	*0.01
Other locations	1	0.14	0.06	0	0	0	1	0.14	*0.14	0.20	0
Ceramic analysis level		A and B	A only		A and B	A only		A and B	A only	A only	A only
Analysis type		pooled	pooled		pooled	pooled		pooled	pooled	pooled	by sample

[a] An asterisk marks the highest value in each set. Wilcoxon rank sum test used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡). N is the number of rims.

[b] From P32 and Mounds 1, 12, and 13.

Locona phase. It includes tecomates decorated with zones of parallel grooves (Figure 8.16f–j). It would not be considered the most highly decorated of the Barra types, and it was considerably more common during its heyday than were Gallo and Amada in theirs.

Cotan is included here on the principle of not concealing potential evidence of differentiation: decorated tecomates of this type are more common at Mound 6 than in Locona samples from other locations. However, that difference may be chronological in origin, with the Mound 6 assemblage from somewhat earlier than most of the other Locona samples considered. The exception is an early Locona non-elite sample from Mound 1, in which the percentage of Cotan Red dwarfs that at Mound 6, reinforcing the argument that observed differences among locations are basically diachronic. Cotan Red sherds in Ocós and Cherla deposits are probably carry-ups.

Gallo Pink on Red values are also higher at Mound 6 than at other locations in the version based on straight rim counts (sample size quite low). In the version based on summed rim proportions, the Mound 6 value is effectively identical to that of other locations. The Cherla occurrences of this type are certainly carry-ups, and those in Ocós probably as well.

The sample of Amada Black-to-Brown is larger than that of the other two types. During the Ocós phase, when the residence at Mound 6 towered above others, there is no hint of a higher frequency of this elaborately decorated type in the elite (Mound 6) as opposed to non-elite (Mounds 12 and 32) refuse. The Cherla occurrences are again probably carry-ups.

In sum, the rightmost columns in Table 25.3 are pro-

Table 25.4. Distribution of likely feasting vessels (basins and very large open bowls)[a]

Phase and Location	Basins				Very Large Open Bowls (≥ 36 cm diameter)		Large and Very Large Open Bowls (≥ 26 cm diameter)	
	Rim Count	Basin Rims per 100 Identified Rims (basin size not distinguished)	"Regular" Basins (< 47 cm diameter), Percent of Summed Rim Proportions	"Large" Basins (≥ 47 cm diameter), Percent of Summed Rim Proportions	Rim Count	Very Large Open Bowls, Percent of Summed Rim Proportions	Large and Very Large Open Bowls, Percent of Summed Rim Proportions of Open Bowls with Measurable Diameters	Large and Very Large Open Bowls, Median Percent of Summed Rim Proportions of Open Bowls with Measurable Diameters, by Sample[b]
Locona								
Mound 6	4	*1.94	*0.98	0	0	0	*38.4	*38.7
Mound 32	3	1.35	0.17	0.50	0	0	26.7	26.7
Other locations	10	1.16	0.15	*0.60	5	*1.76	35.4	38.2
Late Locona								
Other locations[c]	30	2.02	1.10	0.26	17	5.02	44.4	41.5
Ocós								
Mound 6	5	0.94	0.52	*0.22	4	2.64	50.4	*55.9
Mound 12	7	0.70	0.36	0	7	*2.74	*53.5	45.9
Mound 32	9	*1.04	*0.83	0	1	0.88	40.2	46.1
Cherla								
Mound 1	3	0.12	0	0	7	3.06	*43.3	*41.3
Mound 13	0	0	0	0	0	0	37.3	37.3
Other locations	12	*1.74	0	*0.12	6	*3.33	41.0	33.7
Ceramic analysis level	A and B	A and B	A only	A only	A only	A only	A only	A only
Analysis type	pooled	pooled	pooled	pooled	pooled	pooled	pooled	by sample

[a] An asterisk marks the highest value in each set. Wilcoxon rank sum test used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡). None of the differences here are significant ($p \geq 0.20$ in all cases).

[b] The calculation is the same as in the previous column, only in this case it was by sample; the value here is the median among samples for a given row.

[c] From P32 and Mounds 1, 12, and 13.

vided to show the kind of pattern that energetic manipulation of the data can produce. However, we do not regard this as convincing evidence of synchronic differentiation in household refuse. The difficulty of manufacturing even an unconvincing pattern of difference appears to favor a lack of systematic status differences in the decoration of serving ware.

Table 25.4 traces the occurrence of particularly large vessels: (1) basins that appear to be food preparation vessels appropriate for feast-size meals (Forms B9 in Locona and Ocós and Form BR9 in Cherla) and (2) very large open bowls (36 cm in diameter and larger). For discussion of these as likely indicators of feasting, see Lesure (1998a:33–34). For basins, we provide a tabulation per 100 rims as well as a division between regular-size basins (less than 47 cm in diameter) and large basins (47 cm in diameter and larger). Hints of differentiation between elite and non-elite contexts are not convincing. In Locona, there are more basins at Mound 6 overall, but these turn out to be regular rather than large. For the Ocós phase, the pattern is the reverse: an overall similarity in rim frequency but this time with more regular basins in non-elite contexts and more large basins at Mound 6. These kinds of fluctuating results are what one would expect from a situation with a lack of systematic synchronic differentiation.

The patterns in distribution of very large open bowls are even clearer: the elite contexts are not on top in any of the three phases.

To again consider a measure amenable to analysis by sample, the last two columns of Table 25.4 examine large and very large bowls as a percentage of open bowls with measurable rim diameters. Although the elite contexts are

Table 25.5. Fragments of ritual objects per 10 kg of sherds[a]

Phase and Location	Weight of Sherds (kg)	All Fragments of Ritual Objects	Solid Figurine Fragments	Hollow Figurine Fragments	Sculpted Effigy Head Fragments	Censer Fragments (rim and perforation)	Rattle Fragments	Whistle Fragments	Spatula Fragments	Stamp or Seal Fragments
Locona										
Mound 6	110.0	*14.1	*7.2	*2.09	no data	2.9	1.8	*0.09		
Mound 32	24.6	13.4	6.5	1.22[b]	0	*4.4	1.2	0		
Mound 12	266.1	7.7	2.0	0.23	0.08	3.8	1.6	0.04		
Other locations	240.2	9.2	4.9	0.37	0.17	1.9	*2.0	0		
Ocós										
Mound 6	78.4	*9.8	*4.7	*0.38	no data	2.8	1.8	*0.13		
Mound 12	493.2	7.7	2.5	0.08	0.26	2.1	*3.0	0.06		
Mound 32	135.7	8.1	2.7	0.07	0.44	*3.2	2.1	0.07		
Cherla										
Mound 1	2162.7	*5.0	*2.7	*0.18	*0.15	1.3	*0.54	0.04	*0.15	*0.03
Mound 13	43.2	3.2	1.2	0	0	*1.6	0.46	0	0	0
Other locations	127.7	3.6	2.2	0.08	0	0.8	0.39	*0.08	0	0

[a] An asterisk marks the highest value in each set.

[b] All fragments of the statuette were counted as a single fragment. If they had been counted separately, the value here would be 30.92.

in most instances highest, none of the differences are significant ($p \geq 0.20$).

DIFFERENTIAL INVOLVEMENT IN RITUAL

We expect greater involvement in ritual at the residences of household heads and/or in elite residential groups. In contrast to the results of the previous section on ceramic vessels, in this domain we do find evidence of differentiation. We look first at ritual objects that were used in all households and then examine offerings and a few rare ritual objects.

The Distribution of Household Ritual Objects

In Chapter 19, a variety of household ritual objects was identified, including small solid figurines, larger hollow figurines, sculpted effigy pots, censers, rattles, whistles, ceramic spatulas, and stamps/seals. Other rare, minor ritual objects include ground stone spheres, fetishes or divination objects, ground stone rings, a polished stone plaque, minor stone sculpture, and an effigy net weight. An important finding of that discussion was that the rate of discard of household ritual objects declined during the occupation, the general conclusion being that there was a decline in the ritualization of daily life.

The question under consideration here concerns synchronic differentiation in the locations of ritual activity, whether between elite and non-elite contexts or between the houses of residential group leaders and other residences. As a reminder: Mound 6 is both an elite and a group leader residence in the Locona and Ocós phases; Mound 32 is a non-elite, group leader residence in Locona and a non-elite, ordinary residence in Ocós; Mounds 1 and 13 are elite in Cherla; all other contexts are non-elite and are either directly associated with ordinary residences or are toft generated by all households of a residential group.

Table 25.5 presents data on fragments of ritual objects per 10 kg of sherds. The data are from the Expanded Study Sample, pooled for each location and phase (with significance measures consequently not possible).

The elite contexts, Mounds 6 and 1, are highest in their respective phases in all ritual objects together and in most of the objects considered individually. The rather small Cherla sample from Mound 13 is low in terms of figurine frequency but high in censers. (Rattles had declined dramatically in use by the Cherla phase, and most in the Cherla sample may be carry-ups.)

In terms of all ritual fragments as well as those for solid figurines, hollow figurines, and censer fragments, the Mound 32 Locona sample groups clearly with Mound 6 rather than with the other non-elite Locona samples. That point raises the question of whether frequencies of ritual

Table 25.6. Median number of fragments of ritual objects per 10 kg of sherds[a]

Phase and Location	Number of Samples	All Fragments of Ritual Objects	Solid Figurine Fragments	Hollow Figurine Fragments	Censer Fragments (rim and perforation)	Rattle Fragments	Other (whistles, spatulas, seals, and stamps)
Locona							
Mound 6	7	12.6	*7.2	*2.09	2.1	*2.1	0
Mound 32	1	*13.4	6.5	1.22b	*4.4	1.2	0
Other locations	14	‡8.2	‡4.1	‡0.28	2.5	1.2	0
Mound 12	5	‡7.1	‡2.0	‡0.27	3.6	1.3	0
Other	9	†9.6	5.6	‡0.44	1.8	1.1	0
Ocós							
Mound 6	3	*11.0	*4.4	*0.52	*3.7	1.7	0
Other locations	6	8.1	‡2.2	0.08	2.6	2.8	0.05
Mound 12	4	7.9	‡2.2	0.08	2.1	*3.0	0.05
Mound 32	2	8.4	†2.8	0.07	3.3	2.1	*0.07
Cherla							
Mound 1	25	*5.3	*2.7	*0.14	1.2	*0.52	*0.20
Mound 13	1	3.5	†1.2	0	*1.6	0.46	0
Other locations	5	‡3.4	†2.1	0	‡0.8	0.34	‡0

[a] An asterisk marks the highest value in each set. Wilcoxon rank sum test used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡).

[b] All fragments of the statuette were counted as a single fragment. If they had been counted separately, the value here would be 30.92.

objects at Mound 6 are high because that was an elite residence or because it was a household head's residence (or both).

In Table 25.5, there is a pattern of differentiation across multiple measures, what we were looking for among the ceramic vessels but not finding. We get the sense that different social processes may have been operating on the ritual assemblage.

The analyses in Table 25.6 help to reinforce that assessment. Here, analyses are by sample, and the significance of the comparison with Mound 6 or Mound 1 (as appropriate by phase) is assessed with a Wilcoxon rank sum test between pairs of locations. Mound 6 and Mound 1 are recurringly high, with the patterns often significant. In the Locona phase, when Mound 6 does not yield the highest value, it is replaced by Mound 32. For all ritual objects, solid figurines, and hollow figurines, Mound 6 and Mound 32 group together in comparison to samples from ordinary residences. The pattern is less clear for censers and rattles.

The elite/non-elite comparisons are not always significant, especially in the Ocós phase, when Mound 6 is represented by rather few samples (with the values for some objects quite variable). Still, the occurrence of significant results is distinctly more common than what we found in the analyses of ceramic vessels.

Our general assessment of the ritual assemblage is that there was differential engagement in household ritual at Paso de la Amada throughout the 400 years under consideration. We are talking about a pattern similar to the "gradation" of differences among households suggested for highland cases in Oaxaca (Flannery and Marcus 1994:329; Marcus 1989:165–68). All households had access to the objects under consideration; they differed in how many they had and probably in how frequently they engaged in the corresponding activity.

Interestingly, there does not seem to have been a clear elite/non-elite divide. In one measure after another, the Locona sample from beside the platform at Mound 32 falls with Mound 6 rather than with the other non-elite Locona samples. We account for this by suggesting that a significant amount of "domestic" ritual was conducted at the level of the residential group, in and around the leader's residence rather than in ordinary residences. The elite Locona residents of the Mound 6 platform and the non-elite resi-

Table 25.7. Offerings and rare ritual objects from Paso de la Amada

Phase and Location	Social Context	Ceramic Statuette	Ceramic Mask	Subfloor Offering	Floor Surface/ Termination Offering	Comments
Locona						
Mound 6	elite, house of residential group leader	2	0	2	3	Statuettes are represented by small fragments found in platform fill. Subfloor offerings are reported in Blake (1991); termination offerings are reported in Bishop et al. (2018).
Mound 32	non-elite, house of residential group leader	1	0	1 possible	0	Possible offering is Feature 1, a flat-bottomed pit at center of platform; the assumption is that it contained a perishable offering (Chapter 5).
Mound 13	non-elite, house of residential group leader	0	0	1	0	Offering of part of an articulated bird beneath structure floor in Locona platform (Chapter 14 and Bishop et al. 2018).
Ocós						
Mound 6	elite, house of residential group leader	0	1	0	0	Mask is from Basurero 3.
Cherla						
Mound 1	elite residential group, general toft	0	1	0	0	Mask is from unscreened unit of platform fill.
Mound 12	public building?	0	0	1 likely	0	Offering is Feature 24, consisting of three ground stone spheres in a pit dug from the platform surface (Chapter 4).
Mound 14	platform, use unknown	0	0	1 possible	0	Large portion of a hollow figurine of the Zanga type, buried in a Cherla-phase platform (see Figure 6.5).

dents of the Mound 32 platform were engaged in household rituals at similar frequencies.

Offerings and Contextual Aspects of the Ritual Assemblage

With one exception, the preceding discussion focused on objects that, in terms of discard, were treated no differently than other household goods. The ritual objects were generally broken, and they ended up in midden contexts along with pottery, stone tools, and animal bone. The objects meet reasonable criteria for identification as "ritual" in function (see Chapter 19), but they were not treated in any special way in discard. It would appear that the ritual activities were integrated into the rhythms of daily life.

The exception is the statuette from Mound 32, included above with hollow figurines (with a count of one). It seems possible that upon breakage (whether accidental or intentional or both), the pieces of this object were deliberately removed from systemic context and were buried beside the platform. That kind of treatment is rare among ritual paraphernalia in ceramic; the large portion of a hollow, Cherla-phase figurine from Mound 14 (Figure 6.5) may be another example.

There are stand-alone offerings of various kinds at Paso de la Amada (that is, offerings not associated with a burial), either deposited beneath floors or placed on floor surfaces apparently as a termination ritual. At Paso de la Amada, offerings have been identified only in platform contexts—either the houses of residential group leaders or, possibly in the case of the Cherla platform at Mound 12, a public building.

The offerings, along with two rare ritual objects currently known only from elite or group leader residential contexts, are summarized in Table 25.7. The two fragments of statuettes from platform fill at Mound 6 are an ear fragment and a hand fragment, with dimensions comparable to those of the corresponding features on the Mound 32 statuette and distinctly larger than typical for hollow figurines. The two masks noted in the table are the only such objects recovered in our excavations at the site.

The evidence in Table 25.7 suggests that certain ritual activities may have been performed exclusively in and around the houses of residential group leaders. We add three other observations. First, both the rare ritual objects and the offerings appear to have been more common in the Locona phase than later. Second, in Ocós and Cherla, offerings and rare ritual objects are known from both elite residential groups and possible public building contexts. Third, in the Locona phase, although statuettes and offerings have not been identified at ordinary residences, those are known from the non-elite platform contexts that we are identifying as the houses of residential group leaders. It may be that offerings in particular were more common in the elite context (Mound 6), but one needs to be cautious in drawing that conclusion from the table. At Mound 6, there were six successive preserved floors, which were completely excavated. At Mounds 13 and 32, the construction sequence was shorter (fewer superimposed floors) and the exposure much less than at Mound 6.

Overall, in the Locona phase, there appear to have been certain ritual activities (and probably associated sacred knowledge) to which access was restricted. These were not, however, controlled by an elite but rather by residential group leadership (the heads of multi-dwelling households). In the Cherla phase, the data conform better with the expected elite/non-elite division. At the end of this chapter, we return to the issue of ritual as a significant locus for differences among residences in early Paso la Amada.

OBSIDIAN

In several of the comparative cases summarized in Figure 25.2 (La Blanca, San Lorenzo), there is evidence for differential access to obsidian.

It is important to recall that at Paso de la Amada, there was a dramatic decline in the later Locona phase in the amount of obsidian going into household refuse (Table 10.1). Dividing the samples by source reveals that basically all the "excess" obsidian in Locona-phase deposits is from Tajulmulco, the closest and lowest quality of the three sources. Standardized frequencies of obsidian from El Chayal gradually *increased* across the sequence (Figure 10.1).

Here we consider the issue of differentiation among residential groups. Relevant data are presented in Table 25.8. The column for weight of obsidian standardized by weight of sherds is what we consider the best overall measure (and the one most generally used in this chapter). Results for obsidian are at first glance somewhat perplexing. To explore patterns further, we include other information in four additional columns. The numbers in all cases are median values for samples for a given location and phase. Significance is indicated in the same way as in the preceding sections. Note that other locations may be (significantly) either lower or higher than Mound 6 or Mound 1.

For weight of obsidian standardized by weight of sherds, the results for the Cherla phase conform to what we would expect to see for differentiation between elite and non-elite contexts. Mound 1 and Mound 13 are similar, and other locations collectively are significantly lower. In the Locona phase there is also significant difference between Mound 6 and other locations, with Mound 32 (which grouped with Mound 6 in ritual items) this time grouping with the other non-elite locations. The puzzling aspect of the results is that these differences entirely disappear in the Ocós phase, despite the platform for the Mound 6 residence continuing to grow steadily. Based on residential architectural differentiation, we would expect maximum difference between elite and non-elite contexts in the Ocós phase. Instead, that is the one phase in which there is no differentiation at all.

The column for obsidian standardized by volume excavated reverses the pattern between Locona and Ocós: Mound 6 is now low in the former, high in the latter. However, the results are highly sensitive to the overall packing of artifacts in the deposits considered.

The column for count of obsidian standardized by number of rims is a more reasonable alternative to standardization by sherd weight than that by volume excavated. Here the results for the Cherla phase are similar to those in the first column. The Locona and Ocós results are again confusing. In Ocós, Mound 12 is actually significantly higher than Mound 6. In Locona, there is considerable variation among locations, with the clear pattern of differentiation seen in standardization by weight of sherds not apparent here. We prefer the other analysis in part because the measure of counts standardized by number of rims seems to be affected by trampling. Note how the high Mound 12 values in both Locona and Ocós phases correlate with low average flake and sherd weights (and vice versa particularly for Ocós-phase Mound 6).

We considered the average weight of obsidian fragments by sample because we thought that if elite contexts had more secure access to obsidian, they might discard larger fragments. However, this measure also appears sensitive to degree of trampling of the deposits, as suggested by an inspection of the two rightmost columns in the table. (Obsidian flakes are small in deposits in which sherds are also small.)

In sum, for obsidian, the Cherla-phase data conform to expectations for an elite/non-elite division: members of elite residences discarded more obsidian than others. For the Locona and Ocós phases, the picture is more confused. There are hints of the expected elite/non-elite division, but they are not consistent across different versions of the analysis.

EXOTIC GOODS, LABOR-INTENSIVE CRAFT PRODUCTS, AND MISCELLANEOUS ORNAMENTS

In this final section on the evidence, we consider exotic goods (and evidence for the production thereof), labor-intensive craft products, and miscellaneous ornaments. Exotic goods are particularly important because that is the domain in which residential differentiation is most consistently observed in the comparable cases discussed at the outset of this chapter. Labor-intensive craft products are also prominent in the literature on emergent inequality. Personal ornamentation per se has less often been discussed in this context; the original impetus for including it here was the dramatic differences by location in the frequency of clay ear ornaments during the Cherla phase (see Chapter 17).

Table 25.8. Obsidian by location and phase[a]

Phase and Location	Obsidian Standardized by Weight of Sherds (g obsidian/kg sherds), Median	Obsidian Standardized by Volume Excavated (g obsidian/m^3), Median	Count of Obsidian Standardized by Number of Rims (count/total identified rims), Median	Average Weight of Obsidian Flakes (total g/total count), Median	Average Weight of Sherds (total g/total count), Median
Early Locona					
Other[a]	44.1	263.9	15.94	0.45	6.8
Locona					
Mound 6	*83.6	167.0	10.77	0.75	7.3
Mound 32	†33.5	†326.9	†4.92	0.74	8.0
Other locations	‡30.9	†228.6	9.26	0.59	7.9
Mound 12	‡33.6	161.4	*14.53	‡0.38	6.4
Other	‡53.3	*‡359.9	7.41	*0.80	*‡8.9
Late Locona					
Other locations	17.8	335.1	4.84	0.52	8.2
Ocós					
Mound 6	18.7	*1365.3	4.78	0.62	*12.3
Other locations	18.5	‡391.8	*†6.37	‡0.41	‡7.8
Mound 12	18.3	‡391.4	*†6.86	‡0.41	‡7.8
Mound 32	*24.9	583.2	4.53	*0.65	‡7.5
Cherla					
Mound 1	19.9	*829.9	5.06	0.49	7.6
Mound 13	*21.8	‡404.1	*5.52	0.52	7.2
Other locations	‡13.3	‡334.6	‡2.60	*‡0.83	*8.3

[a] An asterisk marks the highest value in each set. Wilcoxon rank sum test used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡).

In previous chapters, several of the patterns considered were discussed in a dispersed fashion (see Chapters 9, 11, 15, and 17). Table 25.9 summarizes results. Two sorts of analyses are included: pooled and by sample. In the latter case, the samples are the Lumped Refuse Samples, and significance is assessed as in previous sections. Obsidian is included for comparison; the numbers differ slightly from those in Table 25.8 because here we are using lumped rather than original refuse samples. Other objects included are as follows: *exotics* include all greenstone, iron ore, and mica fragments; *elite objects* include exotics, *plus* fragments of stone bowls. (Other potential labor-intensive craft products include hollow figurines and sculpted effigies [Clark 1994a:264]. We have considered those in discussions of ritual objects and return to them later in this section.)

A set of three columns considers evidence of *production* of exotic goods. As noted in Chapter 19, sandstone abrading tools were likely used for both lapidary and bone artifact production. They are rare, even in the pooled samples. The two columns dealing with lapidary or bone artifact production include sandstone abraders, a highly polished stone tool, greenstone manufacturing debris, and bone debitage. The counts per sample are high enough in that case that an analysis by sample is at least minimally possible. Note that 0s in "by sample" columns do not necessarily mean that there were no such objects but instead that the *median* was 0 (that is, the count was 0 in more than half the samples). The "other locations" row registers as significantly different ($p < 0.20$) from Mound 6 in the Locona phase, even though the medians were in both cases 0, but that is because more lapidary/bone production tools and debris were recovered at other locations than at Mound 6.

The final two columns of Table 25.9 deal with miscellaneous ornaments and clay ear ornaments. The former

Table 25.9. Imported Items, Artifacts Related to Lapidary/Bone Production, and Miscellaneous Ornaments[a]

Phase and Location	Imported Items			"Elite Objects"		Production of Exotic Goods			Other Ornaments	
	Obsidian	"Exotics" per 100 kg of Sherds[b]	Median Number of Exotics per 100 kg of Sherds[b]	"Elite Objects" per 100 kg of Sherds[c]	Median Number of Elite Objects per 100 kg of Sherds[c]	Sandstone Tools per 100 kg of Sherds	Lapidary or Bone Artifact Production per 100 kg of Sherds	Median Number of Tools/Debris from Lapidary or Bone Artifacts per 100 kg of Sherds	Miscellaneous Ornaments, Median per 100 kg of Sherds	Ear Ornaments, Median per 10 kg of Sherds
Locona										
Mound 6	*83.8	0.00	0	2.73	1.98	*0.91	0.91	0	0	
Mound 32	33.5	*4.07	*‡4.07	*4.07	*4.07	0	0	0	0	
Other locations[d]	‡30.9	1.38	0	1.58	0	0.79	*1.58	†0	*0.95	
Ocós										
Mound 6	*18.7	*2.55	*3.40	*2.55	*3.40	0	0	0	0	
Other locations	15.7	0.32	0	0.80	0.80	*0.64	*1.59	*†1.28	*†3.41	
Cherla										
Mound 1	20.1	1.17	1.20	1.36	1.20	*0.39	2.63	1.97	*4.07	12.3
Mound 13	*20.4	*4.63	*†4.63	*4.63	*†4.63	0	*4.63	*4.63	†0	*14.4
Other locations[e]	‡13.3	0.00	‡0	0.00	‡0	0	0.78	‡0	‡0	‡2.8
Analysis type	by sample	pooled	by sample	pooled	by sample	pooled	pooled	by sample	by sample	by sample

[a] An asterisk marks the highest value in each set. For analyses by sample, Wilcoxon rank sum tests were used to assess significance of difference between value for a given location and either Mound 6 or Mound 1, as appropriate: $p < 0.20$ (†); $p < 0.10$ (‡).

[b] Includes greenstone, iron ore, and mica.

[c] Includes exotic items, plus stone bowls.

[d] Includes Locona samples from Mounds 1, 13, 14, and 21; the Pit 32 excavation; and Mz-250.

[e] Includes Cherla samples from Mounds 11 and 32, Pit 29, Trench 1B, and Trench 1T.

includes all ornaments not included with ear ornaments or exotics reported in Chapters 11, 15, and 18.

There are three basic observations to be made about Table 25.9. First, results for the Cherla phase fit expected patterns for differentiation between elite and commoners. In every analysis by sample, the Mound 1 sample is significantly higher than the samples from other locations considered collectively. Mound 13 typically groups with Mound 1, notwithstanding the small sample. The implication is that in the Cherla phase, elite households had greater access to obsidian, exotic imports, and labor-intensive craft products than did non-elite households. The elites also appear to have been more involved in lapidary and/or bone artifact production. Finally, they discarded more ornaments of all kinds.

Second, for the Locona and Ocós phases, the results are a muddled chaos. Any distinction between elite and non-elite contexts is weak. Mound 6 does not always yield the highest values. When it does, except for the case of obsidian during the Locona phase, differences are not significant, even with the permissive standards in use here. In some cases, the other locations yield higher values than Mound 6, with weak significance in a few instances. It is certainly of interest that in the case of "elite objects"—which include probably the most important objects considered in the table, all pooled together—Mound 6 is higher than other locations in both the Locona and Ocós phases. The differences, however, are not significant. (Lack of significance in the Ocós phase is due to great variability among the Mound 6 samples, despite the high median compared to that of other locations.) Sample size may be a factor, but we have the example of the Cherla phase, in which expectations for elite/non-elite differentiation are met in one analysis after another. There seems reason to suspect that the social factors behind differentiation in household refuse were *different in kind* in Locona and Ocós compared to Cherla.

The third point is simply to reiterate the importance of the production of labor-intensive craft goods. Elites are expected to have used their advantages in access to resources to sponsor craft specialists, give away the resulting "elite objects," and thereby keep followers in a state of debt. A material signature of such a system might be (1) wide availability of exotic items and craft products but (2) more re-

Table 25.10. Distribution of Rim Sherds from Imported Pots (ceramic analysis Levels A, B, and C)

Phase and Location	Extranjero Black and White	Extranjero Glossy Gray	Fine Gray	Extranjero Grayish White	Kaolin	Extranjero Cream	Imported Rim Sherds, All (number of body sherds where known)	Total Identified Rims	Imported Rims per 100 Rim Sherds
Locona									
Mound 6							0	207	0
Mound 32							0	227	0
Other	2						2	2685	0.07
Ocós									
Mound 6							0 (1)[a]	532	0
Mound 12	5[b]						5	3148	0.16
Mound 32							0	855	0
Ocós-Cherla									
Mound 12	8						8	1617	0.49
Mound 1	1						1	821	0.12
Cherla									
Mound 1	84	5	1	4	0[c]	2	96[d]	14,789	0.65
Mound 13	1						1 (6)	318	0.31
P29	2						2 (3)	65	3.08
Mound 11	3						3 (7)[e]	200	1.50
Trench 1B	5						5 (26)	186	2.69
Mound 32	4				0[f]		4	122	3.28
Trench 1T	5	1			3		9 (40)	163	5.52
Totals	120	5	1	4	3	3	136	25,935	0.53

[a] Body sherd from a hard-fired black- and orange-slipped bowl, possibly imported (0605A).

[b] These include two rounded-walled bowls, two open bowls, and one tecomate, from E4/7, F4/18, G6/33, and T1D/8. Of those, only F4/18 is relatively well protected from an overlying layer of Ocós mixed with some Cherla.

[c] No rims, but there is a kaolin body sherd from H12/9-10.

[d] Only seven body sherds recorded in samples analyzed to Level A; body sherd counts are not available for numerous additional samples analyzed to Levels B or C.

[e] Five non-conjoining fragments from the same vessel as one of the rims are not included in the count.

[f] There is a kaolin open bowl rim from Unit 2/227, a slope wash context not included with the Refuse Sample.

stricted evidence for the manufacture of such items. In Table 25.9, no phase yields a pattern of precisely that sort. In Locona and Ocós generally, the pattern is more egalitarian. In both elite and non-elite contexts, there is evidence of manufacture as well as consumption. In the Cherla phase, the pattern is more unequal: there is evidence of consumption as well as manufacture *only* in elite contexts.

Turning to imported pots reveals a possible domain for a flow of gifts from elite to commoner in the Cherla phase. Table 25.10 is a tabulation of rim sherds identified as probably from imported pots. These mostly consist of thin-walled, well-fired sherds of Extranjero Black and White, probably from the region of San Lorenzo on the Gulf Coast. One issue of interest is exactly when those first appear at Paso de la Amada. Two rims from late Locona deposits in the Pit 32 excavations are Extranjero Black and White, but we think those probably worked their way down to these levels from more mixed upper layers in the generally shallow deposits at that location. Even the five Extranjero sherds from Ocós contexts are mostly immediately below a level with mixed Ocós and Cherla.

Access to imported pots either began or significantly expanded early in the Cherla phase. Based on Cheetham's (2010a) sourcing work on the Cantón Corralito assemblage, we believe that the imported pots from Cherla-phase deposits at Paso de la Amada came overwhelmingly or entirely from San Lorenzo.

There are more imported sherds, in a greater variety of types, from Mound 1 than from other locations, but when the counts are standardized against all identified rims (in the column at the far right in Table 25.10), a surprising pattern emerges. The elite contexts have distinctly *fewer* imported pots than the non-elite locations: 0.65 per 100 rim sherds at Mound 1, 0.31 at Mound 13, and 2.27 in other Cherla locations considered together. The high values for the non-elite Cherla locations are consistent from one location to another, a pattern one would not expect if the issue was purely sample size. A further surprise is that the frequency among rims at the non-elite locations at Paso de la Amada approaches that at Cherla-phase Cantón Corralito, where the overall statistic is 3.09 per 100 rims (based on Cheetham 2010a:Table 6.1).

This result contrasts distinctly with that for all other imported goods (Table 25.9). What are we to make of it? Our suggestion is that imported pots moved about in different social transactions than obsidian and exotic ornaments. We suspect that the general source for residents of Paso de la Amada was Cantón Corralito (not San Lorenzo itself). One possibility is that the elites of Paso de la Amada resisted the rising power of Cantón Corralito and therefore sought or received fewer imported pots. In that scenario, it might even be that the leaders of Cantón Corralito tried to undermine the status of their counterparts at Paso de la Amada by buying off non-elite residents of Paso de la Amada with gifts of imported pots. We prefer, instead, a second possibility. In this scenario, commoners at Paso de la Amada were most likely to receive prestations from the elites of their own community (rather than Cantón Corralito), but an imported pot had a different range of meanings than did exotic personal ornaments. The latter were intrinsic markers of elevated status, while the former were not. The elites living at Mounds 1 and 13 (and perhaps other unidentified locations) brought in most of the imported goods arriving at the site. They then gave away the pots but kept the greenstone and iron ore.

We close consideration of the evidence with Table 25.11, an expanded sample of exotic imports, stone bowls, and evidence of lapidary work (specified in various ways, as noted in the table). This time, fragments of hollow figurines and of sculpted effigy pots are also included. In addition to the usual Paso de la Amada samples, the table includes data from the Locona platform at San Carlos (Mz-44), a few kilometers from Paso de la Amada. Counts in parentheses register burial offerings. Those in brackets represent miscellaneous other contexts, often platform fill or other deposits with uncertain dating, in a few cases unscreened. Counts in parentheses and brackets are not included in the calculations of the last two columns on the right. The final column on the right redoes the calculation of "elite objects" by including all fragments of hollow figurines and sculpted effigies; this needs to be used with caution since those ceramic fragments end up overwhelming the rarer occurrences of greenstone, iron ore, mica, and stone bowls.

The main reason for including this table is to provide data in a detailed manner for potential future analyses. Two points stand out to us. First is the impressive array of exotic items and stone bowls recovered from the Locona platform at San Carlos. Those include evidence for the manufacture of greenstone and mica ornaments. One could postulate, on the basis of San Carlos, that (contrary to the results in Table 25.9) the inhabitants of Paso de la Amada Mound 6 did have special access to exotic imports and stone bowls, but for whatever reason scant trace was left in the archaeological record. The second point concerns the Paso de la Amada collection. The most salient factor in the occurrence of exotics appears to be sample size. Any convincing case for differentiation in "elite objects" during the Locona and Ocós phases will require the excavation and publication of additional large, screened samples of domestic refuse.

SUMMARY OF RESULTS

Elite and non-elite locations were identified at the outset of the analysis based on residential architecture for Locona-Ocós and the presence of greenstone, iron ore, and high frequencies of ear ornaments for Cherla. We looked for differentiation between elite and non-elite locations in each of the three phases.

We first tried, unsuccessfully, to find differentiation in ceramic vessel assemblages. Elite vessel assemblages did not display a greater orientation toward serving than their non-elite counterparts; nor did they include any significantly higher representation of very large vessels appropriate for feasting preparation/service. Modified-rim bowls were not more prevalent than bowls with unmodified rims. By energetic manipulation of the data, we produced a hint of differences in elaboration of decorated tecomates between elite and non-elite contexts, but careful assessment left that result unconvincing. (For instance, in the Ocós case, the differences are based entirely on likely carry-ups.)

We next turned to household ritual artifacts. In contrast to the results for the ceramic vessel assemblage, in this case we did find evidence of consistent and/or significant differences among locations. Most of the ritual assemblage consists of artifacts that were generally available in household contexts, but a range of items were more common in elite contexts than in typical non-elite contexts, a pattern present in all three phases. A particularly important finding, however, was that a refuse sample from the group leader's house in a non-elite residential group (Mound 32 Locona) fell in with elite patterns (Mound 6 Locona) rather than with other non-elite samples. In almost all other analyses, the Mound 32 Locona sample grouped with the other non-elite samples. (The exception was exotics/elite objects, but the high values there are likely a sample size effect: one greenstone pendant in a relatively small sample of sherds.) The implication is that the spatial differentiation involved in distribution of ritual objects, at least in the Locona phase, is not between elite and non-elite but rather between the large houses of residential group leaders and ordinary residences. Further, stand-alone offerings (not accompanying human burials) and a few rare ritual artifacts are also unique to such settings.

We next examined obsidian. In the Cherla phase, there was significantly more obsidian in elite than in non-elite households. A similar pattern in Locona was entirely absent in Ocós, a point that goes against expectations based on the steadily expanding platform at Mound 6.

The final analyses considered exotic imports (greenstone, mica, and iron ore mirrors), labor-intensive craft goods (particularly stone bowls), the manufacture of greenstone ornaments, and ornaments generally. Most of the artifacts in question are rare, and a case for differentiation needs to be built up by looking for patterns across multiple artifact types. The Cherla-phase pattern of significant differentiation between elite and non-elite samples recurs across the board. The one worry in that case is that the elite sample from Mound 1 is much larger than the non-elite samples. In future work, it will be interesting to see if a larger set of non-elite samples reveals the same patterns found here. In the Locona and Ocós phases, differentiation between elite and non-elite contexts in this last set of measures is weak. The across-the-board pattern seen in the subsequent Cherla phase is absent. By pulling in data also from the nearby site of San Carlos, one could postulate that a tendency toward higher frequencies of exotics, labor-intensive craft products, and greater involvement in the manufacture of ornaments from exotic imports on the part of the elite were present in the Locona phase but poorly represented in the archaeological record. Overall, though, the Locona-Ocós artifact record suggests a lower level of inequality than during the Cherla phase.

HOUSEHOLD REFUSE IN RELATION TO OTHER SOURCES OF EVIDENCE

How does the evidence from household refuse at Paso de la Amada relate to that of other site-level sources of evidence on social inequality, namely mortuary patterns and residential architecture?

The sample of burials from Paso de la Amada and contemporaneous sites in the region is small. The social importance of mirrors—mica in Locona-Ocós and iron ore in Cherla—is documented by a Locona-phase child from El Vivero who wore a headdress with a mica mirror and a Cherla-phase adult female from Paso de la Amada who had iron ore ear ornaments (Clark 1991:20; Clark and Colman 2014:149). A possible Ocós-phase burial from Mound 6 had a greenstone bead, and an adult in the Pit 32 excavation had two such beads. Other burials were accompanied by fragmentary vessels, stone tools, or nothing at all. So far, differentiation appears modest and in keeping with the low level observed among refuse assemblages in the Locona and Ocós phases.

Architectural differentiation, by contrast, is significant. Further, changes in the degree of residential architectural differentiation over time do not appear to be reflected by corresponding changes in the households' refuse. In particular, there is no convincing evidence for increasing differentiation in household refuse assemblages as the platform for the Mound 6 residence—envisioned as the house of someone who was both a residential group leader and the village chief—grew steadily during the Locona phase and into Ocós. If anything, the Ocós-phase assemblages look more egalitarian than those of the Locona phase. It is only after cessation of construction activity at (and possible abandonment of) Mound 6 in the Cherla phase that we find evidence of differentiation in multiple artifact categories beyond ritual paraphernalia. We know little about residential architectural differences in Cherla, though elite residences do not appear to have been built on specifically constructed platforms of an impressive size. Two points are worth mentioning in terms of spatial distribution of Cherla-phase elite residences. The proposed Cherla-phase public building at Mound 1 was constructed in the area of a preexisting elite residential group. The elite residence at Mound 13 was immediately beside the location chosen for construction of the Mound 12 public building. It thus looks like there was a degree of spatial association of elite residential areas and locations for public structures in the Cherla phase (even if at Mound 1 the relationship was sequential).

POTENTIAL CONFOUNDING FACTORS

At the outset of this chapter, we noted several potential confounding factors that might lead to the formation of a material record in which unequal social relations that were actually present nevertheless ended up archaeologically invisible.

One issue is the physical location of craft activities. Our model postulates aggrandizers/chiefs who sponsor craft activities and use the products to enhance their own status (typically by giving the products away). Our expectation was that evidence of labor-intensive craft production should appear in elite residential groups, but the model

Table 25.11. Expanded sample of exotic imports and stone bowls from San Carlos and Paso de la Amada, with Locona-phase locations specified[a]

Phase and Location	Weight of Sherds (kg) in Refuse Sample (or volume excavated)	Sandstone Abrader (ab) + Greenstone Bead Blanks (bd) + Greenstone Flakes or Other Worked Fragments (fk)	Greenstone, All (not including production debris)	Iron Ore Mirrors	Mica Fragments	Stone Bowls[b]	Hollow Figurines, All Fragments	Sculpted Effigy Pot, All Head Fragments	Original "Elite Objects" per 100 kg of Sherds[c]	Expanded "Elite Objects," Including Hollow Figurine and Sculpted Effigy Fragments, per 100 kg of Sherds
Locona										
San Carlos[d]										
AU10-AU14	(44.4 m^3)	[1 + 1 bd + 2 fk]			[27]	[1]	[1]			
AU15	(1.2 m^3)					[3?]				
Paso de la Amada										
Mound 6	109.98	1 ab	0 [2]	0	0 [1[e]]	3 [2]	23	missing data	2.7	23.6
Mound 32	24.58	0	1	0	0 [2]	0	3 + 72	0	4.1	16.3
Mound 12	266.15	1 bd + 2 fk	1 [1]	0	2 [1]	1 w	6	2	2.6	5.6
Pit 32	89.67	1 ab	0 (2) [1]	0	0	0	4	1	0	5.6
Mound 1	46.90	2 ab	0	0	0	0	2	1	0	6.4
Mz-250	43.23	0	0	0	0	0	0	1	0	2.3
Mound 14	35.13	0	0	0	0	0	0	0	0	0
Mound 13	13.50	0	0	0	0	0	1	0	0	7.4
Mound 21	11.72	1 ab	1	0	0	0	2	1	8.5	34.1
Ocós, Paso de la Amada										
Mound 6	78.39	0	1 (1)	0	1	0	3	≥ 1 (missing data)	2.6	7.6
Mound 12	493.20	4 ab [1 bd]	2 [1]	0	0	1 g, 1 p	4	13	0.8	4.2
Mound 32	135.68	0	0	0	0	1 t	1	6	0.7	5.9
Miscellaneous other[f]			[2]			[1 g]				

does not actually require that sponsored craft activity take place in any particular location. Nothing like the concentration of mica fragments at the San Carlos elite mound is known from Paso de la Amada, but the manufacture of greenstone ornaments was dispersed in both elite and non-elite residences during the Locona and Ocós phases. In currently available data, by the Cherla phase, greenstone ornaments were no longer manufactured in non-elite residential groups (though certainly one might wish for a larger sample from non-elite contexts). If the Cherla pattern holds up in future work, that would contribute to the general pattern revealed here of more marked inequality in Cherla than in Locona or Ocós.

A second issue stems from the observation that, in the aggrandizer model, everyone gets valuables, since the aggrandizer gives them away. Thus unequal social relations might yield what appears to be a relatively egalitarian archaeological record. We have enlisted this logic in attempting to account for the more frequent occurrence of imported pots in non-elite contexts during the Cherla phase (a pattern that contrasts with those for obsidian, greenstone, and iron ore in the same phase). A more general argument of that sort could be applied to the weak or inconsistent evidence for differentiation in the Locona and Ocós phases. In other words, the residents of Mound 6 and its associated residential group (so this argument goes) did have powers, privileges, and favorable access to status-validating goods even though the refuse patterns do not clearly show that. We cannot rule out that possibility. We would add, however, that the powers, privileges, and advantages in access during those phases were, overall, weak, as suggested by clearer evidence for differentiation in the

Phase and Location	Weight of Sherds (kg) in Refuse Sample (or volume excavated)	Sandstone Abrader (ab) + Greenstone Bead Blanks (bd) + Greenstone Flakes or Other Worked Fragments (fk)	Greenstone, All (not including production debris)	Iron Ore Mirrors	Mica Fragments	Stone Bowls[b]	Hollow Figurines, All Fragments	Sculpted Effigy Pot, All Head Fragments	Original "Elite Objects" per 100 kg of Sherds[c]	Expanded "Elite Objects," Including Hollow Figurine and Sculpted Effigy Fragments, per 100 kg of Sherds
Ocós-Cherla ground surfaces										
Mound 12	236.00	1 ab + 1 bd	1 [1]	0 [1]	0	0	6	3	0.8	4.7
Mound 1	108.86	4 ab + 1 bd + 1 fk	1 [1]	0	0	0	6	2	2.7	10.1
Cherla, Paso de la Amada										
Mound 1	2053.82	8 ab + 2 fk [1fk]	13 [12]	9 [7]	0	2 g, 2 w [2 g, 3 w]	39	33	1.4	4.9
Mound 13	43.18	0	1	1	0	0	0	0	4.6	4.6
Mound 14[g]							[1]			0
Other[h]	127.72	0	0	0 (2)	0	0	1	0	0	0.8

[a] Artifact counts in parentheses are from burials. Counts in brackets are from other miscellaneous contexts (including, in some cases, unscreened units) for which the given phase assignment is likely but not always secure. In the counts, zeros are noted only in rows that record fully screened contexts.

[b] Divided by material type if known: g = relatively hard gray andesite; w = relatively soft white andesite; p = pink andesite; t = granite.

[c] Includes exotic items, plus stone bowls; same calculation as in Table 25.10, except with Locona "other locations" separated.

[d] Data from Clark 1994a:Appendix 1. AU12 and AU13 are platform fill in an elite context; AU15 is midden from the same location. Note that some of the total sherd weights for analytical units (AUs) in the appendix represent the weights of sherds that were left after some body sherds were initially discarded. That appears to be the case for AU15, since the percentage of rims among all reported rims is 23 percent, whereas we would not expect it to be greater than 10 percent. There is not enough information to screen the sherd weights that way for AU12 and AU13.

[e] Mica mirror recovered by Ceja Tenorio (1985) from Mound 2, likely within the Mound 6 residential group (noted by Clark 1994a:406).

[f] Includes platform fill in Mound 12 and upper levels in the Pit 32 excavations.

[g] Large portion of hollow figurine buried in a platform; this is a possible public building context.

[h] Includes Cherla samples from Mounds 11 and 32, Pit 29, Trench 1B, and Trench 1T. The two iron ore mirrors noted in parentheses are from a burial in the same unit as the Trench 1T midden (Clark and Colman 2014:149, Figure 6.2b).

contents of refuse assemblages in the Cherla phase and, importantly, the complete lack of any trajectory of increasing inequality in the artifact assemblage as the Mound 6 platform grew steadily during the Locona phase and into Ocós.

The final potentially confounding issue is the possibility of minor variations in practice having significant consequences in the material record. For instance, what if elite sponsors of feasts gave away pots? Could that be the cause of the complete lack of differentiation in the ceramic vessel assemblage? We can't rule that out, but such a scenario would again effectively involve a low overall level of inequality in this particular domain. It is of interest that we do observe differentiation in ceramic ritual objects whereas we do not find differences in the case of food-related vessels.

A SHIFT IN THE ORGANIZATION OF ACTIVITIES?

In the search for residential differentiation in artifact assemblages, one issue is the implication of the artifacts themselves. Did high-status residences have more wealth items than others? More important for cases of emergent inequality is what artifact distributions tell us about the organization and distribution of activities. Did high-status people do different things than others, or do things in a different way? Did they engage in certain activities at a higher rate, or were certain practices under their exclusive control? Possibilities include craft activities, ritual, and the ways people accoutered themselves for social interactions or public performances.

During the occupation of Paso de la Amada, there appears to have been a shift in the specific activities most

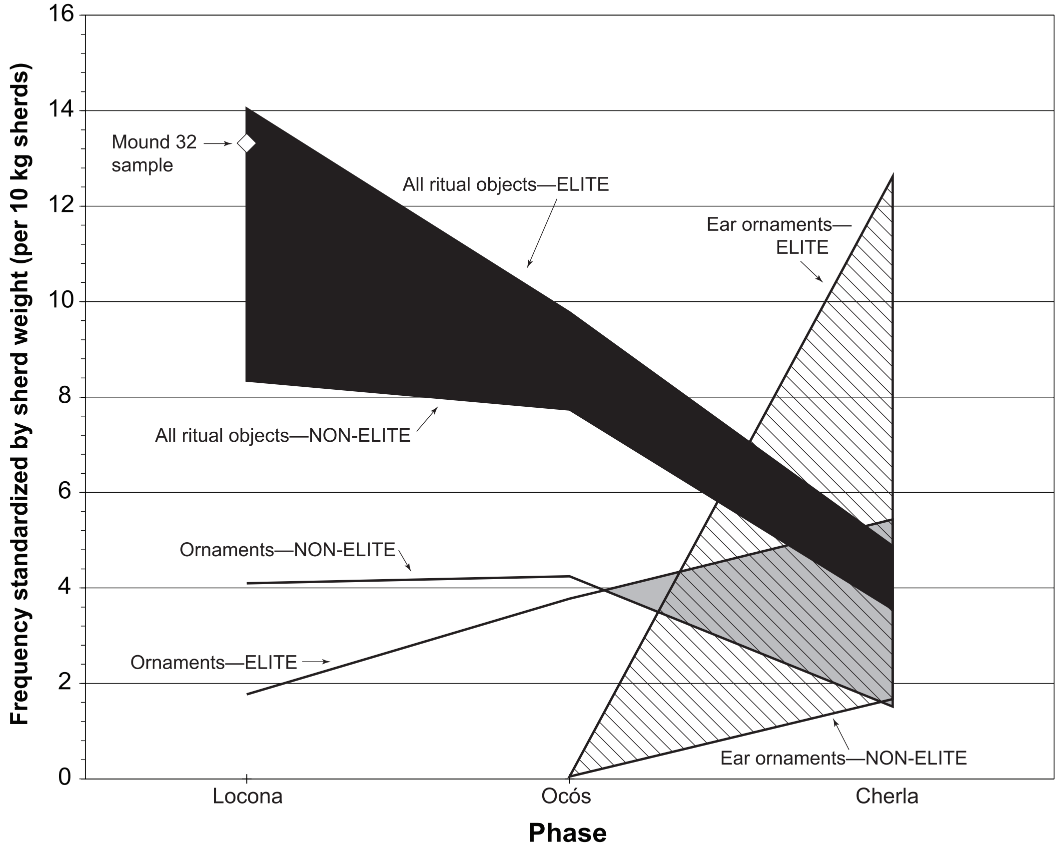


Figure 25.3. Shift in the primary locus of differentiation from ritual objects to personal ornaments. Diagram shows standardized frequencies of ritual objects, clay ear ornaments, and all other ornaments, emphasizing the differential between elite and non-elite contexts over three phases. Shading between corresponding elite and non-elite lines tracks instances in which the elite value is higher than the non-elite value. The relative thickness of the shaded band (black for ritual objects, diagonal lines for ear ornaments, and gray for other ornaments) indicates the magnitude of the difference between elite and non-elite. For ritual objects, the Mound 32 Locona sample is plotted separately and not included with other non-elite Locona samples.

prominent in the generation of differences in artifact assemblages among residential locations. In the Locona phase, the most salient factor was involvement in ritual. By the Cherla phase, adornment of the body was more important as a source of differentiation.

Figure 25.3 attempts to capture that shift by plotting changes in standardized frequencies of three classes of artifacts: all ritual objects, all ear ornaments, and all other ornaments. For each phase, samples designated "elite" are considered separately from "non-elite." The shading is introduced to clarify the confusion of six lines by directing attention to the elite/non-elite pairs (black for ritual objects, diagonal lines for ear ornaments, and gray for other ornaments). Shading is used only where the elite value is higher than the non-elite value. The vertical thickness of the shaded band indicates the magnitude of difference between elite and non-elite at any given time. For ritual objects, the Mound 32 Locona sample is plotted separately (and not included with other non-elite Locona samples).

The overall decline in the frequency of ritual objects discussed in Chapter 19 is readily apparent. Interestingly, as frequencies of ritual objects decline, the gap between elite and non-elite narrows. For the Locona phase, though, elite/non-elite may not be the fundamental source of difference, as suggested by the (non-elite) Mound 32 sample, in which the frequency of ritual objects is similar to that at Mound 6. The key distinction may be between residences of household heads and other dwellings. It is not that there were no status differences, but the effects of those differences on domestic artifact assemblages is essentially undetectable, whereas the effect of differential involvement in ritual is clearly identifiable. In the Cherla phase, there were still higher frequencies of ritual objects at elite residences, but the gap had narrowed. By this time, differential use of personal ornamentation was a more salient factor behind observable differences among domestic artifact assemblages.

CONCLUSIONS

Paso de la Amada yielded a large sample of domestic refuse of the Locona, Ocós, and Cherla phases, from locations scattered from dozens to hundreds of meters apart across the site. The assemblage provides an opportunity to investigate differentiation in domestic refuse at a major site of the second millennium BC. The overall sample of artifacts is large compared to previously published cases, and the number of separate locations is typical (Figure 25.2). This case is of great interest not simply because the sample is big but because the coverage extends a few centuries earlier than comparable cases, and the degree of differentiation in residential architecture is unique in Mesoamerica for the era prior to 1400 BC.

We developed a set of expectations for what we might find in domestic artifact assemblages from three sources: general theory on the origins of inequality, roughly comparable Mesoamerican cases from the second millennium BC, and the trajectory of platform construction at Paso de la Amada itself (particularly the steadily expanding platform at Mound 6 from Locona to Ocós, followed by cessation of construction or even abandonment in Cherla). General theory directed attention to four likely domains of differentiation: involvement in the serving of food and the sponsorship of feasts; access to resources obtained through interregional exchange; access to and involvement in production of labor-intensive craft goods; and involvement in ritual activities. A basic expectation derived from general theory was that we would find differentiation in all these domains, but the examination of real-world cases from other second-millennium BC sites tempered that somewhat. There were claims for differentiation in all four domains, but results at any particular site were variable. The most consistent domain of differentiation in previous studies was exotic imported items.

Our plan to identify elite and non-elite contexts and expected degrees of differentiation in different phases from the trajectory of platform construction at Paso de la Amada found support among the comparable cases. Particularly in the Oaxacan village sites of the late second millennium BC, three basic sources of evidence—domestic refuse, residential architecture, and mortuary patterns—yield mutually consistent results, pointing to a gradation of statuses without rigid class divisions. In the case of Central Mexico, there is arguably a disjunction between mortuary patterns (at Tlatilco), which show significant inequality, and domestic refuse (at Coapexco), in which there are only minor hints of differences among residences. It needs to be remembered, however, that many of the Tlatilco burials date up to several hundred years later than the occupation of Coapexco.

In the Cherla phase at Paso de la Amada, we found no evidence of differentiation in the ceramic vessel assemblage, but in the other domains of expected differentiation, the Cherla assemblage fit expectations for an elite/non-elite divide across a broad range of artifacts. In the preceding Locona and Ocós phases, patterns suggesting differentiation between elite and non-elite contexts were weaker in the key domain of imported goods. There was differentiation in ritual activity, but the non-elite Mound 32 Locona sample grouped with Mound 6, raising the possibility that spatial differentiation in ritual activity was associated with differences between the large houses of residential group leaders and ordinary residences, rather than an elite/non-elite divide. Further, as Mound 6 grew during the Locona and into the Ocós phase, there was no hint of a corresponding increase in differences among domestic artifact assemblages. Thus, for the Locona and Ocós phases, the evidence of architecture and refuse does not appear to be closely consistent, with the latter yielding results that look more egalitarian than the former.

We have little secure knowledge of differences in residential architecture during the Cherla phase, though we are confident that differences in terms of platform construction were less than previously. We do have what Lesure believes were public (rather than residential) constructions during this phase. It is of interest that both of our samples of elite Cherla refuse are from the general area in which public construction seems to have been concentrated. Thus there seems to be some basis for postulating a basic consistency in the evidence of residential architecture and domestic refuse in the Cherla phase, if only in terms of the location of the residences themselves.

Those points lead to the following conclusions. First, in the Cherla phase (1400–1300 BC) we found: (1) the broadest match between observed patterns of differentiation and general expectations, (2) the greatest similarity between basic patterns of differentiation and those observed in comparable cases from Early Formative (1400–1000 BC) Mesoamerica, and (3) hints of a consistent picture provided by residential architecture and domestic refuse. Maybe this result should come as no surprise because the Cherla sample directly overlaps in time with those other cases. Second, in the Locona and Ocós phases (1700–1400 BC), there appears to be discordance in the site-level sources of evidence on inequality: (1) dramatic differentiation in residential architecture versus weak evidence for differences in domestic artifact assemblages and (2) lack of a trajectory toward increasing differentiation in the artifact assemblages, even as differences in residential architecture became more marked. The main exception in the artifact assemblages was the frequency of ritual artifacts. Still, in that case the key distinction seems to be between the houses of residential group leaders and ordinary residences rather than one between elite and non-elite households. The argument to be developed in Chapter 27 is that this apparent discordance is not the result of limitations of the evidence but instead an important clue concerning the specific nature of sociopolitical organization at that time.

CHAPTER 26

Subsistence Change at Paso de la Amada and the Development of Agrarian Societies in the Soconusco

Richard G. Lesure, R. J. Sinensky,
Thomas Wake, and Kristin Hoffmeister

THIS CHAPTER examines subsistence practices at Paso de la Amada from 1700 to 1300 BC and their implications for understanding the development of settled, agrarian societies in the Soconusco. Of particular interest is the shift, around 1900 BC, from Archaic to Formative. What insight does evidence from Paso de la Amada yield on the nature of that transition?

Traditionally, the Archaic to Formative transition in Mesoamerica was understood to have involved the simultaneous appearance of ceramics, sedentism, and agriculture based on maize as a staple crop. It would thus have marked, essentially, the full-blown emergence of agrarian societies. Research in recent years has eroded the association of all three of those developments with the transition to the Formative. Well-fired ceramic containers appeared in multiple regions of western Mesoamerica and the southeastern Pacific Coast at 1800 ± 100 BC, but not until late in the millennium in the Maya lowlands. Increased sedentism in the Soconusco is indicated by architecture and other evidence from no later than 1700 BC, and the earliest settled villages appeared around 1900 BC, with the Barra phase (Blake 1991, 2011; Blake et al. 1995; Clark 2004a; Clark et al. 2007; Lesure 1997a; Rosenswig 2006, 2010). For the Tuxtla Mountains, however, Arnold (1999) argues for residential mobility throughout the second millennium BC. Even in the Soconusco, a pattern of seasonal movement between permanent villages and resource-processing locations in the estuaries seems to have persisted through at least 1000 BC (Lesure 2009c; Lesure and Wake 2011). Despite these various caveats, a widespread, essentially synchronous appearance of pottery and a shift toward greater sedentism still characterize the Archaic-to-Formative transition beginning around 1900 BC in multiple regions of Mesoamerica, both lowland and highland. The status of the third traditional criterion, maize as a staple crop, has been more seriously challenged.

A growing literature pushes the emergence of agrarian societies later by nearly a millennium, to the Early–Middle Formative transition at around 1000 BC. This recent work portrays maize as not yet a dietary staple during the second millennium BC, particularly in lowland regions such as the Soconusco and the Gulf Coast (Arnold 2009; Blake 2006; Blake et al. 1992b; Clark et al. 2007; Cyphers and Noguera 2012; Cyphers et al. 2013; Rosenswig 2006, 2010:172–73; Rosenswig et al. 2015). There has been debate over whether maize stalk sugar was originally more important than kernels and whether consumption was in the form of beer (Smalley and Blake 2003; Webster 2011). Diets during the second millennium BC appear to have been more diverse and more heavily dependent on wild resources than in the fully established agrarian societies of the first millennium BC (Arnold 2009:404–6; Blake et al. 1992a; Cyphers and Noguera 2012:151–55; Killion 2013; VanDerwarker 2006:194–95). What people ate probably varied considerably from one site to another, or one region to another, depending on the nature of locally available resources (Blake et al. 1992b:91; Peres et al. 2013; Rosenswig 2015:147). The underlying causes of the shift from Archaic to Initial Formative have thus been envisioned as local rather than pan-Mesoamerican (Neff et al. 2006:306). It has been suggested that, in some cases, change in subsistence was a result rather than a cause of the transition to the Formative (Clark et al. 2007:29, 35; Killion 2013:589; Rosenswig 2006:341; Rosenswig et al. 2015:103).

Our work with materials from Paso de la Amada prompts us to push back against some aspects of these recent characterizations of the Archaic to Formative transition. The excavations at Paso de la Amada yielded several relevant sources of evidence, particularly grinding stones, human skeletal remains, and faunal remains. This chapter examines changes from 1700 to 1300 BC for insight into long-term trends in the diets of local villagers during the course of the second millennium BC. We also consider the extent to which the Archaic to Formative transition constituted a tipping point in the trajectory toward agrarian societies in the Soconusco and, if so, how that "early" tipping point at 1900 BC compared to the recently popular "late" tipping point at 1000 BC. We argue that, in the Soconusco, 1900 BC was the more important of the two.

THE SOCONUSCO REGION

Ceramic-using settlements appeared early in the second millennium BC along the Pacific Coast, from the Río Verde in Oaxaca to El Salvador. Within this coastal area, the Soconusco was unusual (and possibly unique) for the rapid emergence of dense populations during the Initial Formative. To the southeast of the Soconusco, Initial Formative and/or Early Formative coastal settlements have been found in both Guatemala and El Salvador (Arroyo 1994, 1995, 2004; Arroyo et al. 2002; Estrada-Belli 1999; Morgan 2011; Pye 1995; Pye and Demarest 1991). Those include settlements as early as those in the Soconusco but, as far as we can tell, no settlement clusters as dense as the Initial Formative occupation of the Mazatán zone. To the northwest of the Soconusco, the coast is drier, and second millennium BC settlement appears to have been generally sparse. The site of La Consentida in Oaxaca (Hepp 2015, 2019; Hepp et al. 2017) represents an Initial Formative case with some interesting similarities to our settlements in the Soconusco.

The coastal wetlands of the Soconusco include brackish estuary-lagoon systems and freshwater swamps. Rivers descending from the Sierra Madre complicate a generally parallel structure of beaches and wetlands. Some rivers, including the Coatán, empty directly into the ocean. Others feed the wetlands. The latter include the Pumpuapa, which enters the Cantileña Swamp (Clark 1994a:75), and the Doña María, Cintalapa, and others that feed the Acapetahua estuary (Voorhies 2004:6).

There are two major freshwater swamps, the Cantileña (or Hueyate) and the Guamuchal (or Manchón); we use the first name in each case. Villages of the second millennium BC were concentrated in the area between those swamps (Rosenswig 2010:105–6), an area in which the forested coastal plain pushed comparatively close to the ocean on alluvial deposits of four significant rivers (Figure 1.2). During the second millennium BC, the region from the Acapetahua estuary in Chiapas to the Río Jesús zone in Guatemala was culturally cohesive, with a shared sequence of ceramic complexes and phases (Blake et al. 1995; Pye et al. 2011; Rosenswig 2011). That area excludes only what might be called the "northwestern fringe" of the Soconusco as traditionally defined (see Lesure 2011c:Figure 1.1). For the sake of brevity and for discussion of the Formative period only, we refer to the region from the Acapetahua zone to Río Jesús as the Soconusco (see Figure 1.2).

In the Acapetahua zone, the system of estuaries and lagoons reaches some 9 km inland. On the other side of the Cantileña Swamp, in the Mazatán zone, the estuary extends inland only 1 to 3 km. Also, there are no lagoons in Mazatán today, as noted by Clark (1994a:63–64). Excavations at the estuary site of El Varal, however, revealed traces of an ancient lagoon system to the southeast of the (present) Coatán mouth during the second millennium BC. A similar system was probably at one point present to the northwest of the river, but siltation may have been already well advanced by the Initial Formative due in part to changes in the course of the river during the Middle and Late Holocene. (See the section on habitats in the Mazatán zone in Chapter 14.)

In the Soconusco wetlands, effects of the annual cycle of wet and dry seasons are dramatic. During the rainy season of mid-May to mid-October, water levels in the Pampa Cabildo, to the southeast of the Coatán, rise by as much as 2 m (Clark 1994a:64). Salinity levels in estuaries and lagoons decline. Savanna zones between the estuary and the forests of the coastal plain experience seasonal flooding, and old river courses farther inland also fill with water. In Mazatán, seasonally flooded inland areas known as *chahuites* would have provided a succession of opportunities for dry season subsistence, first providing fish trapped as the waters subsided, then as choice locations for dry season crops (Clark 1994a:76).

SETTLEMENT AND SUBSISTENCE FROM ARCHAIC TO FORMATIVE

We first review what is known of settlement patterns and subsistence systems in the Soconusco from the Middle Archaic through the Early Formative period. Subsequent sections examine four classes of evidence: isotopic studies of human bone, grinding stones, human paleopathology, and faunal remains.

The Archaic System

Most known Archaic sites in the Soconusco are large mounds in the estuary, composed almost entirely of shells. Dating to the Middle and Late Archaic (5000–3500 BC and 3500–1900 BC, respectively), these shell mounds have been documented mainly in the Acapetahua estuary and the Cantileña Swamp (Clark and Hodgson 2009; Kennett et al. 2006; Voorhies 1976, 2004, 2015). The Late Archaic sites in the Acapetahua zone appear to have been associated with lagoons of the upper estuary. In most cases, the shells are marsh clams of a single species (*Polymesoda radiata*). Voorhies (2004:42–51) notes patterns in the bedding of the shells involving paired layers of burnt and unburnt shells. The lack of disturbance in these extensive layers suggests that people collected large numbers of shellfish during short visits. The lack of structures, a limited range of tool types, and absence of commensal household rodents all support her interpretation that these were *not* long-term habitation sites.

Drawing on Binford's (1983) analysis of hunter-gatherer settlement systems, Voorhies (2004) interprets the Archaic shell mounds as special-purpose locations for the extraction of estuary resources (Kennett et al. 2006; Michaels and Voorhies 1999).[1] The shell mounds are postulated to be the most archaeologically visible manifestation of a logistically organized settlement system centered at residential bases on the interior coastal plain. The only excavated example of a likely residential base is the site of Vuelta Limón (Voorhies 2004:100–17). According to the model, task groups visited the shell mounds for short periods to collect large numbers of marsh clams, steam them open, and dry the meat. The product would then have been transported inland for consumption by some larger social unit. Based on observations of contemporary and historic practices, Voorhies (2004:400–3) identifies other possible products for drying and transport, including shrimp and fish.

Aspects of Voorhies's model have been challenged by Clark and Hodgson (2009) based on a survey of shell mounds in the Cantileña Swamp. Those authors argue that the Middle Archaic shell mound Álvarez del Toro and perhaps others (including, if we understand correctly, Late Archaic sites like Tlacuachero) were constructed platforms rather than huge middens. Clark and Hodgson's paper has languished unpublished for a decade, though as we finish this chapter, we hear that a new version is about to be submitted for publication. Voorhies (2015:193–95, 202–4), commenting on the 2009 paper, points out that the study lacks the detailed stratigraphic analysis and rich subsistence data of her own work. We accept Voorhies's model as the best currently available understanding of Late Archaic settlement patterns on the Chiapas coast. In terms of the topics considered in this chapter, the most important features of Clark and Hodgson's model are (1) that at least some of the shell mounds are envisioned as residential bases (or even permanent settlements) rather than logistical processing stations, (2) that the settlement-subsistence system is seen as less extensive in that it did not involve movement between estuary locations and residential bases on the interior coastal plain, and (3) that Archaic populations would have been larger than currently envisioned and probably already concentrated near the Mazatán zone (in the Cantileña Swamp) prior to the Initial Formative.

Into the Formative: A Shift of Settlement Focus

During the Initial Formative, the Archaic shell mounds were abandoned and permanent villages were established. Initial Formative settlement patterns appear to have involved significant changes in the distribution of people within the Soconusco region. Most known Late Archaic sites are in the Acapetahua zone. That area was only sparsely populated during the Initial and Early Formative. Only one Archaic site is known from the Mazatán zone. The deposits in question (still unexcavated) lie beneath the water table under the San Carlos mound (Clark 1994a:142, 145 [a or b?]; Clark et al. 2007:29; Voorhies 2004:121–22).

In the Initial Formative, villages appeared on the alluvial deposits of the Coatán, Cahuacán, Suchiate, and Naranjo Rivers—from Mazatán down to the Guamuchal Swamp—but the highest concentration was in Mazatán (Pye et al. 2011:Table 10.1).

It could be that the Late Archaic concentration of population in the Acapetahua zone is more apparent than real and that actually there was a more even distribution of mobile forager-farmers throughout the Soconusco during that era. Still, it appears that the establishment of sedentary villages in the Initial Formative involved (1) a shift in the preferred location of settlements to the near-coastal alluvial deposits between the Cantileña and Guamuchal Swamps, (2) a rapid overall increase in population, and (3) emergence of a regional-scale population structure involving considerable variation in density from one zone to another. Locona-phase settlement density was 0.06 ha occupied per square kilometer in the Río Jesús zone, 0.25 ha/km^2 in Cuauhtémoc, and 11.8 ha/km^2 in Mazatán (Pye et al. 2011:Table 10.1).

There is, at first glance, something of a paradox in the location of concentrated Initial Formative settlement in the Soconusco. Because of a steep decline in rainfall from the foothills of the Sierra Madre to the ocean margins, the best locations for agriculture are well-drained alluvial soils closer to the mountains (Kennett et al. 2010:3410; also Jones and Voorhies 2004; Kennett et al. 2006). Most large centers of the later Formative, including Izapa and Takalik Abaj, were in that area.

The one known Archaic base camp, Vuelta Limón, is also on the interior coastal plain. Recent geoarchaeological studies have documented increased sediment delivery to Soconusco estuaries in the later Archaic, likely the result of agricultural disturbance on the coastal plain (Kennett et al. 2010:3407–10; Neff et al. 2018:397–99, 406–8). Several lines of evidence are therefore consistent with Voorhies's model of an extensive Late Archaic settlement-subsistence system in which cultivated fields and residential bases were generally located inland from the estuary on the coastal plain. Clark and Hodgson (2009) dispute that point, arguing that the settlement focus during the Middle and perhaps the Late Archaic was in the wetlands. Based on current published evidence, however, it appears that the second millennium BC was one episode in a long-term oscillation in which the focus of settlement shifted from the interior coastal plain (Late Archaic) to near-estuary areas like the Coatán delta (Early–Middle Formative) and back to the coastal plain (Middle–Late Formative).

The most likely explanation for Initial Formative settlement concentration in the Mazatán zone is that the alluvial deposits of the lower Coatán, despite comparatively lower rainfall than locations farther inland, offered the best compromise for a diversified subsistence regime. Clark et al. (2007:37) point to the combination, in the Mazatán region, of both sandy, somewhat elevated soils suitable for root crops and seasonally inundated *chahuite* lands suitable for an extra dry season crop of maize, beans, and/or squash. Another advantage of the lower Coatán was that lands suitable for farming were close to the wetlands, with their abundant wild resources (Lesure 2009c:261). In sum, within the Soconusco, the coastal strip between the Cantileña and Guamuchal Swamps was the optimal location for sedentary societies with a diverse subsistence base that included agriculture.

Changes in the Nature of Estuary Sites

The Late Archaic inhabitants of the Acapetahua zone and the Initial to Early Formative inhabitants of Mazatán both left traces in the estuary in the form of large mounds that were islands for all or part of the year and that we believe were built up mainly with production debris. Yet the composition of estuary mounds from the two periods is very different, indicating significant changes in productive activities.

The Archaic shell mounds are composed almost entirely of shell. The deposits appear to be the material outcome of a system of logistically organized collecting in which task groups visited the estuary to process marsh clams and other resources for transport to inland base camps and consumption by a larger group of people (Kennett et al. 2006; Michaels and Voorhies 1999; Voorhies 2004:397–417; for a contrasting view, see Clark and Hodgson 2009).

The Initial and Early Formative estuary mounds of the Mazatán region do contain deposits of shells, but these are in no way "shell mounds." They are mainly composed of alternating layers of homogeneous sediment and broken tecomates, with abundant evidence of burning throughout. It is often suggested that the debris derives from salt production (Blake et al. 1992a:141; Clark and Pye 2000:236–37; Paillés 1980:83–87; Pye 1995; Pye et al. 2011:230–35; Shook and Hatch 1979:147). Lesure (2009d) presents a detailed case for a *sal cocida* process similar to that observed on the Pacific Coast in historical times (Coe and Flannery 1967:92). He argues that Initial and Early Formative salt production in the Mazatán zone was organized not as occupational specialization but instead along the lines of Binford's (1983) collecting model. Individual consumption units provisioned themselves with salt by sending task groups to estuary outposts for lengthy dry season visits.

Wild aquatic resources would also have been abundant in the estuaries at that time of year. Lesure and Wake suggest that there was, in Binford's (1983) terms, a substantial "foraging" component to use of the estuaries during the second millennium BC, in that people were moved to resources rather than resources to people (Lesure 2009c; Lesure et al. 2009a; Lesure and Wake 2011). The estuary mounds were not permanently occupied villages but rather seasonally occupied stations to which people with permanent residences at inland villages moved for days or weeks during the dry season. They produced salt for transport inland (and possibly for preservation of fish and/or exchange), but they also harvested a broad array of aquatic faunal resources. Although best documented for the Cuadros and Jocotal phases at El Varal, this pattern of estuary use appears to have begun by the Locona phase at sites such as Los Álvarez and Sandoval (Ceja Tenorio 1974, 1999; Clark 1994a:111–13, 541; Lowe 1977). El Varal has a second, unexplored Locona-Ocós mound that is likely another early example (Lesure 2009c:264).

Cooking Practices and Technological Innovation

A general decline in the occurrence of fire-cracked rock and an increase in the prevalence of plain-bodied tecomates during the second millennium BC has been documented in the Mazatán and Cuauhtémoc zones (Clark and Gosser 1995:Figure 17.3; Rosenswig 2006:Figure 4; see also Clark et al. 2007:Figure 3.4 for a version with calibrated chronology). The prominence of plain-bodied tecomates stabilized and then began to decline in the Cuadros phase (Mazatán) or the Cherla phase (Cuauhtémoc).

These patterns suggest that Archaic cooking practices (cooking in gourds using boiling stones or perhaps roasting in pits) declined gradually as boiling in ceramic tecomates placed over direct heat became more common (Clark and Gosser 1995:215; Clark et al. 2007:29; Rosenswig 2006:340; Rosenswig 2010:152–55; Voorhies 2004:357–66; Voorhies and Gose 2007). We think that boiling is more likely given the lack of roasting pits among excavated features (see the discussion of fire-cracked rock in Chapter 12) and that shouldered basins (ceramic vessel form B9) might have been used as containers for that activity during the Locona and Ocós phases. (See the functional classification of vessel forms in Chapter 8.)

There are some complications. Although they do not provide any quantitative data, Clark et al. (2007:29n) note that fire-cracked rock was surprisingly common in Cuadros-phase deposits at Cantón Corralito. They ascribe the reversal in the local trend to ethnic differences. A suggestion of a decline in plain-bodied tecomates in Clark's Cuadros–Jocotal data appeared also at Cuauhtémoc, where it was more dramatic and began earlier (Rosenswig

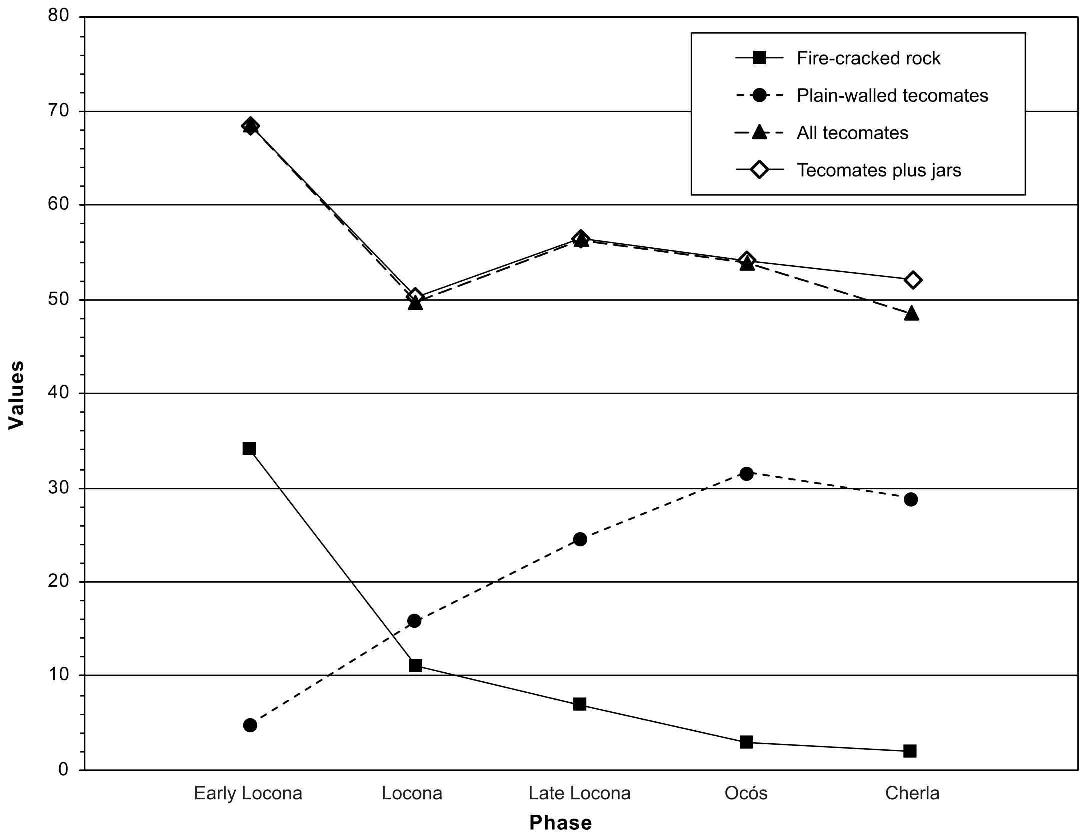


Figure 26.1. Changes in abundance of fire-cracked rock and tecomates at Paso de la Amada from Early Locona through Cherla. The values are: weight of fire-cracked rock as a percentage of the combined weights of fire-cracked rock and sherds; plain tecomates as a percentage of rims; all tecomates as a percentage of rims; all tecomates plus jars as a percentage of rims. Calculations for ceramic vessels are based on summed rim proportions. *Illustration by R. Lesure.*

2006:340–41). Rosenswig (2010:152) ascribes the decline in tecomates to a rising frequency of serving bowls, but another possibility is that people began to use jars for some of the functions previously fulfilled by tecomates (Lesure and Rodríguez López 2009:145).

Data from Paso de la Amada cover only a segment of the periods included in the analyses of Clark and Rosenswig. We find the same basic patterns of decreasing fire-cracked rock and increasing plain-bodied tecomates. Figure 26.1 shows: (1) weight of fire-cracked rock as a percentage of the combined weights of fire-cracked rock and sherds and (2) plain tecomates as a percentage of all non-censer rims, based on summed rim proportions. Also shown are all tecomates and (what until the Cherla phase amounts to nearly the same thing) all tecomates plus all jars. In the case of plain-bodied tecomates, we seem to catch, in Cherla, the beginning of the same decline noted by Rosenswig at Cuauhtémoc, though in our case, if plain-bodied jars were included, the Cherla value would be basically identical to that of Ocós. Apparent in Figure 26.1 is a hint of what would in subsequent centuries be a steady expansion of the importance of jars (Lesure and Rodríguez López 2009:Figure 9.27). Finally, it is worth noting that tecomates *in general* decline as a percentage of the vessel assemblage, even as plain-bodied tecomates rise; that is due to the dramatic decline in slipped tecomates (with unidentified tecomates constituting a relatively steady 10 to 15 percent of the total summed rim proportions for each phase).

An important consideration in the effort to trace changes in cooking practices along the Pacific Coast during the second millennium BC is the dramatic synchronic difference between permanent villages and estuary processing stations. The basic pattern is that the vessel assemblages of permanent villages are "dish dominant," in that a substantial portion of the assemblage consists of bowls and dishes. Assemblages from estuary processing stations are "tecomate dominant," in that tecomates are the overwhelmingly predominant vessel form (Figure 26.2). Readers should note in the figure that the pattern of synchronic differences between sites persists even as the percentage of tecomates declines at both estuary processing stations and permanent villages. Another important point is the radical change in the character of the El Varal vessel assemblage at the very end of the Jocotal phase and immediately before abandonment of the site. That change marks the transformation of the site from seasonal camp to permanent village. For a de-

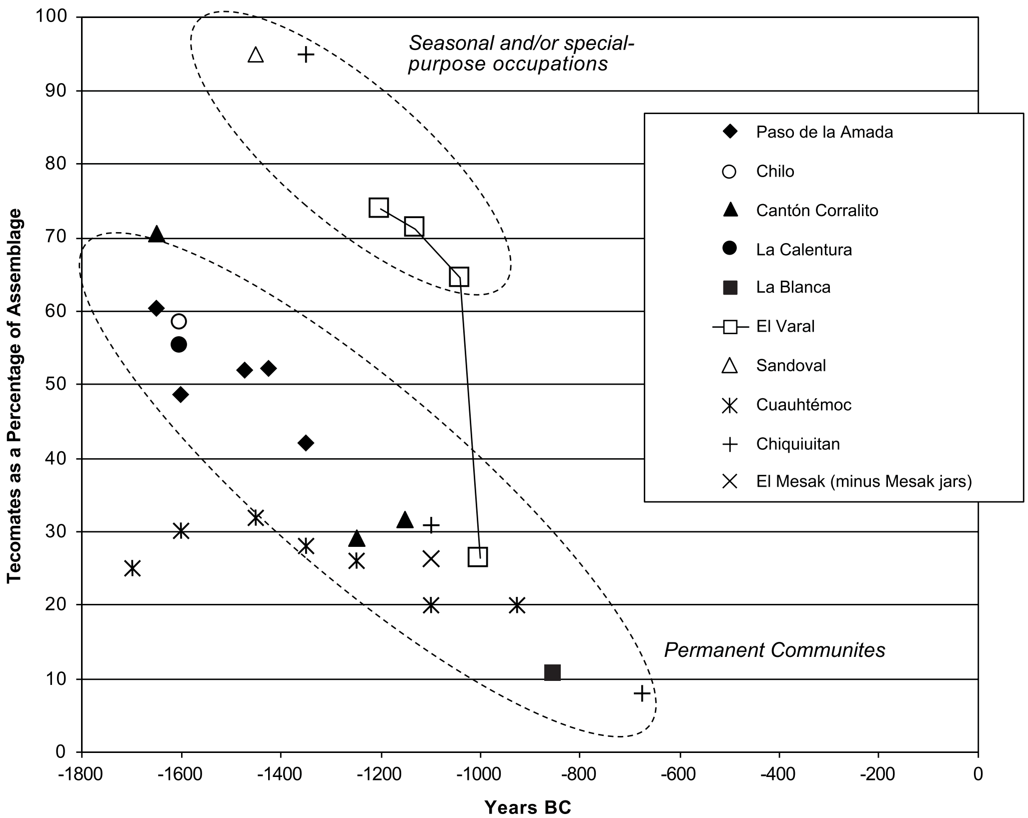


Figure 26.2. Tecomates as a percentage of the vessel assemblages from Initial through Middle Formative sites along the Pacific Coast of Chiapas and Guatemala (based on rim sherds). Data from Clark 1994a; Lesure 1995; Lesure and López 2009; Love 2002; Morgan 2011; Pye et al. 2011; Rosenswig 2006. *Illustration from Lesure and Wake (2011:Figure 4.2).*

tailed assessment of the multiple lines of evidence leading to the conclusion that the basic organizational difference here is between permanent villages and seasonal processing stations, see Lesure (2009a, 2009b, 2009c, 2009d) and Lesure et al. (2009a, 2009b).

Consideration of the estuary stations complicates any impression of gradual change from Archaic cooking practices based on Figure 26.1 or similar diagrams published by other researchers. The most tecomate-dominant estuary station vessel assemblages (more than 90 percent tecomates) date to the Locona and Ocós phases (Clark 1994a:113; Cuevas 1991). At that time, the change in cooking practices, from heating with rocks to round-bottomed pots, was still under way at permanent villages. One implication is that although the full spectrum of cooking practices changed gradually, change in *certain* cooking-related activities was rapid. In other words, the rounded-bottom cooking pot had a relatively rapid impact on some aspects of the subsistence system, even as practices in other domains changed more gradually.

Neff et al. (2006:307) suggest that technological innovation might have been a key component of adaptive changes between Late Archaic and Initial Formative. Their specific suggestions concern *recovery* technologies such as net weights and fishhooks. Fishhooks have now been found at the Archaic site of Tlacuachero (Wake and Voorhies 2015:Figure 9.1). Based on local accounts of shrimp processing and drying in the Acapetahua estuary during the early twentieth century, Voorhies (2004:152) suggests that recovery was not the key problem. Shrimp are abundant and easy to catch but spoil quickly. *Processing* and *transport* were the more important constraining factors before the advent of refrigeration and modern transportation. Fish also spoil rapidly in the heat of the Soconusco and were traditionally dried for later consumption (Voorhies 2004:405–11). If there was an important technological innovation involved in the Archaic to Formative shift in the Soconusco, it probably had to do with processing rather than recovery. Specifically, the practice of cooking with rounded-bottom tecomates on direct heat may have helped open up a range of previously underexploited resources in the estuary (Lesure 2009c:261–63). Tecomates could have been used in the bulk processing of shrimp. They were also used to produce salt and to cook a range of foods for immediate consumption. In addition, we think that rounded-bottom tecomates became important for the processing of maize: villagers boiled dried kernels before grinding them wet.

Yet rounded-bottom cooking pots do not appear in the Soconusco until as much as 200 years after the local Archaic to Formative transition. The Barra complex (1900–1700 BC) is dominated by flat-bottomed, decorated tecomates, with rounded-bottom pots absent or virtually so (Clark and Gosser 1995). On that basis, Clark et al. (2007:29, 36) suggest that the introduction of rounded-bottomed cooking pots could not have been the cause of the Archaic to Formative transition. Yet their emphasis on a long, gradual transition in cooking practices at permanent villages ignores what appears to have been a comparatively sudden shift in use of the estuary, from shell mounds to salt production sites. An important question is: When did the change in the use of the estuary occur?

Available evidence points to the Locona phase. Estuary usage in the Barra phase is poorly understood, but Voorhies (1976:109, Figure 57) found a few characteristic Barra sherds in the mixed upper layer at the Tlacuachero shell mound and no sign of subsequent occupation until the Late Formative. By the Locona phase, there were multiple estuary processing stations in the Mazatán zone, with vessel assemblages dominated by tecomates and pervasive evidence of burning. Excavations in the Locona-Ocós mound at Sandoval halted at the water table, still in Locona deposits (Clark 1994a:113). It remains unknown whether Barra components underlie Locona layers at Sandoval and Los Álvarez. We suspect, however, that the Barra phase was transitional in terms of estuary usage, with shellfish processing still under way at some of the Archaic mounds and the use of round-bottomed tecomates in salt production and broad-spectrum harvesting still in the future.

Neff et al. (2006:309) suggest that the red-rimmed tecomate tradition, which would include most rounded-bottomed cooking pots in the Soconusco during the Locona and Ocós phases, arose on the central Guatemalan coast during the Barra-era Madre Vieja complex. Neff and his colleagues favor a scenario involving rapid emergence of Initial Formative, Pacific Coast adaptive patterns in one location, but that does not appear to be a logical necessity. Perhaps the rounded-bottom cooking pot was an invention of peoples along the central Guatemalan coast, but a particular combination of sedentism and mobility that allowed simultaneous intensification of estuary and terrestrial resources developed locally in Mazatán, after adoption of a crucial technological component of that adaptation, the round-bottomed tecomate.

Wild Resources and Diet Breadth during the Second Millennium BC

Villagers of the Soconusco during the second millennium BC practiced a mixed subsistence economy involving fishing, hunting, gathering, and farming (Blake and Neff 2011; Blake et al. 1992a, 1992b; Clark el at. 2007:28–29; Coe and Flannery 1967:71–83; Kennett et al. 2006:132; Rosenswig 2010:137–48). Less clear is the nature of any dietary change related to wild resource consumption between the Late Archaic and the Initial Formative. Some investigators argue for basic continuity: the transition "was not about food preparation practices . . . or about foods eaten" (Clark et al. 2007:36; see also Rosenswig et al. 2015:90, 101). Others envision intensification and diversification in exploitation of wild estuary resources (Neff et al. 2006:306–8).

Lesure et al. (2009a) and Lesure and Wake (2011) compared three samples of faunal remains from the later second millennium BC to Archaic samples. They found various indications of greater diet breadth in the Early Formative samples, including a greater variety of shellfish, presence of crab, and a greater representation of reptiles, amphibians, birds, and mammals. Yet, in the vertebrate faunal assemblages from the Archaic shell mounds, there was a greater evenness of spread among the top fish taxa compared to the Early Formative cases (Lesure and Wake 2011:78–79). A subsequent study that increased temporal coverage at Paso de la Amada found evidence of declining diversity over the course of the occupation (Lesure and Wake 2012). That study is updated in Chapter 14 of this book and in analyses presented later in the present chapter. The question here is what can be learned from the fauna of Paso de la Amada concerning changes in subsistence between the Late Archaic and Early Formative. Our results lead us to agree with Neff et al. (2006) that there were some important dietary changes in the Soconusco *generally* associated with the Archaic to Formative transition, including an expansion in diet breadth. However, following Clark et al. (2007), we also think it probable that these changes emerged gradually during the Barra phase rather than rapidly at the beginning of that phase.

Maize Agriculture and Agenda for the Analyses

The settlement pattern shift between Late Archaic and the Barra phase suggests that early sedentary villages in the Soconusco were located with agricultural concerns in mind (Clark et al. 2007:26–28). Maize was present from the Middle Archaic (Jones and Voorhies 2004:340–41; Kennett et al. 2010; Neff et al. 2006), but only with the Initial Formative do maize kernels and cupules constitute prominent components of carbonized macrobotanical samples (Blake et al. 1992a; Feddema 1993; Rosenswig et al. 2015). Still, recent assessments of the emergence of agrarian societies in the Soconusco hold that maize was not a staple crop until the Middle Formative. Results of isotopic analyses of human bones indicating lack of reliance on C4 plants have played an important role in the argument. New results, however, complicate that picture, as we discuss in the next section.

With evidence from Paso de la Amada, we hope to address three basic questions concerning the role of maize in the subsistence systems of Initial–Early Formative Soconusco. First, was there an *early tipping point* in terms of systemic orientation toward maize agriculture around 1900 BC? Tipping point models for the transition to the Formative vary concerning the importance of maize as a factor. Flannery's (1986:504–6) proposal for the Valley of Oaxaca—in which maize became a more productive resource than mesquite at the beginning of the second millennium (cal) BC, prompting a reordering of subsistence choices, removal of mesquite from riverine alluvium, increased investment in agricultural fields, and the establishment of sedentary villages—is a strongly maize-oriented tipping point model. In the suggestions of Clark et al. (2007:36) for the Soconusco, maize had a more modest role. They wonder "whether corn was still important—not because it made *the difference* but *because it made enough difference*" (italics in original).

Our second question is whether there was a trajectory of intensification in the use of maize during the second millennium BC. The third question concerns the prominence of a late tipping point at around 1000 BC in the reorientation of subsistence toward maize agriculture. The excavations at Paso de la Amada do not yield any subsistence evidence from later than 1300 BC. Nevertheless, answers to our first and second questions have implications for understandings of the late tipping point, an issue we take up in our conclusions. The sections that follow discussion of the isotopic evidence consider three datasets from Paso de la Amada: grinding stones, human skeletal remains, and faunal remains.

ISOTOPIC EVIDENCE OF DIET

An important source of evidence in arguments for a subsistence threshold at 1000 BC consists of carbon and nitrogen isotopes ($\delta^{13}C$ and $\delta^{15}N$) extracted from human bone collagen (see Chisholm and Blake 2006:166; Clark et al. 2007:32; Rosenswig et al. 2015:98; Smalley and Blake 2003:684). Analysis of numerous samples has yielded a small set of usable results due to deterioration of collagen (Blake 2015:196). The dataset has been considerably refined over the last 25 years (Ambrose and Norr 1992; Blake et al. 1992a, 1992b; Chisholm and Blake 2006; Chisholm et al. 1993; Moreiras Reyaga 2013). Following Blake (2015:145–48) and Moreiras Reyaga (2013:Tables 3 and 4), we use results for the 14 human bone samples dating between the Late Archaic and the Middle Formative that have reported carbon and nitrogen isotope values and C:N ratios that fall between the accepted values for proper collagen extraction. (See Bocherens and Drucker 2003; note that this current dataset supersedes that in Chisholm and Blake 2006:Table 12-3). One of the individuals from Paso de la Amada (Sample 1901) is from an Ocós context (Mound 6, N48E46, Level 7) but is classified to the Middle Formative Conchas phase by Chisholm and Blake (2006:166; Moreiras Reyaga 2013:Table 4), apparently based on a radiocarbon date directly on the bone. In Lesure's opinion, that date is suspicious because the site was not occupied at that time. The main occupation ended around 1300 BC; there was an ephemeral subsequent occupation of some mounds during the Jocotal phase, but any Jocotal deposits at Mound 6 should have been stratigraphically well above the context of Sample 1901. Lesure suspects that the individual (distinguished as "Initial Formative context" in Figure 26.3) actually lived during the Ocós phase, but obviously that interpretation is inconsistent with the radiocarbon date.

The available isotope data suggest that foodways during the second millennium BC were variable but with a trend toward an increasing focus on maize. In Figure 26.3, the human bone isotope values are plotted over carbon and nitrogen values from modern and archaeological plants and animals from Chiapas and Oaxaca. We have applied a -1.05 $\delta^{13}C$ and a -4.0 $\delta^{15}N$ correction for trophic level fractionation (see Ambrose 1991; Bocherens and Drucker 2003; DeNiro and Epstein 1981). The dashed ellipse is a 95 percent confidence interval for the Middle Formative cases.

We would emphasize four observations concerning Figure 26.3. First, many of the individuals sampled were probably eating a substantial amount of maize. Second, although the samples that diverge from that pattern are from the second millennium BC, others from that same era plot with the Middle Formative samples. In other words, there appears to have been considerable dietary diversity among individuals in the Initial and Early Formative villages of the Soconusco. Some people ate considerable amounts of maize while others did not.

Third, of four Early Formative (Cherla-Cuadros-Jocotal) samples, three yielded carbon values similar to or even less negative than those of the Middle Formative samples, suggesting a maize-focused diet for those individuals. The shift from Early Formative to Middle Formative involved a reduction of the diversity of diets among individuals but not any society-wide shift toward a more maize-focused diet.

Finally, we note possible evidence for a shift toward more reliance on maize during the course of the second millennium BC. Two of three or four Locona-Ocós samples fall outside the Middle Formative confidence ellipse compared to one of four Cherla-Jocotal samples. (Note that Moreiras Reyaga 2013:Table 4 reports a Cherla sample that had a very low carbon value, an acceptable C:N ratio, but no nitrogen reading. There is also the Locona sample reported by Rosenswig [2010:146] for which the C:N ratio is not given. Neither of those samples is included here; both would fall outside the Middle Formative confidence ellipse.)

The isotopic evidence from the Soconusco has been treated as a kind of jewel in the crown of the argument for a late tipping point (around 1000 BC) in the emergence of maize as a staple. Refinement of the dataset (Moreiras Reyaga 2013) calls that into question. The set of samples is quite small, and things could change again, but the isoto-

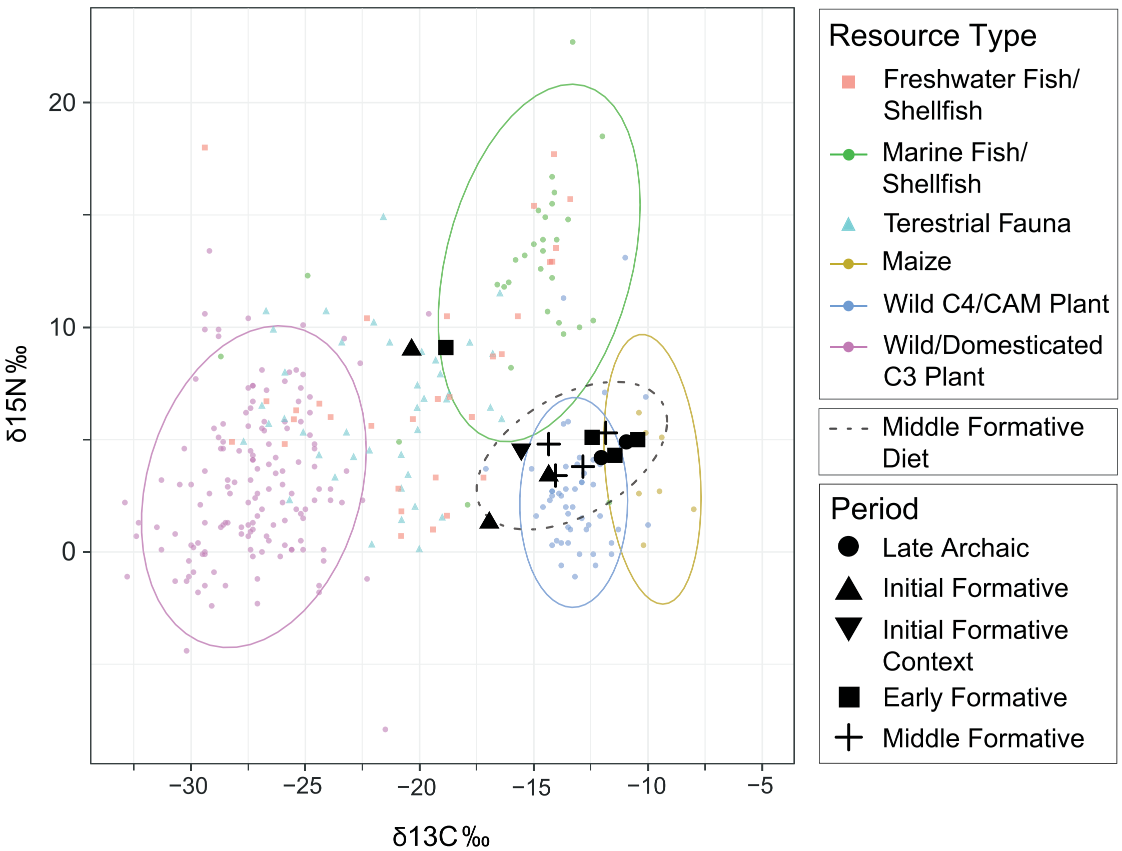


Figure 26.3. Human bone isotope values plotted over carbon and nitrogen values from 305 modern and archaeological plants and animals from Chiapas and Oaxaca. A 90 percent confidence ellipse around the Middle Formative samples is shown with a dashed line. Data from Chisholm and Blake 2006:Appendices 1 and 2; Moreiras Reyaga 2013: Tables 3 and 4; Warinner et al. 2013:Appendix A. *Illustration by R. Sinensky and R. Lesure.*

pic evidence as it stands is no longer consistent with a late tipping point. Favored instead would be a model of gradual change during the second millennium and into the first millennium BC.

THE GRINDING STONE ASSEMBLAGE AND MAIZE AGRICULTURE

The discussion section of Chapter 9 addresses the second of the questions posed above concerning the role of maize in Initial and Early Formative subsistence systems of the Soconusco: whether there was a trajectory of intensification in maize usage during the second millennium BC. Sinensky presents multiple lines of evidence that point to such a trajectory. An important initial observation, to which we return in a moment, is that already by the early Locona phase, a technological style (*sensu* Dietler and Herbich 1998) of dedicated maize grinding tools was already in place. The relevant tools are the flat/concave metate and the medium to large flat/concave mano, both used exclusively with a reciprocal stroke. The manos were designed to have a truncated oval shape in plan-view. Their lengths ranged from 15 to 30 cm and were consistently between 2.5 and 3.5 times their widths (Figure 26.4a). Concomitant secondary use for activities other than reciprocal grinding is rare for these types of manos and metates. In Chapter 9, Sinensky proposes that these grinding tool types are the respective indicators of passive and active maize processing.

Patterns among both passive and active grinding stones suggest a trajectory of intensification in maize grinding from the Locona to Cherla phases. The ratio of dedicated maize processing tools to tools with other and/or multiple uses increases from Locona to Cherla (passive, 3.7 to 4.2; active, 1.5 to 3.1). Strategic rather than expedient design in the maize processing complex becomes increasingly pervasive: among flat/concave manos, the ratio of strategic to expedient rises from 19.0 in Locona to 40.0 in Ocós to 55.0 in Cherla. The durability index for active processing tools rises steadily, from 2.42 in Locona to 3.02 in Cherla, while the durability of passive maize processing tools also peaks during Cherla.

The evidence from Paso de la Amada indicates that, at least in the Mazatán region of the Soconusco, the devel-

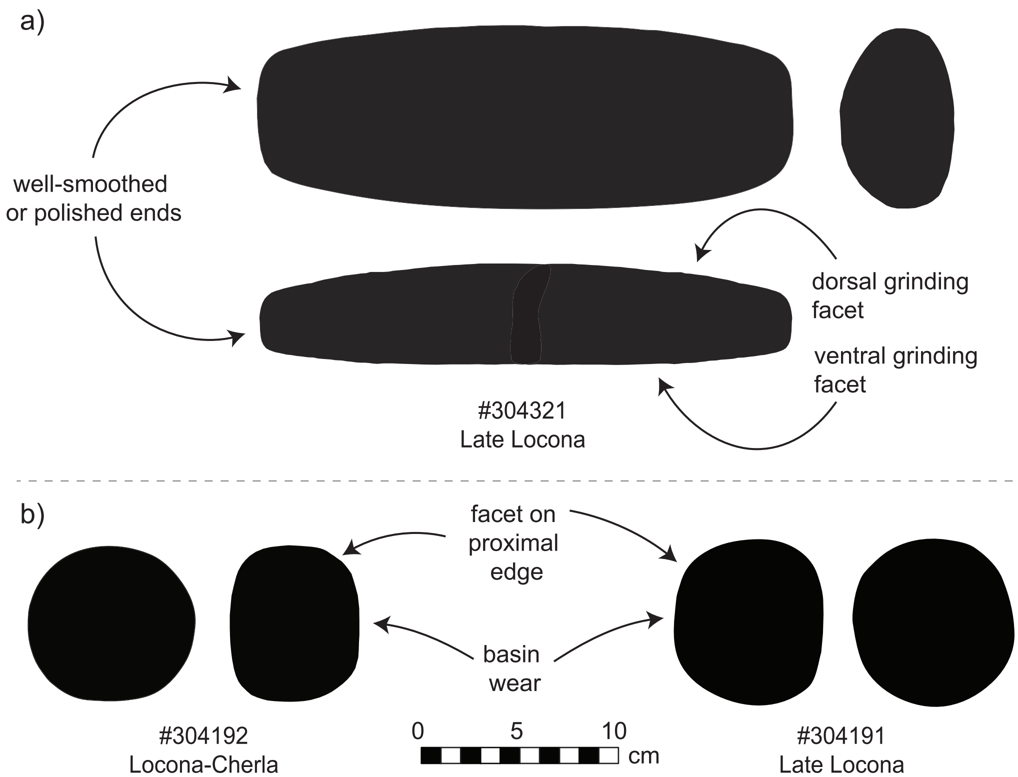


Figure 26.4. Two mano traditions in the Paso de la Amada grinding stone assemblage: (a) a medium–large flat/concave mano, proposed here as part of a technological complex dedicated to maize grinding (reconstructed from an artifact 50 percent complete); (b) basin manos, part of an older technological complex present already at local Archaic sites. *Illustration by R. Sinensky.*

opment of a specialized technological repertoire for maize grinding was well under way by the early to mid–second millennium BC. That point leads us back to the first of the questions posed above: whether the Archaic to Formative transition was an early tipping point in the role of maize in subsistence systems of the Soconusco.

The evidence from grinding stones suggests that it was. The most important point is that the dedicated maize grinding technological repertoire—present at Paso de la Amada in the Locona phase and expanding thereafter—appears to be absent in Late Archaic assemblages of the Soconusco. Metate fragments from the Archaic shell mounds and from the inland site of Vuelta Limón have generally small, round working areas (Voorhies 2004:Figure 7.21) and appear to mainly resemble the basin metate milling stones at Paso de la Amada, with some specimens probably of the flat/concave type (Voorhies 1976:73–75). The manos are more intact than the metates, and the patterns are particularly clear. There is one strategic-in-design, small, flat/concave mano (length 7.5 cm) from the uppermost unmixed Archaic layer in Pit N0E2 Level 12 at Tlacuachero (Voorhies 1976:77, Table 12, Figure 34). Otherwise, all the identified manos in Archaic deposits are expedient, often multiuse handstones (Voorhies 2004:380–84; "ovoid manos" in Voorhies 1976:76). In the typology presented in Chapter 9, they would be classified as basin manos or handstones.

Based on the small available sample of grinding stones from the Barra phase, it appears that the dedicated maize grinding technology we have from the Locona phase did not appear immediately with the earliest villages in the Soconusco but instead developed during the first couple centuries of village life. Clark (1994a:234–36) notes two mortar fragments, three mano fragments, and six metate fragments from the unmixed Barra deposits in Mound 5 at Paso de la Amada. The manos were small, and one functioned also as a pestle. One of the metates was from a tool about 10 cm wide.

The earliest refuse sample reported in this volume, 0101A (Mound 1 Feature 10, Early Locona), yielded eight fragments of grinding stones, including a midsection fragment of what was probably a two-handed mano of gray andesite (304324) with evidence of use (moderate sheen) on dorsal and ventral surfaces. The width and thickness of this mano (both intact, measuring 7.6 cm and 5.6 cm, respectively) fall within the expected range for active maize grinding tools at Paso de la Amada (mean width 7.2 cm, mean thickness 5.3 cm). Moreover, the elliptical-asymmetrical transverse cross-section view—the result of uneven moderate wear on dorsal and ventral surfaces on a flat/concave metate—matches the dominant wear patterns on later flat/concave manos from Paso de la Amada. This artifact is an exemplar of what we identify as the dedicated maize grinding complex of the Initial Formative. The complex was therefore present by around 1700 BC, pushing its era of development back into the Barra phase.

A comparison of the Paso de la Amada assemblage with Archaic assemblages from the Soconusco and a Middle Formative assemblage from La Libertad, Chiapas, yields further insights. Although La Libertad is located some 150 km from Paso de la Amada, in the Central Depression of Chiapas, the collection of grinding stones from the site is published in detail (Clark 1988), unlike assemblages from Middle Formative sites in the Soconusco. All measurements considered are original dimensions of the tools, either directly observed or reconstructed, as discussed in Chapter 9.

The Middle Formative assemblage is, as one would expect, more oriented to intensive maize grinding than that from Paso de la Amada. Small, rotary-stroke manos (basin manos) and pestles comprise 7 percent of the active grinding tools at La Libertad, compared to 25 percent at Paso de la Amada. At La Libertad, flat/concave metates are wider and longer than at Paso. Metate widths at La Libertad are 19 to 30 cm (average 26.9, n = 15) compared to 17.7 to 30 cm at Paso de la Amada (average 24.9, n = 4). Metate lengths at the Middle Formative site were 29 to 55 cm (average 43.5, n = 8) compared to 25 to 40 cm at Paso (average 36.0 cm, n = 4). Also, strategically designed, medium–large, flat/concave manos from Paso de la Amada were narrower, thinner, and not quite as long as their counterparts at La Libertad.

A closer look at the manos, however, reveals several interesting points of commonality between the Paso de la Amada and La Libertad assemblages. Figure 26.5 examines several aspects of the mano assemblages from those sites and the Soconusco Archaic sites. We divide each mano assemblage into dedicated maize grinding manos versus basin manos and handstones. The former category includes medium to large, flat/concave manos used *exclusively* with reciprocal strokes on a flat/concave metate (Figure 26.4a). The latter includes designed or expedient, circular to oval stones that fit comfortably in a single hand (Figure 26.4b); they were used with *any combination* of circular strokes, reciprocal strokes, and (less frequently) crushing strokes, all in a basin metate. (See Chapter 9 and Adams 1999, 2014:100–14 for a description of these metate types.) This second category for La Libertad includes only the small cobble (n = 1) and small oval (n = 2) types (Clark's Group C and Group D manos), while the first category includes the types that Clark (1988:132–33) considers were used to process maize with a reciprocal stroke on a metate (Clark's Group E and Group F manos).

Figure 26.5a considers overall mano length, Figure 26.5b the ratio of length to width, and Figure 26.5c the ratio of length to thickness. As already noted, the strategic, maize-dedicated manos from Paso de la Amada are narrower (longer in relation to width), thinner (longer in relation to thickness), and shorter than those from La Libertad. However, compared to other manos, the medium–large, flat/concave manos in these two assemblages look distinctly alike.

The reciprocal-stroke manos and metates that dominate the grinding stone assemblage at Paso de la Amada also exhibit patterns of ware similar to the reciprocal-stroke manos and metates commonly found on sites of later periods. For example, most reciprocal-stroke manos at Paso de la Amada exhibit moderate to heavy wear on both dorsal and ventral surfaces, yielding an elliptical-symmetrical, elliptical-asymmetrical, oval, or lenticular appearance in longitudinal and transverse cross-section view. (See Chapter 9, Figure 9.6, numbers 304331 and 304321 for examples.) Lightly worn reciprocal manos, although rare in the assemblage, have an oval appearance in cross section (Chapter 9, Figure 9.6, 304505). Similar patterns of wear are reported from reciprocal-stroke manos of a similar technological style at La Libertad (Clark 1988:117–22), Altamira (Green and Lowe 1967:29), and Chiapa de Corzo (Lee 1969:114–17), albeit on wider and longer manos.

The Soconusco is not unique in registering the emergence, prior to 1000 BC, of a technological repertoire dedicated to maize grinding. In some cases, a trajectory of expanding importance during the second millennium BC is also detectable. In Figure 26.6, percentages of maize-dedicated manos from the Chiapas sites under discussion are compared to Middle Archaic to Middle Formative patterns in the Tehuacán Valley and at Tlapacoya-Zohapilco in the Basin of Mexico. In the Tehuacán assemblage, "long, sub-rectangular" manos were classified as maize-dedicated (MacNeish et al. 1967); in the Zohapilco assemblage, Niederberger (1976:73) distinguishes "manos largos (de 16 a 28 cm de longitud), utilizados con movimento rectilíneo" that are strikingly like those from Paso de la Amada.

The first thing to note in Figure 26.6 is that a dedicated, maize grinding technological complex appeared in each case well before the proposed late tipping point at 1000 BC. Further, the complex was either absent before 1900 BC or (in the case of Tehuacán) formed a very minor component of the mano assemblage during the Late Archaic. The pattern observed in Chiapas, in which changes in grinding technology between Initial/Early Formative and Middle Formative were quantitative rather than qualitative, appears also in the other two cases. To what extent and how precisely 1900 BC constituted a tipping point in the development of grinding technology is not resolvable from these data. Note that in each of these sequences, the earliest Formative phase yielded a sample of just three mano fragments.

Considered *as a whole*, the ground stone assemblage of Paso de la Amada looks expedient and less dedicated to

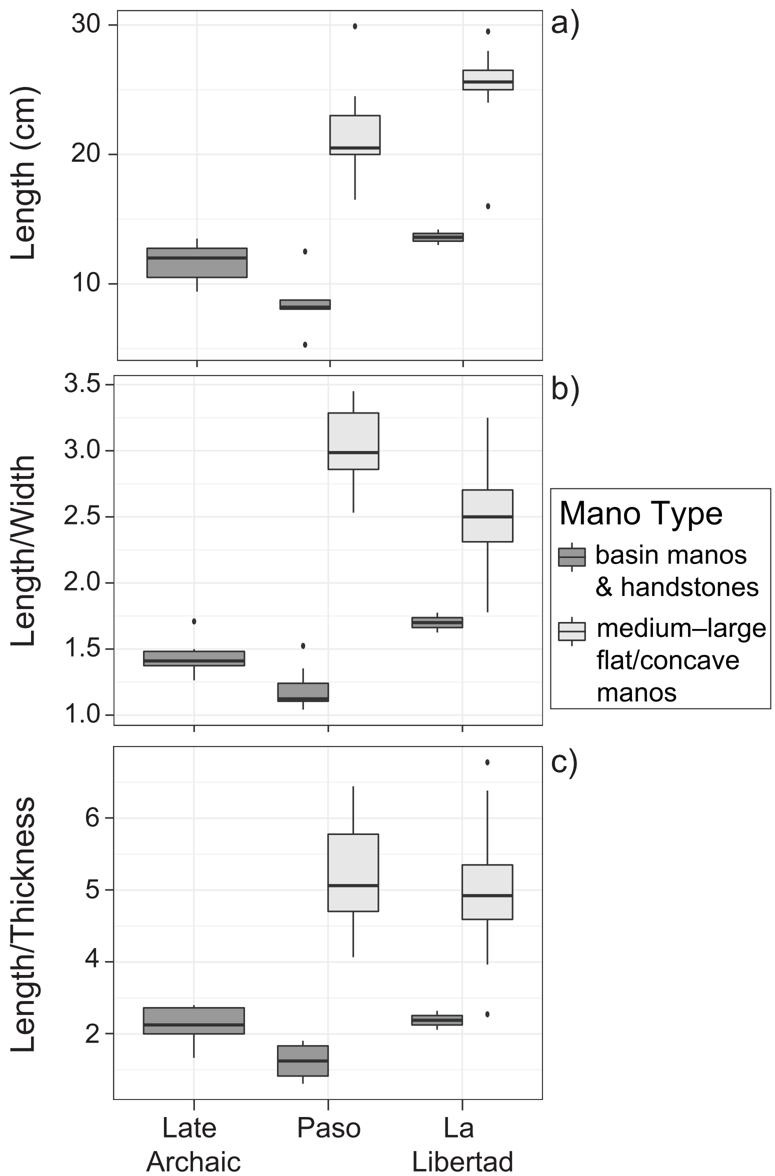


Figure 26.5. Manos and handstones from Paso de la Amada (center) compared to those from Archaic sites in the Soconusco (left) and from the Middle Formative site of La Libertad (right): (a) mano length; (b) mano length divided by mano width; (c) mano length divided by mano thickness. Mano assemblages are separated into medium–large flat/concave manos, consisting of mainly two-handed, strategically designed tools used with a reciprocal stroke, and basin manos and handstones, a category that includes all other mano types. Archaic data from Voorhies (1976, 2004); La Libertad data from Clark (1988). Some of the mano lengths are reconstructed. *Illustration by R. J. Sinensky.*

maize grinding than assemblages of the Middle Formative and later eras. Yet it is actually a technologically mixed assemblage. A strategically designed subset of the assemblage closely resembles later maize grinding technology. When we focus in on those tools, the differences between Paso de la Amada and the Middle Formative site of La Libertad appear quantitative rather than qualitative. This technological complex emerged in the Soconusco during the first two centuries of settled village life. By the Locona phase, it formed a significant portion of the ground stone assemblage, and its importance grew between 1700 and 1300 BC, with several lines of evidence suggesting a trajectory toward more intensive grinding during that time.

In the case of the grinding stones, as with the bone isotopes, evidence does not support the proposed late tipping point at 1000 BC but instead gradual change over the Initial, Early, and Middle Formative periods. The real qualitative change was the appearance of a novel technological repertoire designed for maize grinding. That change occurred during the first 200 years of the Initial Formative. More clearly than for the isotopes, the evidence here is consistent with an early tipping point in which the appearance of sedentary villages was associated with a significantly greater commitment to maize agriculture.

SKELETAL EVIDENCE OF HUMAN HEALTH

Human populations across the globe experienced a variety of health consequences from the transition to agriculture. One general pattern is that while fertility often rose with the introduction of agriculture, health declined. Early agricultural populations suffered more from dental pathologies, nutritional deficiencies, and infectious disease than did their hunter-gatherer predecessors (Cohen and Armel-

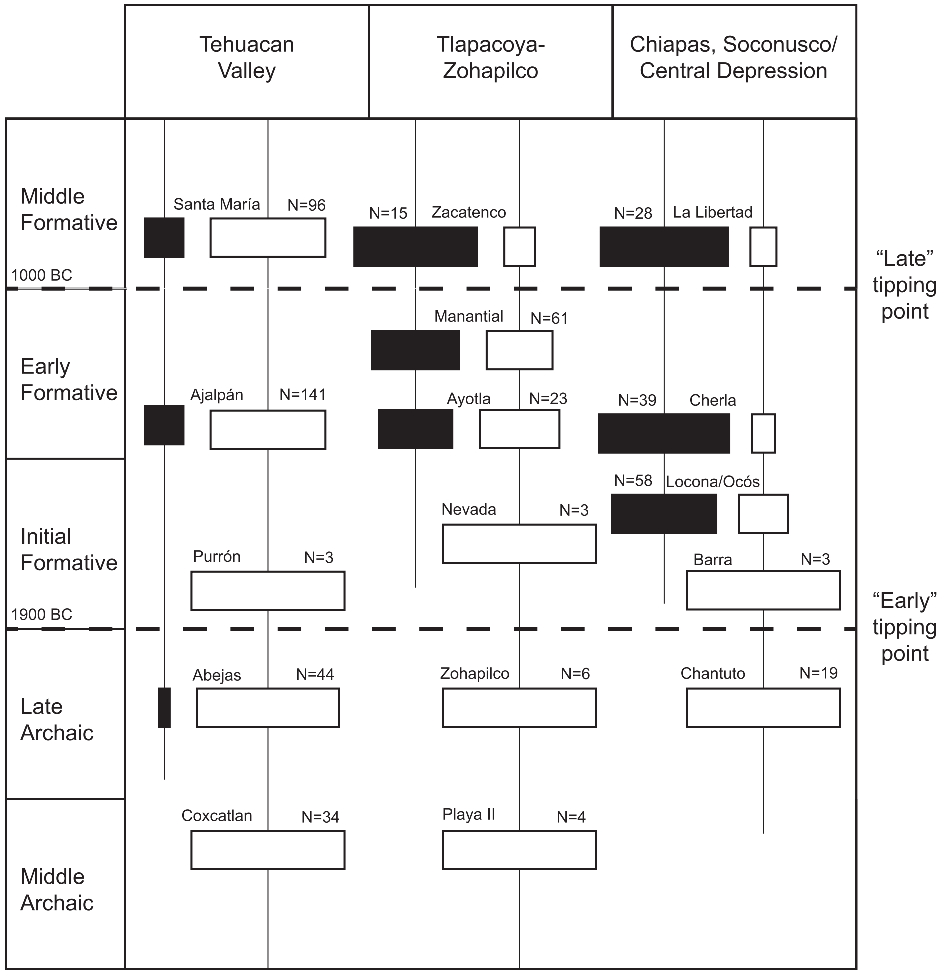


Figure 26.6. Emergence of a technological repertoire dedicated to maize grinding in the Tehuacán Valley, the Basin of Mexico (Zohapilco), and Chiapas. In black is the percentage of maize-dedicated manos—two handed, strategic design, with oval or lenticular cross sections, and used with a reciprocal stroke—among all manos for the phase. The white box shows all other mano types. N is the total mano sample for each phase. Data from Clark (1988), MacNeish et al. (1967), and Niederberger (1976). *Illustration by R. Lesure.*

agos 1984; Larsen 2006). For example, agricultural populations often exhibited a higher prevalence of caries than was characteristic of their hunting and gathering predecessors. That outcome is thought to be the result of the greater carbohydrate content of agricultural diets and perhaps more prevalent episodes of malnutrition during dental development (Cohen and Armelagos 1984; Lukacs 1992, 2008; Ortner 2003). Carbohydrate-rich agricultural diets may also yield an increase in dental calculus, though the etiology of plaque accumulation is complex (Lieverse 1999).

In Chapter 24, Hoffmeister presents a study of the paleopathology of 26 individuals from Paso de la Amada. Many of the burials were in a poor state of preservation. As demonstrated in Chapter 24, the sample is best considered as a whole (Locona through Cherla together).

In terms of general expectations for patterns in hunting and gathering versus agricultural populations, the results for Paso de la Amada are mixed. The caries frequency, scored by tooth, is low (6 percent), along the lines of what might be expected in a hunting and gathering population. Yet dental calculus was common (66 percent of teeth). Further, in terms of the full set of pathologies considered—linear enamel hypoplasias, caries, calculus, porotic hyperostosis, cribra orbitalia, and periostitis—overall health at the site was relatively poor, similar to that of later Mesoamerican agriculturalists.

Figure 26.7 places the caries percentage at Paso de la Amada among values reported for other Mesoamerican mortuary assemblages from Archaic to Postclassic. Only sources that clearly reported caries frequency by tooth are included. Obviously, it would be preferable to have additional samples from the Archaic; we interpret the data as they stand.

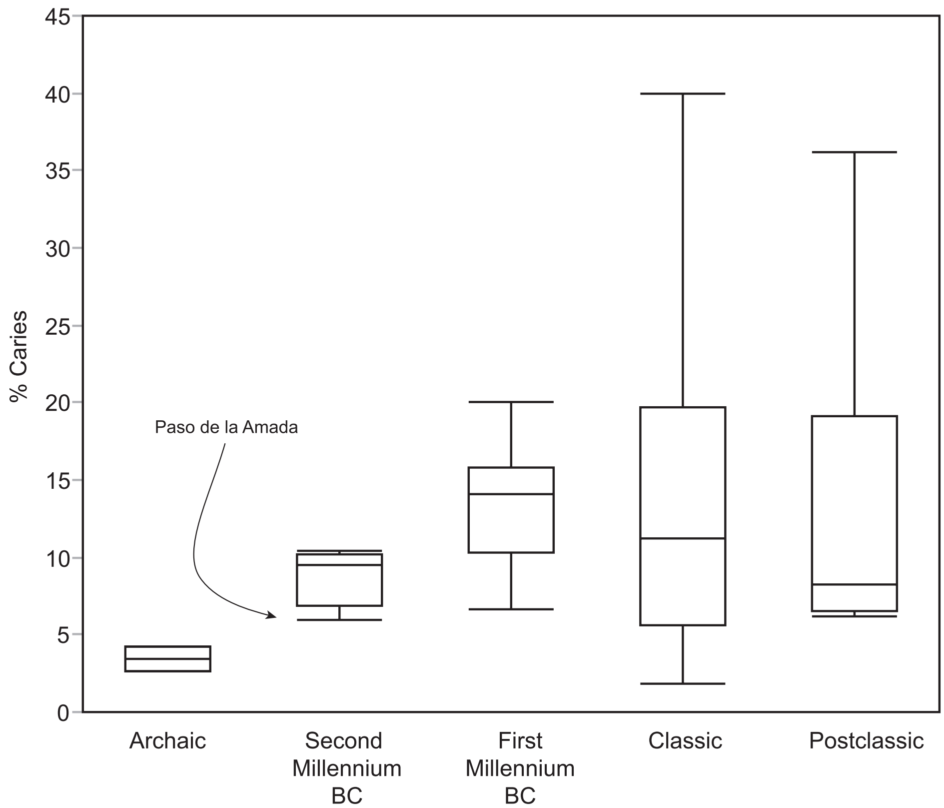


Figure 26.7. Caries frequencies, scored by tooth, reported for Mesoamerican mortuary assemblages from Archaic to Postclassic, grouped by period, with the Formative divided around 1000 BC. Data from Anderson 1967:107; Cucina and Tiesler 2003; Cucina et al. 2011:Table 5; Glassman and Garber 1999:124; Hodges 1989:Appendices 1 and 3; Márquez Morfín et al. 2002:332; Seidemann and McKillop 2007:Table 2; Whittington 1999:158. *Illustration by R. Lesure.*

With Paso de la Amada reduced to a single data point, the caries results reflect in only a very general way on the question of tipping points and gradual change in the Soconusco. The results are consistent with the suggestion, based on grinding stones, that Paso de la Amada (and other sites of the second millennium BC) were transitional in the shift to more carbohydrate-rich diets. Considered alongside other Mesoamerican samples, the paleopathology record from Paso de la Amada is generally consistent with a long-term trajectory of change from the Archaic through the end of the Formative. An early tipping point seems possible given the data as they stand, but more Archaic samples are obviously needed. A late tipping point (around 1000 BC) is somewhat more convincing if only because of the larger number of samples on each side of the boundary. Caries frequency tabulated by tooth was highly variable from one site to another throughout the Classic and Postclassic eras, but it is noteworthy that high percentages (well above 10 percent) do not appear until the first millennium BC. In other words, high caries percentages first appear in the era (from 1000 BC onward) identified by recent literature as that in which maize was a staple.

FAUNAL REMAINS: DIET BREADTH AND RESOURCE PRESSURE

Flannery (1969) proposed that the shift to the Holocene in Southwest Asia precipitated a "broad-spectrum revolution" of diversified diets and that agriculture emerged in the resulting context of increased diet breadth. Ongoing discussion of the notion of a broad-spectrum revolution at the end of the Pleistocene and the early Holocene includes a carrot versus stick debate concerning the origins of agricultural villages. On the "stick" side is work inspired by optimal foraging theory. The emergence of agriculture was preceded by an increase in breadth of diets to include lower-ranked (less optimal) resources because higher-ranked resources were stressed by a growing human population or perhaps climate change (Stiner 2001; Stiner and Munro 2002; Stutz et al. 2009). Alternatively, Zeder (2012) favors more of a "carrot" approach. People took advantage of climate change at the beginning of the Holocene. Broadening the spectrum of resources consumed allowed for aggregation of larger groups, longer-term residence, and in some cases full sedentism.

The Archaic to Formative transition in the Soconusco region occurred long after the transition to the Holocene. Yet the ongoing debate concerning the emergence of agriculture in Southwest Asia provides a useful point of reference for thinking about the role of wild faunal resources in the emergence of sedentary villages in our area at around 1900 BC—the possible early tipping point in the local emergence of agrarian societies. Our proposals for the Soconusco borrow themes from both the carrot and the stick models debated for the broad-spectrum revolution.

Various observations suggest an increased diet breadth in villages of the Initial and Early Formative compared to what is observed at Archaic shell mounds. The Late Archaic shell mound assemblages consist mostly of a single species of marsh clam. Crab remains are absent from the Archaic assemblages, as are the toads proposed in Chapter 14 as a food source at Paso de la Amada during the Locona and Ocós phases. The Archaic assemblages also lack domestic dog, a fairly important food source during Locona and Ocós at both Paso de la Amada (Table 14.4) and Cuauhtémoc (Rosenswig 2010:Figure 5.3A). Wild mammals and reptiles are rare in the Archaic assemblages compared to village sites of the Initial and Early Formative (Lesure et al. 2009a:Tables 15.2 and 15.3).

To explore this issue further, we compare the vertebrate assemblages of the Archaic shell mounds to those of the later village sites. Caution is in order. In the settlement-subsistence model proposed by Voorhies (2004), the Archaic sites are understood to have been special-purpose stations for harvesting and processing estuary resources and thus may be expected to yield predominantly location-specific faunal assemblages. In contrast, the faunal assemblages at Paso de la Amada and other Formative villages are likely pooled assemblages. They are the result of the collection of animals in a variety habitats, as indicated, for instance, by the higher representation of terrestrial mammals and reptiles. We would therefore expect Paso de la Amada to yield a more diverse vertebrate assemblage than the shell mounds. The best Archaic analog for the Formative village sites would be Vuelta Limón, the proposed residential base. Unfortunately, it appears that no faunal remains were recovered from that site. (If the shell mounds were residential bases, as envisioned under the model being developed by Clark and Hodgson [2009], then these particular concerns about comparability of the Archaic and Formative assemblages would be eased.)

Given concerns about comparability, it is valuable to have data from El Varal, a special-purpose estuary site of the Early Formative. We can compare the vertebrate assemblage from El Varal both to the village sites and to the Archaic shell mounds. To compare the faunal assemblages, we used the most widely reported summary statistic, minimum number of individuals (MNI). We followed the same procedures described in the methods section of Chapter 14 to produce a taxa list for analysis.

Figure 26.8 plots the Shannon-Weaver diversity statistic and a derived equitability statistic (Reitz and Wing 2008:110–13) by period or phase.[2] Samples are categorized by site type as either "estuary station" or "village." The category "specific habitat" includes the yield of two late-twentieth-century fishing expeditions in the Cantileña Swamp as well as the Ocós Oven deposit from Mound 6, identified in Chapter 14 as resulting primarily from a similar expedition to the same habitat. Smoothing lines are provided to highlight patterns among the scattered points. There is unevenness in the sample sizes from the different sites (see footnote 2), which can affect the results of diversity analyses. We include an assessment of the strength of the effect of sample size toward the end of this section.

Observed diversity in the catch from habitat-specific modern fishing trips to the swamp is, as expected, low. Diversity in the Ocós Oven assemblage (the closest archaeological case to a habitat-specific sample from the swamp) is higher, primarily due to admixture of other faunal remains even in this unusually pure archaeological deposit. Assemblages from the estuary stations—both Archaic and Formative—are intermediate in diversity. Diversity of taxa is generally high at village sites, again as expected given pooling effects at home bases, but there are important temporal differences. The Locona, Ocós, and mixed Ocós-Cherla samples from Paso de la Amada are particularly high, while the three later samples (Cherla-phase Paso de la Amada, Cherla-phase Feature 6 from Aquiles Serdán, and La Blanca) are lower. We suspect that Aquiles Serdán is particularly low here because a significant variety of fish were not identified in the initial analysis reported in Blake et al. (1992a). Figure 26.8c shows diversity values for both village and estuary station sites, with Aquiles Serdán and the habitat-specific samples removed. Diversity goes up with the transition from Archaic to Formative, but how much of that is due to the pooling effects of village as opposed to estuary station context? It is helpful to consider the later samples. Ignoring the potentially artificially low value for Aquiles Serdán, the diversity differential between the Cherla-phase village samples and the estuary station is narrower than that between the Archaic shell mounds and the Locona-Ocós village samples. That point is consistent with the idea that Archaic/Initial Formative change is not solely due to pooling in the villages.

Equitability is a measure of the evenness of distribution of specimens across categories, with higher equitability signaling greater evenness and low equitability a more clumped distribution. There are several interesting points to be made concerning the equitability values in Figure 26.8b. First, the Locona and Ocós values for Paso de la Amada are similar to those for the vertebrate fauna at the Archaic shell mounds. Equitability then declines dramatically in the later second millennium BC, before rising again in the Middle Formative. The rise after 1000 BC is a complex topic that probably has to do with the riverine location of La Blanca and a somewhat reduced importance of

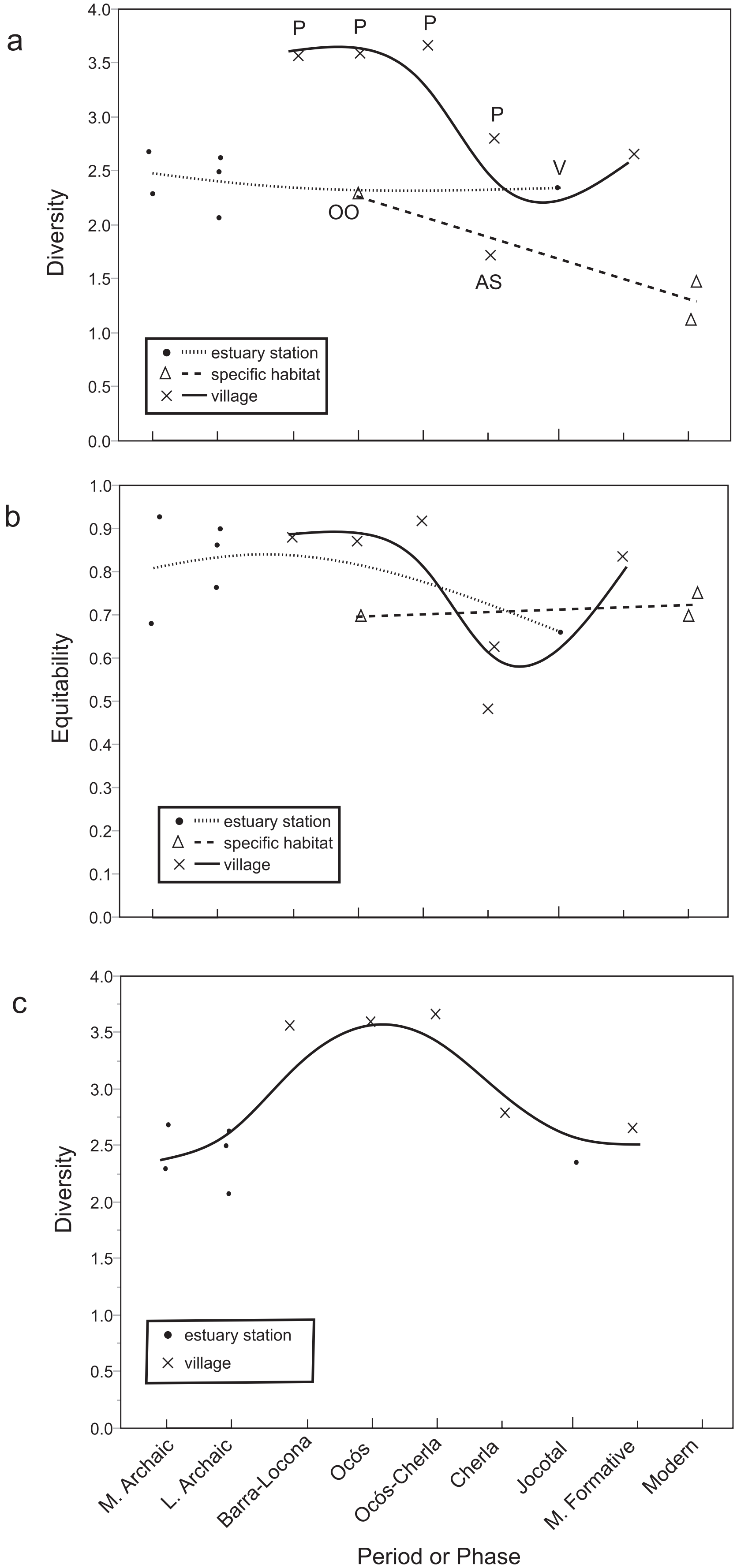


Figure 26.8. Diversity and equitability in fauna samples from Middle Archaic through Middle Formative sites in the Soconusco: (a) Shannon-Weaver diversity index, with separate smoothing curves for the different site types; (b) equitability; (c) Shannon-Weaver diversity index, with a single smoothing curve for estuary stations and villages. Several points are labeled in the top graph: P = Paso de la Amada; OO = Ocós Oven (at Paso de la Amada); AS = Aquiles Serdán; V = El Varal. *Illustration by R. Lesure.*

fish; we will not discuss that here because Wake is working on a vastly expanded dataset from that site.

Of more immediate interest are the particularly low values in the Cherla and Jocotal samples, with that of Paso de la Amada very similar to that of El Varal (and with differences between analysts probably accounting for much of the gap between those and Aquiles Serdán). The equitability values for these samples are distinctly lower than not only the Archaic and Initial Formative samples but also the habitat-specific samples. The low equitability in the late second millennium BC appears to derive from a concentrated focus in that era on fishing for a narrow range of species, overwhelmingly sea catfish at El Varal, sea catfish plus sleepers at Paso de la Amada, and cichlids plus sea catfish at Aquiles Serdán. In contrast, resource procurement strategies in the Locona and Ocós phases were more evenly distributed across taxa, suggesting a continuation of practices from the preceding Archaic.

Figure 26.9 presents a similar set of analyses, this time considering only fish (by family, the most reliable level given inter-observer variability and ongoing taxonomic issues in some families, particularly Ariidae). We have left out Aquiles Serdán because very few fish taxa were identified in the original analysis; Wake's in-progress study will add at least half a dozen additional families. Note also the low vertebrate diversity at one of the Late Archaic shell mounds, Campón. That site is the closest of the excavated shell mounds to the modern freshwater swamp, where sleepers and cichlids are common. Although other taxa present include more estuary-focused species, the faunal assemblage from Campón seems the most strongly skewed among the Archaic sites toward representation of a single habitat. That and the three habitat-specific samples are left out of Figure 26.9c.

Patterns to note in Figure 26.9a include the higher diversity values for Locona and Ocós phases at Paso de la Amada compared to particularly the Late Archaic. Thus, even after removing all the terrestrial fauna from consideration and focusing on a resource category particularly available at the Archaic estuary mounds, we still observe elevated diversity values in the Initial Formative. Diversity among the fishes in the subsequent Early and Middle Formative is lower and, at least among the available samples, is similar at village sites and estuary stations.

Particularly important to note in the equitability analysis (Figure 26.9b) is that the Locona-Ocós values are quite similar to those for the Archaic sites, thereby reinforcing the suggestion above concerning continuity of recovery practices between the Late Archaic and the Initial Formative. The high equitability among the fishes at Middle Formative La Blanca is quite different from that at Cherla-phase Paso de la Amada and El Varal, suggesting that it would be a mistake to read the Initial to Early Formative shift in terms of a simple linear trajectory.

Figure 26.9c is presented simply to make the point that a rise in diversity in the Initial Formative is perceptible in available faunal assemblages even when we focus just on fish and thus remove terrestrial taxa.

Since diversity and richness can be highly correlated with sample size, statistical methods are necessary to control for variable levels of sampling effort. Figure 26.10 displays species accumulation curves (rarefaction) for the five Archaic-period faunal assemblages and the three Initial Formative assemblages that yielded high diversity values in Figure 26.8 (the Locona, Ocós, and Ocós-Cherla samples). The goal is to assess how much of the change in diversity between Archaic and Initial Formative samples might be explained by sample size. The rarefaction curves compare mean richness and diversity values with sampling effort. Diversity measures examined include the Shannon-Weaver index, used in Figures 26.8 and 26.9, as well as Simpson's, another common diversity index; sampling effort is displayed as MNI. Such curves mitigate influence of sample size through random resampling, with replacement, from the observed data (see Colwell et al. 2004) and are increasingly used by archaeologists (Eren et al. 2016; Sinensky and Farahani 2018). The analyses of species diversity were calculated in the program R using the iNext package (see Chao et al. 2014; Colwell et al. 2012; Hsieh et al. 2016 for details). Note the difference in scale of the two figures. The results indicate that the difference in diversity between the full faunal assemblages of the Archaic sites and those of the Initial Formative at Paso de la Amada is a robust pattern that cannot simply be explained by differences in sample size.

To sum up, a variety of observations point to an expanded diet breadth in Initial Formative settlements of the Soconusco compared to the preceding Late Archaic. Increased diversity is observed in all taxa (Figure 26.8c) and in fish considered separately (Figure 26.9c). Crab was added to the diet. Toads may have been, for a few hundred years, a minor but nonetheless noticeable source of food. During the same era, dog was an important food source. Late in the occupation of Paso de la Amada, diet breadth narrowed. Toads were eliminated from the diet, and dog decreased dramatically in significance. Although Cherla-phase inhabitants of the site still collected resources in the full range of available habitats, the lower estuary and the freshwater swamp yielded a smaller proportion of the aquatic resources collected, even as fish in general formed a greater percentage of the overall diet. In other words, the Cherla inhabitants relied more on fishing but emphasized a few habitats. In Chapter 14, we suggest that the favored habitats for aquatic resources in that phase were the upper estuary, the Coatán River, seasonally inundated abandoned river courses of the Coatán delta, and perhaps a lagoon. All of those would have been part of the immediate (nearer than 5 km) catchment of the site, with the swamp and lower estuary somewhat farther (more than 5 km) away. The higher equitability of the Initial Formative faunal assemblage compared to that of the Cherla phase (Figures 26.8b and 26.9b) thus extended to the cov-

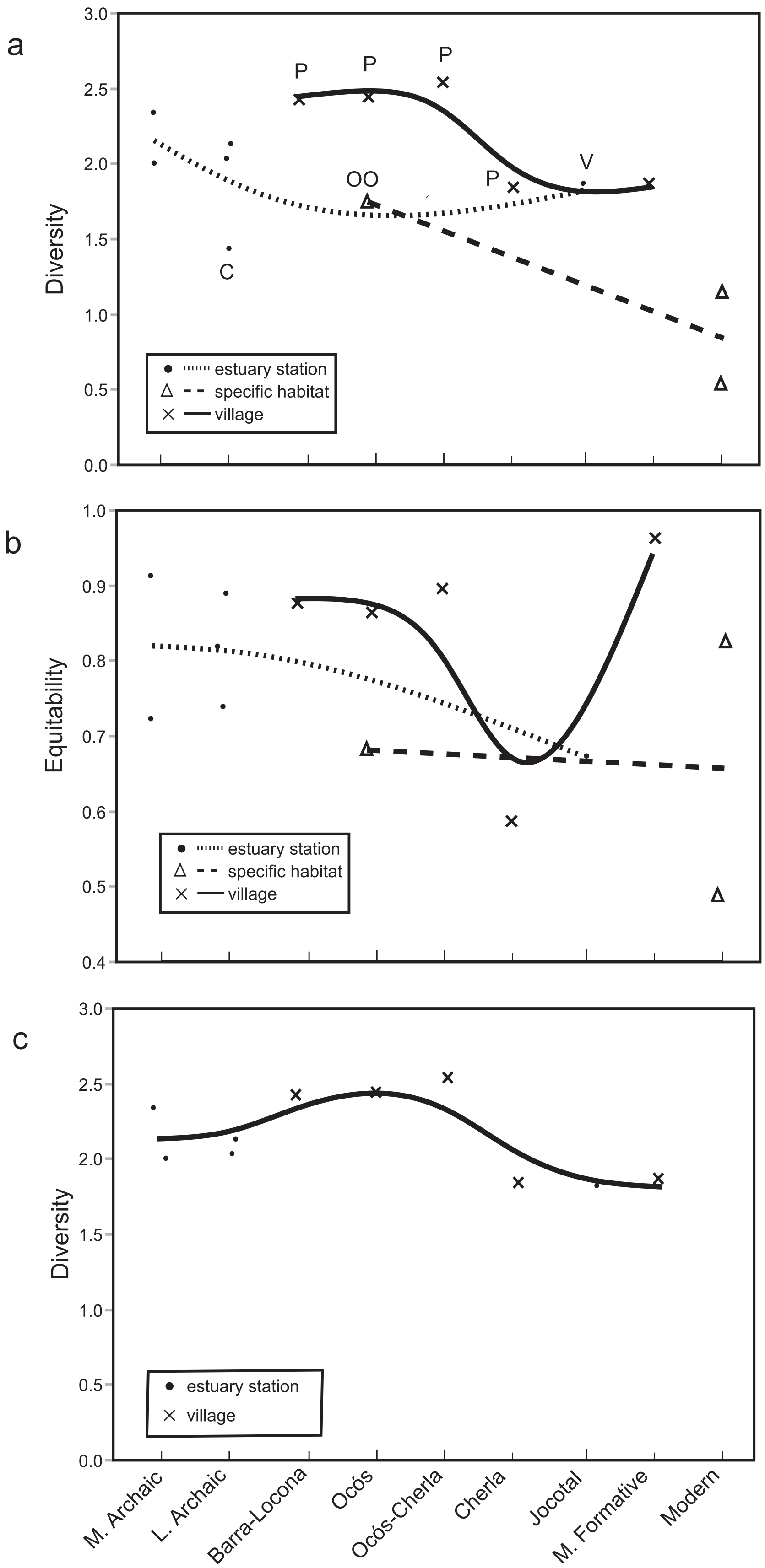


Figure 26.9. Diversity and equitability among fish only (calculated at the family level) in fauna samples from Middle Archaic through Middle Formative sites in the Soconusco: (a) Shannon-Weaver diversity index, with separate smoothing curves for the different site types; (b) equitability; (c) Shannon-Weaver diversity index, with a single smoothing curve for estuary stations and villages. Several points are labeled in the top graph: C = Campón; P = Paso de la Amada; OO = Ocós Oven (at Paso de la Amada); V = El Varal. *Illustration by R. Lesure.*

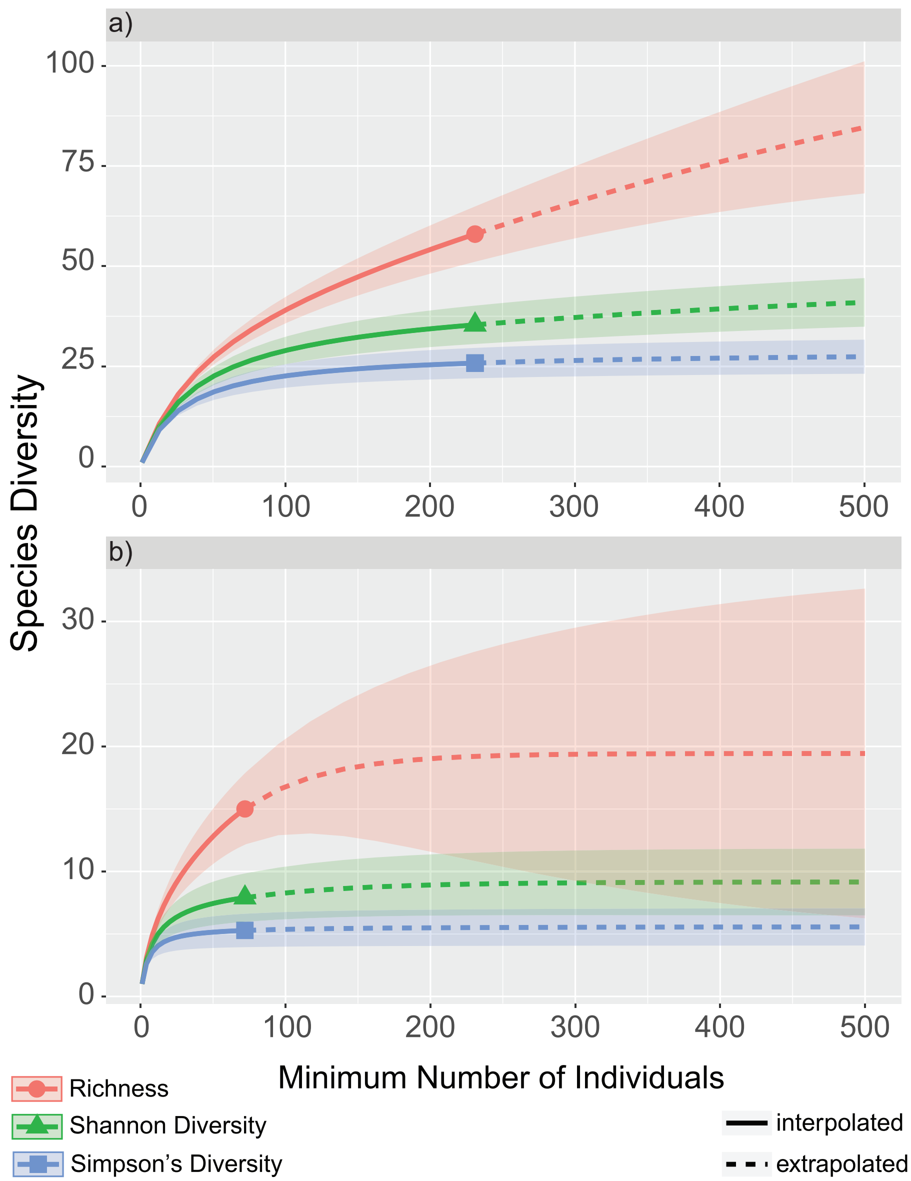


Figure 26.10. Species accumulation curves (rarefaction) for: (a) Initial Formative and (b) Archaic faunal assemblages in the Soconusco. Calculated using the iNext package in the program R. (See Chao et al. 2014; Colwell et al. 2012; Hsieh et al. 2016 for details.) Interpolated (observed) and extrapolated richness and diversity values are displayed for given level sampling effort, here displayed as MNI. The 95 percent confidence intervals in the figures are derived from random resampling from the data 200 times with replacement. *Illustration by R. J. Sinensky.*

erage across habitats, at least for aquatic resources (Table 14.10B).

At first glance, these results seem to fit directly with the logic of an optimal foraging model, with the era of greater diet breadth (Locona) corresponding to the time of the highest regional population density of the second millennium BC. Yet evidence of pressure on the wild resource base appears not in the Locona phase but instead in Cherla, when population density of the Mazatán zone had declined significantly from a Locona-phase peak. (See the section on evidence of pressure on wild faunal resources in Chapter 14.) There may have been modest pressure on large prey (consisting mainly of deer) during the Cherla phase. The more convincing evidence is for some degree of overfishing. Fish recovered in the Cherla phase tended to be smaller, and a greater proportion of them were from low vulnerability as opposed to high vulnerability species. These results seem to be the reverse of what one would expect from a simple application of optimal foraging logic. Here, evidence of pressure on the resource base *increases* as diet breadth *decreases*. We will attempt to account for that observation in the following section.

SUBSISTENCE CHANGE IN THE SOCONUSCO, ARCHAIC TO FORMATIVE

We have been considering diet at Paso de la Amada as a source of insight on the emergence of agricultural village life in the Soconusco. Recent studies have emphasized a late tipping point around 1000 BC that would have marked the emergence of maize as a staple crop. Our analyses of grinding stones do not support that model, and we argue that the current bone isotope data do not support it either. Among the datasets considered, we find patterns consistent with a tipping point around 1000 BC only in a generalized analysis of caries percentages among sites from across Mesoamerica. In the finer-grained analyses of grinding stones and faunal remains, we find evidence of gradual change during the second and into the first millennium BC. There are also suggestive hints that the more fundamental tipping point was the traditionally recognized moment of establishment of sedentary villages around 1900 BC (the Archaic to Formative transition).

The Late Archaic (3500–1900 BC) was probably characterized by low density occupation along much of the Pacific Coast, with any given area episodically occupied and abandoned by mobile populations with a mixed subsistence involving hunting, gathering, fishing, and food production (Neff et al. 2006:305). The Acapetahua zone of the Soconusco may have hosted a larger or more stable population in this era based in part on its system of estuaries and lagoons; such systems are less extensive along the coast of Guatemala. The most convincing current understanding of the settlement system is that residential bases were located inland on the coastal plain (Kennett et al. 2006, 2010; Michaels and Voorhies 1999; Neff et al. 2018; Voorhies 2004:397–417). Logistical task groups visited the estuary to process marsh clams and possibly other resources for transport inland.

A dramatic shift in settlement occurred around 1900 BC. For the first time, the Mazatán zone of the Coatán delta emerged as a population hot spot. During the Locona phase (1700–1500 BC), it was probably the most densely settled region of the Pacific Coast from the Chiapas/Oaxaca border to the Guatemala/El Salvador border. How quickly it reached that status during the Barra phase (1900–1700 BC) is uncertain. The Barra-phase inhabitants of the Mazatán zone resided in what were probably the first sedentary villages in the area. Population increased rapidly during this era, probably due to a combination of increased local fertility and in-migration of people attracted by the social and cultural florescence under way.

What was the subsistence system that underwrote sedentism, novel social structures and ritual practices, and an unprecedented concentration of population in one relatively small area? Our results are consistent with Clark et al.'s (2007:36) suggestion that an increased commitment to maize agriculture was probably one significant factor among others. We would go further, however, to emphasize 1900 BC as a crucial tipping point in what would still thereafter be a lengthy trajectory toward fully developed agrarian village life in the Soconusco. Barra-phase villagers planted, harvested, and stored maize. They boiled the dried kernels before grinding them wet. Two important technological developments introduced sometime during the Barra phase (in place by early Locona) kept up the momentum of demographic expansion and sociocultural innovation: the rounded-bottom cooking pot and a grinding stone complex specifically designed for the processing of maize.

Yet maize agriculture in the early second millennium BC—even with these technological developments and even supplemented by other crops, including possibly manioc—was not sufficiently productive to support the rapidly growing population of sedentary villagers in Mazatán and adjacent zones of the Soconusco. Wild resources were a key pillar of the subsistence system. Village life was founded in part on an expansion of diet breadth in comparison to the Late Archaic. Villagers ate a wide variety of animals acquired in the multiple habitats readily accessible from the Coatán delta, including the freshwater swamp, the upper estuary, the river itself, the lower estuary, the savanna, field edges, and the forested coastal plain. The rounded-bottom cooking pot may have been an important innovation not just for boiling maize but also for expanding the variety of estuary resources in the diet. We have noted suggestive evidence that there was continued use of the Acapetahua shell mounds into the Barra phase. However, those were abandoned by the Locona phase, and a new pattern of estuary use emerged, signaled by dense deposits of broken tecomates and layers of sediments. Like their Archaic predecessors, these mounds were seasonally or intermittently occupied resource-processing stations. The bulk of the debris derives from salt production, but other resources were harvested as well, by large parties of people who resided at these sites for days or weeks during the dry season.

While a gradual decrease in fire-cracked rock and an increase in the percentage of tecomates at village sites gives the appearance of a gradual change in Archaic cooking practices during the Initial and Early Formative, the pattern at estuary processing stations is different. The assemblages most heavily dominated by rounded-bottom tecomates used over direct heat (Figure 26.2) are from the earliest of the Initial Formative estuary sites, yielding basically the opposite of the pattern of change in plain-walled tecomates observed at village sites (Figure 26.1). At estuary stations, the shift to heating vessel contents in rounded-bottom pots over direct heat was rapid. Indeed, the new pattern of estuary use may have been founded on that technological innovation.

We are not certain how villagers used the salt they produced in the new estuary stations. It could have been a product for exchange or used to preserve fish for transport to inland villages. We have not been able to find any clear supporting evidence for the latter hypothesis (see Tables 14.11 and 14.12).

The shift to sedentism at the beginning of the Barra phase, along with a greater commitment to agriculture and consumption of a diversified array of wild animals, generated rapid population growth. Innovations in technology and practice helped sustain that expansion well into the Locona phase. Early in that phase, the multiple components of a novel (albeit transitional) adaptive pattern were in place, supporting a density of population in the Mazatán region of the Soconusco that would not be seen again for centuries.

Over the next few hundred years, diet breadth declined from a Locona-phase peak, and people became more reliant on maize agriculture. Regional population density declined from Locona to Ocós and again from Ocós to Cherla (Pye et al. 2011:Table 10.1), yet during this era, pressure on the wild resource base increased. Why? One possibility is that the population became more evenly distributed. A series of adaptive innovations and a growing commitment to maize agriculture may have allowed a "breakout" from the restrictive conditions of subsistence that had underwritten the initial villages (requiring close propinquity of estuary resources, swamp resources, and agricultural lands of various sorts). By the later Locona and Ocós phases, the new subsistence system was generalizable to sedentary life in a variety of habitats. Thus the reduction of population in the Mazatán zone may signal the radial movement of people from the deltas of the Coatán and other nearby rivers to other zones of the Soconusco, including the interior coastal plain.

Social factors may also have been involved. The trajectory of population decline (beginning in Ocós, continuing in Cherla) corresponds to decreasing ritual density (Figures 19.3, 19.4, and 25.3). The ballcourt at Paso de la Amada was no longer refurbished and eventually fell into disuse. The formalism and ritualization so strongly evident in Locona-phase village life gradually weakened (Lesure 2011a). It may be that the social bonds that had kept people concentrated in Mazatán had begun to weaken. A more even distribution of villages could have precipitated a narrowing of catchments accessible from the core areas. There are other possible factors. By the Cherla phase, an increased importance of maize in the diet could have prompted smaller catchments for wild resource procurement and a narrowed diet breadth. Also in that phase, heightened political competition with the rise of Cantón Corralito as a competing center (Cheetham 2012) could have led to increased violence and prompted villagers to forage closer to home.

Notes

1. Kennett et al. (2010:3402) seem to suggest that they are revising the model, but the differences between the 2010 version and previous papers seem minor to us.

2. There are five samples from Archaic shell mounds. The Middle Archaic samples are both from Cerro de las Conchas (Voorhies et al. 2002:Table 3): Stratum II (fish MNI 192, total MNI 200) and Stratum III (fish MNI 26, total MNI 31). Late Archaic cases are from Tlacuachero, Campón, and Zapotillo (fish MNI 70, 55, and 29; total MNI 101, 72, and 35, respectively) (Wake et al. 2004:Table 4.8). The "village" samples from Paso de la Amada (Chapter 14) are Barra-Locona, Ocós, Ocós-Cherla, and Cherla (fish MNI 118, 120, 61, 367; total MNI 231, 232, 119, 454, respectively). Another Cherla-phase village sample is from Aquiles Serdán (Cherla phase; fish MNI 287, total MNI approximately 57) (Blake et al. 1992a:Tables 1 and 2). The El Varal sample (Wake and Steadman 2009:Table 4.8) is from the Cuadros and Jocotal phases (fish MNI 186, total MNI 213). The final village sample is from the Middle Formative site of La Blanca (fish MNI 16, total MNI 102) (Wake and Harrington 2002:Table 35). The data from Aquiles Serdán and La Blanca will soon be superseded by more complete analysis currently in progress by Wake. Faunal remains from Cuauhtémoc (Rosenswig 2010:Table 5.2) have not been reported in sufficient detail for use here. The Ocós Oven deposit from Paso de la Amada (see Chapter 14) is classified as a "specific habitat" rather than a "village" sample (fish MNI 80, total MNI 91). We also include counts of animals recovered in two fishing expeditions to the Cantileña Swamp (Clark 1994a:68–69; Lesure et al. 2009a:Table 15.7), with 151 and 79 individuals, respectively. Comparability of the samples is enhanced by the fact that Wake analyzed nine of the 13 archaeological cases considered in Figures 26.8 and 26.9 (all except for Aquiles Serdán and the three Late Archaic cases). In a report on new data from Tlacuachero (Wake and Voorhies 2015), MNI counts are unfortunately not provided. We hope to include that important new evidence in future comparative work.

CHAPTER 27

Toward a History of Paso de la Amada

Richard G. Lesure

INITIALLY SETTLED around 1900 BC, Paso de la Amada was among the earliest sedentary, pottery-using villages of Mesoamerica. Still, even during the Barra phase, it was not alone in the Soconusco. By the Locona phase, there were numerous other settlements, with a particularly dense concentration surrounding Paso de la Amada on the lower delta of the Coatán River. Large villages, each associated with a cluster of hamlets or homesteads, were spaced at approximately 5 km intervals in the Mazatán zone (Pye et al. 2011:221). The larger villages were politically independent communities, collectively comprising a system of small chiefdoms (see Figure 1.5). Yet during the Locona phase, if not before, Paso de la Amada emerged as a "first among equals." Its dispersed settlement on the edges of old oxbows extended across 140 ha, an order of magnitude larger than the other large villages. Other centers, including La Calentura and San Carlos, had earthen constructions comparable to those at Mound 32 and Mound 6 (Clark 1994a:339–45). No other site, however, is known to have had a ballcourt. It is also uncertain whether large-scale site planning and alignments of buildings were present at the other large villages. As noted in Chapter 1, those are among the features that have led to the identification of Paso de la Amada as a ceremonial center (Clark 2004a, 2004b; Clark et al. 2010; Lesure 2011a).

This chapter examines several aspects of social practices and their history at Paso de la Amada. Topics considered include the relation between household organization and adaptation, the conduct of daily life in large versus small residences, valuables and social reproduction, and the trajectory of development of the site as a community and ceremonial center. Also covered is the Olmec style at Paso de la Amada and its implications for the history of the site.

SEDENTISM, ADAPTATION, AND HOUSEHOLD ORGANIZATION

I begin by linking a proposal concerning large, multifamily households (from Chapter 7) to discussion of adaptive innovations that enabled and then sustained the emergence of sedentary villages in the Soconusco (from Chapter 26). The basic suggestion is that the multifamily coresidential group—typically centered on a large structure that served as a dwelling for the group leader, a locus for collective rituals, and the group's public face toward the rest of the community—was among the adaptive innovations that underwrote sedentary life and population growth in the Soconusco during the early to mid-second millennium BC.

As noted in Chapter 7, an accumulation of evidence leads to the suggestion that the occupants of platform-top buildings were part of multifamily residential groups, some of whose members lived in adjacent, ground-level dwellings. Under the platform at Mound 1, there were traces of a possible small structure (Structure 1-3) just 8.5 m from a large residence (Structure 1-2). Inferences based on the number of broken vessels in the elite, Cherla-phase midden redeposited as fill of the platform suggest that the group that generated the original debris—inhabitants of Structures 1-2 and 1-3 and likely a few more dwellings—had at least 17 or 18 and perhaps up to 30 members (see Chapter 3). That is well within the size range of multiple family households, defined by Hammel and Lasket (1974:93) as coresidential groups incorporating two or more conjugal units. (Ten to 20 members seems typical, with larger households having 30 to 40 and in exceptional cases as many as 100 members.)

Such observations underlie a set of hypotheses on household structure at Paso de la Amada: that a pattern of multifamily households was present from Locona times until at least the early part of the Cherla phase; that these large, complex households typically inhabited a cluster of individual structures; that a recurring feature of these clusters was a large building, 10 to more than 20 m long, in some cases atop a specially constructed platform; and that the head of household lived in the large building (presumably with close family members). Investment in an impressive leader's residence may have been an expression of household rank. It is likely that the building, as an index of the labor the residential group could muster, itself constituted a claim to status. Elements of an organizational logic are perceptible based on a comparison between Structures 6-4 and 32-1. The smaller dwellings were clustered in back, while the front of the leader's residence looked out onto the community. A cleared patio area to the front was a place for group rituals, entertaining guests, and so forth. These various suggestions are summed up in Figure 7.10, with elaboration in terms of associated features and depositional practices in Figure 7.11c.

The claim is that occupants of one of these clusters of dwellings constituted a "household." They cooperated in some set of tasks typical of households, such as production, consumption, the rearing of children, and the intergenerational transmission of rights to resources (see Wilk and Netting 1984:5–19). The question for this section is: What circumstances in the Initial Formative of the Soconusco could have favored the emergence of large, complex households of this sort?

Comparative research on variation in household structure identifies several potential factors. One possibility involves ownership of property, rights to resources, and inheritance (Yanagisako 1979:169–73). Because the nest of causal factors associated with property rights and their effects on household structure is complicated (Wilk and Netting 1984:11–14) and depends heavily on specifics of cultural rules that remain poorly understood for the Initial Formative of the Soconusco, I set aside this class of factors here.

A second possibility raised in comparative research is that large households may have advantages over smaller ones in status competition. Often, they can amass more wealth (Netting 1982; West 2009:282). Aggrandizers who headed corporate groups were able to concentrate power and resources beyond what was possible in societies with simpler households (Hayden 1995:59). The advantage of large households in status competition may well have helped perpetuate such groups in the Soconusco during the second millennium BC. The observed variation in effort expended on the residence for the group leader would make sense in a situation of inter-household competition, as has often been pointed out (Blake 1991; Blake and Clark 1999; Blake et al. 2006; Clark 1991, 1994a; Clark and Blake 1994).

Still, a third set of themes from the literature on variation in household structure was probably equally important in this case. Household organization can be understood as an adaptation to the particular socioeconomic challenges faced by domestic groups in a given set of circumstances (West 2009:286). Households must manage a variety of tasks associated with production, distribution, and consumption (Wilk and Netting 1984:6–11). Large, multifamily households have been widely observed to be effective organizational responses to the scheduling challenges posed by widely dispersed resources requiring simultaneous attention (Ames 1996; Netting 1965; Pasternak et al. 1976; Sahlins 1957; Toulmin 1992:255–70; West 2009; Wilk 1984).

Large households incorporating several nuclear families and thus a diversity of personnel may have been an effective response to the scheduling challenges of subsistence in the early sedentary villages of the Soconusco. Indeed, the multifamily household as a unit of production may have been among the suite of innovations—including the rounded-bottom cooking pot, a grinding stone complex dedicated to maize processing, and establishment of villages close to the estuary—that enabled sedentary lifeways and rapid population expansion.

Evidence from the Archaic shell mounds of the Acapetahua zone provides a glimpse of the effects of subsistence scheduling challenges immediately prior to the establishment of sedentary villages. Isotopic analyses of marsh clam growth rings identify the harvest as either wet season or dry season (Kennett and Voorhies 1996). Toward the end of the Late Archaic, task groups visited the estuary almost exclusively during the wet season. There was also a shift from larger, predator fish (snook, snapper, corvina) to smaller fish (sleepers). Based on an analogy with Lacandon Maya subsistence practices, Voorhies and Kennett (2011) link shifts during the mid- to late third millennium BC to adaptive adjustments in groups that were gradually making a greater commitment to agriculture. During the wet season, men were increasingly preoccupied with agricultural fields on the coastal plains. Women were more mobile in that season and continued to visit the estuary, where they harvested clams and fished for small sleepers (Voorhies and Kennett 2011:42–43).

The establishment of sedentary villages not on the interior coastal plain but rather in a near-coastal location that afforded ready access to the estuary, the swamp, and soils suitable for different crops should have addressed some of the scheduling conflicts in the Late Archaic subsistence system. The multifamily household most likely emerged as an adaptive innovation within *already settled* communities of the Initial Formative (where it also provided aggrandizers with an expanded base of support in status competition). The adaptive advantage of larger households was that they could dispatch task groups to all the diverse ecological zones of the Soconusco, from the estuary to the piedmont. Plots of farmland could be maintained close to home but also farther inland on the coastal plain. The household could maintain a permanent presence at sites like Paso de la Amada even with individuals or subgroups away for days at a time.

Such a system might involve long-term, task-specific use of locations away from the village. That is what we have in the estuary sites of the Initial and Early Formative. There was a cluster along the margin of a lagoon to the southeast of the Coatán mouth, including Los Álvarez, Sandoval, and El Varal (Lesure 2009b:Figure 14.3). Available evidence suggests that these sites were visited by substantial numbers of people, especially during the dry season. That would have been an appropriate time for producing salt and harvesting wild aquatic resources. Visitors may have used salt to preserve fish for storage and transport back to the villages. Maybe they also dried shrimp (Voorhies 2004:147–57). One of the conclusions from the work at El Varal was how far these practices were from occupational specialization (Lesure 2009c, 2009d). There was a high degree of redundancy, with numerous groups engaged in the same range of activities, probably because individual households managed their own consumption.

If households adapted to sedentism and a broad-based subsistence system by boosting membership so that they could simultaneously project personnel to a variety of locations, sometimes for days at a time, then one might expect considerable variation in the diets of individuals at Initial Formative villages of the Soconusco. The isotopic data from human bones for the second millennium BC indicate exactly that pattern. (See discussion in Chapter 26.) In other words, not only is the household model proposed here *consistent* with observed variability in carbon and nitrogen values; it also provides a logic that would *explain* those patterns.

THE DIFFERENTIAL RITUALIZATION OF ORDINARY ACTIVITIES

The archaeological record of Paso de la Amada is puzzling in several ways. Clark (2004a:65) characterizes public spaces at the site as involving "a plaza without a shrine." He contrasts that with the "shrine without a plaza" at San José Mogote (Valley of Oaxaca) and wonders whether both of those arrangements "proved to be developmental dead ends." That assessment is founded on our interpretation of large buildings such as Structure 6-4 (Figure 1.7 top) as residences rather than temples. The case for people having lived in these structures is strong (Blake 1991, 2011; Blake et al. 2006; Clark 2004a; Lesure and Blake 2002), yet traces of activities do include certain temple-like aspects, including the careful superposition of structures with the same alignment in Mound 6, the high frequencies of ritual objects, the occasional offering, and the presence of a few rare ritual objects (such as statuettes) that are absent in other contexts. Further, although the sequence at Mound 6 seems to register the emergence of hereditary rank (Blake et al. 2006; Clark 2004a), evidence for status-related differences in the artifact inventory at Mound 6 compared to other buildings is weak, and there is no hint of increasing residential differentiation as the mound was steadily expanded over the course of the Locona and Ocós phases (Chapter 25).

Plausibly, those last observations might bring us back to the issue of whether these were public buildings or temples—but to go that route requires ignoring evidence for domestic activities. In an effort to break out of that frustrating loop, I proposed an alternative framework for understanding the spatial organization of practice at Paso de la Amada during the Locona phase (Lesure 2011a). It may be that the distinction between temple and residence—and, more broadly, between "public" and "private" buildings—did not exist in that era.

Catherine Bell (1992) argues that "ritual" is not a stable cross-cultural category. Examined in a practice framework, activities are seen as differentially and strategically *ritualized*. At an abstract level, ritualization can be understood as "a way of acting that sets itself off from other ways of acting by virtue of the way in which it does what it does" (Bell 1992:140). An analysis of ritualization involves examining culturally specific modes of practice to identify actions that strategically distinguish themselves from others through the manner in which they are conducted. Ritualization establishes an opposition between ritualized and other activities, produces an environment simultaneously structured and structuring, and thus creates "ritualized agents" that embody a localized sense of ritual (Bell 1992:98–101, drawing on Bourdieu 1977). A common dynamic involves the creation of symbolic oppositions and the organization of those into nested hierarchies (Bell 1992:101–4; Bourdieu 1977:116–19).

Ritualized activities have characteristics such as formalism, traditionalism, invariance, rule governance, sacral symbolism, and performance (Bell 1997:138–69). I am concerned particularly with the first of those. Formal activities "set up an explicit contrast with informal or casual ones" by adhering to restricted codes of communication or behavior (Bell 1997:139). Instead of public versus private or temple versus residence, Locona-phase buildings at Paso de la Amada are best understood as having been differentiated according to the formalism or informality of activities conducted in and around them. People living in large buildings were more active in overtly ritual activities (Figure 25.3), but they also comported themselves differently from people in small, ground-level residences. The self-conscious formality of action at large buildings gave the "ordinary" activities of their inhabitants a ritual-like character that contrasted with the truly ordinary activities of others and helped constitute the social order of early Paso de la Amada.

This interpretation was developed by comparing distributions of features across contexts, beginning with a contrast between the Locona and Ocós occupations at Mound 32 (Chapter 5 and Lesure 1999a). It was built up from the evidence by hermeneutic procedures and is appropriately evaluated according to such procedures (Hodder 1992, 1999:30–65).

The basic idea is that certain spaces at Paso de la Amada—interiors of buildings, areas adjacent to buildings, and so forth—were recurrently the settings for self-consciously formalized action, whereas other spaces were consistently settings for the informal action in contrast to which formalized action was constituted. In other words, two modes in the use of space were present:

> In formal mode, spaces for activities were segregated (on platform/beside platform, indoor/outdoor, patio/discard area), buildings were terminated in systematic sequences and refurbished with continuity of alignment and function, and rituals included the placement of sub-floor offerings. Formalized activity is particularly associated with platforms and with large buildings over 10 m in length. Certain rare ritual objects appear only in contexts in which other attributes of formalization are also present, yet domestic garbage indicates that people lived in these buildings (Lesure 2011a:135–36).

Material correlates of the informal mode of use of space were developed beginning with a contextual analysis of the Locona platform at Mound 32 and Structure 4 at Mound 6. In both design and use, the two buildings appear to have had a distinguishable front and back:

> The front was a setting for formal action, the platform highlighting the distinction between the interior of the building and the swept-clean patio before it. Certain informal activities—the digging of pits, the deposition of domestic garbage—were relegated to the back of the platform. Contrasts between the Locona and Ocós occupations emphasize the greater formality of the former and provide, from the latter, further material correlates for an informal use of space. In those cases, we expect lack of arrangement, spatial segregation, rites of termination, or self-conscious attempts to promote continuity in the use of space. Distinctions between indoor and outdoor would not have been marked or elaborated, and domestic garbage was deposited in whatever location was most convenient (Lesure 2011a:136).

Human burials are grouped with "informal" use because they consistently occur in association with trash-filled pits and other midden deposits. I am not denying funerals the status of ritual but instead arguing that there was a cultural logic during the Locona phase according to which settings for formalized action—platforms and their associated patios—were deliberately avoided as locations for burials. The deceased were interred instead at the edges of household activity areas (toft areas in Figure 7.11) and along the margins of bajos.

The full set of material correlates associated with the two modes of practice is provided in Table 27.1, along with occurrences in Locona-phase deposits from different excavation locales. Traces of formalized action were concentrated in and around the three Locona-phase architectural platforms (Mounds 6, 13, 32). (The ballcourt, Mound 7, is included as a reminder that there was an *open-air* public space at that time, where some attributes of formalism are observed.) The occurrence of correlates of informal use of space is limited at the large buildings, but we can go farther than that. Traces of informal action at the platforms can be understood as following a scheme of deliberately segregated space within and around these buildings, understandable in terms of the hierarchized oppositions discussed by Bell and Bourdieu. It is possible that there was a division between informal and formal spaces *within* structures—in Structure 6-4, the distinction would be between the ends and the middle, respectively—but, if so, the chemical traces and micro-artifact distributions indicate that patterns of use were different in successive structures (see Blake et al. 2006:201–4, Figures 7.6 and 7.8). Superimposed on any interior division was the distinction between informal back and formal front, particularly evident at Mound 32 (Figures 5.12 and 7.10). That distinction between front and back as spaces for different activities would have helped organize an opposition between the head's residence and adjacent dwellings but would also set the former on another level, as a physical demonstration of the leader's authority to speak and act for the household.

An issue I didn't clearly address in my 2011 paper was how differential formalism articulated with rank. The patterned differences between formal and informal in quotidian activities would have been part of the embodied experience of power relations for the inhabitants of larger households. The different modes of activity helped to construct and reproduce the hierarchical internal structure of these groups, but there would have been external implications as well. Comparative ethnography leads us to expect a range in household size and composition at the site, from simple or extended to multifamily. As already noted, the elaborateness of a leader's house was probably a materialized expression of the relative rank of the household vis-à-vis other households. The apparent absence of a platform-top structure in some residential groups provides modest support for my suspicion that formalization of daily routines was *not* uniformly adhered to in the residences of all household heads. Probably, only the more ambitious and socially prominent groups adhered strictly to a spatially segregated division between these two modes of activity. If the ritualization of daily life was differentially adhered to among the residences of household heads, then the spatial patterning of these two modes of practice helped to constitute power relations not simply within households but also among them.

Table 27.1. Distribution of material correlates of "formal" and "informal" activities at Paso de la Amada during the Locona phase

	Locales Exhibiting Formalized Activity				Locales Exhibiting Informal Activity				
Material Attribute	Md. 7 Ballcourt	Md. 6	Md. 32	Md. 13	Md. 12	Md. 21	Md. 14	Md. 1	Pit 32
Formalized Use of Space									
Platform (creating segregated spaces, raised vs. ground level, etc.)	X	X	X	X					
Post holes of structure 10 m or more in length		X							
Swept-clean patio, spatially segregated refuse deposition		X	X						
Refurbishment with continuity of location, orientation, and use	X	X							
Structure termination		X							
Offering on or below floor		X	?[b]	X					
Rare ritual object		X	X						
Nonresidential function	X								
Informal Use of Space									
Lateral or ad hoc addition to platform					X	X			
Post holes of small structure, 8 m or less in length					X			X	
Burial or cluster of burials									X
Domestic refuse on structure floor		X							
Trash-filled pit		X[a]	X[c]		X		X	X	X
Toss midden			X[c]			X	X		
Trash-filled ditch or deep pit (well?)					X				
Occupation on unstable sediments					X				

[a] Interior of Structure 6-5 or Structure 6-6, the earliest structures; otherwise not identified until Ocós occupation.
[b] See Figures 5.12 and 5.13 and discussion of Feature 1 in Chapter 5.
[c] To the back of the platform only; see Figure 5.12.

Yet, as a system for the expression and reproduction of household rank, differential ritualization would have constrained the machinations of leaders even as it raised them above their followers. Bell's (1992:206–9) analysis of the limits of ritualization in the construction of hegemony is basically Foucauldian: the misrecognitions that objectify and inculcate power relations work both ways, the consent of participants is in part an illusion, and everyone is in some way empowered. The following suggestions are more theoretically crude but are specific to the system being proposed for Locona-phase Paso de la Amada.

The platform-top structures at Mounds 6, 13, and 32 were not merely houses for leaders who occasionally officiated at rituals. Instead, everyday existence in these buildings was ritualized, with activities that were self-consciously formal, regulated, and thus constrained. Why? Probably because the studied decorum of residents of these buildings had effects similar to rituals. Household heads acted as intercessors between the community and the supernatural not simply by officiating at periodic rituals but also by pursuing an everyday existence organized as pious action and entailing a nest of constraints that did not bind people living in small ground-level residences. But supernatural entities were not the only audience for the ritualized routines of leaders. Adherence would have been monitored by household members and probably, in the case of high-ranking households, also by the community as a whole. Household leaders maintained this formalized and constrained existence even in the "privacy" of their own homes at least partly because they were constantly subject to the surveillance of others. The leaders of high-ranking households benefited from the labor of others—both household members and other followers—but their elevated status was maintained at the cost of constant public surveillance.

In a certain sense, they can be envisioned as having lived in "temples," but a better assessment would be that there was not a categorical distinction between temple and residence. More generally, a distinction between public and private would also seem to be lacking, since the "private" lives of some people were "public."

The proposed system may sound a bit strange—and it can hardly be the only possible explanation—but it has been built up through a contextual analysis of the evidence. It is also capable of accounting for the puzzling disjunction between residential architecture, with evidence of significant inequality, and household artifact inventories, with little evidence of differentiation. The platform-top dwellings of high-status household heads were the communal property of household members and perhaps other followers, all of whom visited frequently and maintained constant vigilance. The abilities of the residents of those buildings to amass and flout special access to the material accoutrements of elevated status (fancy pots, imported goods) were thereby significantly constrained. The artifact categories in which their refuse was most clearly distinguished from that of others were the nature and frequency of ritual objects (Tables 25.5–25.7).

I have previously traced the dissolution of this system based on differential formalism (Lesure 2011a:136–44). It is telling that the informal character of the occupation at Mound 32 in Ocós as compared to Locona is mirrored also at Mound 6. Instead of becoming stronger as the platform continues to grow, evidence for differential formalism weakens as one moves up the sequence of large structures. The structures themselves are simpler in their internal spatial arrangements, termination rituals are less elaborate, and trash-filled pits appear even in front of the structure. As the Mound 6 platform grew in size, life in the structure on top became less self-consciously formalized. I suggest that a distinction akin to public versus private emerged in the Ocós phase: daily life became more informal because the platform-top residence was now "private" space—or, at least, not so routinely subject to surveillance by people beyond the immediate family of the head of household. As far as we know, the site still lacked a temple-like public building, though in the later Locona and/or Ocós phases there was considerable construction activity at Mound 14. It is possible that some of the public/ritual activities previously conducted in and immediately around the Mound 6 residence shifted at this time to an expanded public plaza. An overall decline in "ritual density"—in the frequency of ritual activities—seems to have been under way (Figures 19.3–19.4). The decline may have appeared first in the large leaders' residences: in Figure 25.3, the Ocós-phase values for ritual objects declined in the elite case (Mound 6) but not the non-elite (Mounds 12 and 32).

By the Cherla phase, the decline in ritual density is noticeable in all contexts. Other observations suggest significant changes in habitus, including the downfall of previous institutions (no residence at Mound 6, no ballcourt) and changes in the way living spaces were organized, arranged, and inhabited. One striking pattern is the appearance of trash-filled pits and sometimes burials on the upper surfaces of mounds (11, 13, 32, possibly 7, and the area around Pit 29). There were new institutions, including possibly the first temples at Mounds 1 and 12. Ornamentation rather than ritual activity became the most salient factor in residential differentiation in artifact assemblages (Figure 25.3). Consistent patterns of unequal access to imported objects, labor-intensive craft goods, and the production thereof appear for the first time in domestic refuse (Tables 25.8–25.9). That last development may have been causally related to the others. With the creation first of a cultural distinction between public and private spaces and then of the first temples, the people who were now well on the way to being "commoners" no longer held rights of surveillance over the private lives of prominent people, rights that had previously kept inequality in check.

PASO DE LA AMADA AND THE GENESIS OF VALUE

Transactions in valuables for bridewealth or other life-cycle payments are often important in the political economies of small-scale societies, and they may have been a locus for the emergence and perpetuation of inequality (Collier 1988; Friedman and Rowlands 1978; Godelier 1991; Meillassoux 1981). For example, in the model developed by Friedman and Rowlands (1978:206–11), hierarchical relations among corporate kin groups emerge from a feedback relation between the sponsoring of feasts and the exchange of valuables in marriage transactions. Bridewealth validates marriages, and high-ranking kin groups demand brideprices commensurate with their status. Marriage ties with high-status groups are socially desirable as a source of both prestige and economic stability. Higher-ranking kin groups therefore provide marriage partners to lower-ranking ones and collect high brideprices in return. Manipulation of that flow of wealth results in the emergence of a new, vertical relation of production modeled on the asymmetrical wife-giver/wife-taker relation, in which the chiefly kin group mediates with the supernatural on behalf of the entire community, in return for tribute and corvée labor.

Yet marriage systems vary in organization and in potential for the emergence of asymmetries, as demonstrated in Collier's (1988) study of variable relations between husbands and wives' kin. Archaeologists have not made much headway on the difficult issue of variable marriage systems, but they have explored differences between group-oriented and individualizing chiefdoms (Renfrew 1974), corporate and network political strategies (Blanton et al. 1996), and stable versus wealth finance (Earle 1997:70–75).

In the case of the Soconusco during the second millennium BC, ceramic figurines provide a tantalizing but cryptic glimpse into social relations as portrayed by the people themselves—social relations not as they really were, of course, but as formulated ideologically or in common stereotypes. Among small solid figurines, the juxtaposition of nubile young women and figures that are fat, seated, costumed, and masked—possibly elders shown engaged in rituals—could reflect a gerontocratic ideology, a materialized portrayal of the power of women's kin to give them away in marriage (Lesure 1997b). The goal of this section is to identify valuables that might plausibly have been used as bridewealth. Of course, having identified valuable objects, we still face the challenge of distinguishing those used for bridewealth from those merely used, say, for ornamentation (Marcus 2008:255). I briefly describe a framework for exploring such questions and then consider cloth and greenstone as potential valuables.

Gradations of Value in the Study of Value Genesis

In a previous work, I developed the idea that the objects archaeologists routinely gloss as "elite goods" acquired that status in relation to *gradations of value* that simultaneously linked and differentiated a range of objects used in different ways (Lesure 1999b). I drew on the work of Weiner (1985, 1992) and Thomas (1991) on inalienable possessions; Kovacevich (2014, 2017) has recently pursued a similar line of inquiry for Classic Maya jade. In Weiner's (1992:10) analysis, inalienable possessions gain significance in relation to other objects: "Things exchanged are about things kept." Objects exchanged share certain properties with objects retained but differ in others, thereby establishing a set of graded material differences that come to stand as physical manifestation of differences in meaning or social use. The meanings of items at different positions on such gradients therefore depend on the existence of the gradient itself. Gradations of differently valued objects provide a source of material metaphors for evaluating people. To trace the emergence of highly valued, inalienable objects—and explain their effectiveness in the legitimation of power and authority—it is not sufficient simply to show how access could be controlled. It is also important to ask: In relation to what *alienable* objects did the *inalienability* of some things become an index of power and authority?

Inquiry begins with the identification of potential gradations of value. Of particular interest are sets of objects that share some but not all material properties. For instance, they might be similar in function but of different material. They might be of the same material but with formal differences suggestive of distinct functions. They might differ in *specificity*, the uniqueness of their appearance. Further, objects may be used in deliberately contrasting ways. Ritual use of utilitarian objects or personal ornaments suggests some development of a gradation of value. Where the ritual objects are nonfunctional elaborations of their ordinary counterparts (such as an axe head that is intricately carved or too big to use), a more richly developed gradation has emerged.

The next step is to consider the social use of items at different points along the proposed gradient, with particular attention to potential *alienability*—the degree to which the objects are likely to have moved freely in social transactions without developing the sort of individualized life histories that would favor either retention as heirlooms or eventual return to an original owner. Alienable objects are often relatively common, not specific in formal detail, and sometimes divisible into component parts (such as a dentalium shell necklace). Inalienable objects tend to be scarce, specifically identifiable in formal detail, and of low divisibility (see Lesure 1999b:31).

One can go on to explore the kinds and scales of social relations activated by use of the items from different positions along a gradation of value. For study of *kinds* of social relations, a topic of interest is the distinction between horizontal relations among structurally similar entities (such as individuals or kin groups) and vertical relations involving differences in rank. *Scales* of social relations activated in the circumstances of deployment of valuables may be roughly characterized as small (interpersonal), medium (among households or kin groups), or large (within the community as a whole or among communities). I have suggested a few archaeological patterns that might be indicative of horizontal versus vertical relations of small, medium, or large scale (Lesure 1999b:32–33). For instance, homogeneous intra-site distribution of a given item would suggest deployment in horizontal relationships, highly differentiated distributions would indicate vertical relations, and moderate differentiation would suggest a combination of the two (everyone has some, but the chief has more). Several lines of evidence may be relevant to the scale of social relations implicated in deployment of a given class of object. For analysis of greenstone objects at Paso de la Amada, a consideration of particular interest is the circumstances of deposition, including implied rates of loss and discard.

A system of bridewealth would require a class of alienable objects (relatively common, of low to moderate specificity, perhaps divisible into component parts), with evidence of deployment in horizontal relations of intermediate scale. With the emergence of hereditary inequality, we would expect not simply an unequal distribution of such goods but also development of an increasingly rich gradient of differentially valued objects, including inalienable items that legitimized the high status of their owners by being both similar to and different from objects that circulated.

Cotton Cloth as a Valuable

In Late Postclassic Central Mexico, cloth was an alienable commodity, produced by women for tribute payments and market exchange (Brumfiel 1991). Significant archaeological visibility of spinning and weaving typically dates no earlier than the Classic period (Chase et al. 2008; Hall 1997; Halperin 2008; Smith and Hirth 1988; Stark et al. 1998).

Yet cotton could have been grown in the Soconusco, and we have evidence at Paso de la Amada for spinning of cotton thread and weaving, most likely with a backstrap loom (Chapters 15 and 18). Follensbee (2008) argues on the basis of iconographic evidence that textiles were valued objects on the southern Gulf Coast during the Early to Middle Formative.

At Initial Formative Paso de la Amada, cotton cloth is a possible (even likely) candidate for a wealth item distributed across a gradation of values, one component of which could have involved circulation as bridewealth. Yet the perishable nature of clothing leaves this an uncertain case.

On the basis of items of apparel depicted on ceramic figurines of the Playa de los Muertos tradition (mainly 900–200 BC), Joyce (2014) argues that woven cloth was a valuable and that items of twined or woven clothing were donned as ritual regalia linked to female life-cycle rites. Younger women were depicted with twined wraps around the middle of the body, whereas older women were (occasionally) shown with skirts, shorts, capes, and veils that would have been made with valuable sheets of woven cloth. In the terms I use here, clothing mediated small-scale social relationships (among family members) by symbolically and performatively reconfiguring them at a medium to large scale as relations among age classes.

At Paso de la Amada, several hundred years before the Playa de los Muertos materials, we have numerous impressions of woven cotton cloth or thread-wrapped paddles on sherds of the Ocós-phase type Amada Black-to-Brown (Figures 8.25–8.27). There is also a spectrum of relevant tools, including likely spindle whorls (modeled in clay or made from sherds) and bone needles, battens, and other likely weaving implements (Figure 15.4). The tools are relatively rare, and their distribution among locations, shown in Table 27.2, is strongly tied to sample size. (Bark beaters were unusually common and weaving implements rare at Mound 32, raising the issue of whether the inhabitants of that mound favored bark cloth over cotton clothing. However, bone preservation was not as good at Mound 32 as at Mounds 1 and 12.) It seems possible that, as in later eras (Hendon 2006), women spun cotton thread and wove textiles, most likely with backstrap looms such as those still used today in highland Chiapas. Such work was time-consuming, creating potential scheduling conflicts with other domestic activities. One can readily envision that bolts of woven cloth and/or items made therefrom would have been valuable yet alienable objects that could have been exchanged in horizontal, intermediate-scale social relationships such as marriage transactions.

What we don't have at Paso de la Amada are figurines with depictions of items of cotton cloth. Young females are depicted as not wearing anything. As Joyce (2014:67) argues for the case of Playa de los Muertos, most clothing items depicted among Xumay-type figures appear to be ritual apparel. The tunics and hoods are roughened with shell-edge or other stamping techniques to suggest a pelt or animal skin. Masks, headdresses, and hats appear to have been complicated creations that could have incorporated cloth as well as other perishable materials. I have generally thought of the three- or five-tassel outfit that also appears among Xumay torsos as consisting of masses of feathers, but bark cloth might be another possibility. In a few cases, the short, linear impressions used to decorate the tassels appear also on the torso (Figure 27.1g–h). (There may be a few more cases in the highly fragmentary collection of hollow figurines, currently under analysis alongside those from other excavations.) Cases such as those in Figure 27.1 are the closest we have to potential depictions among the solid figurines of people wearing cotton cloth. The decoration in this case would raise the possibility of embroidered elaboration and thus potentially a gradation of different values of cloth. It is worth remembering, as well, the highly unusual Needle B described in Chapter 15, in which a longitudinal hole from the end joins the eyehole. I have been unable to identify any comparable modern exemplar. One possibility is that this needle was used to produce a double-stranded embroidery, with separate threads going in each side of the eyehole and coming out of the rear hole together.

Greenstone as a Valuable

By the Middle Formative period across Mesoamerica, greenstone objects were part of richly developed gradations of value. Many of the cosmological themes associated with this substance in later eras were already in place (Taube 1996, 2000, 2005). Axes—often but not always of greenstone—display a particularly dramatic range of variation in size, form, decorative elaboration, traces of use, and depositional context. Heavily battered versions are found in domestic contexts (Clark 1988:139–48; McAnany and Ebersole 2004:318–19). Given their low frequencies, use in woodworking seems more likely than use in forest clearance. However, axes were also manipulated in rituals at sites like La Venta, La Merced, and San Isidro, where they were deposited in large offerings, arranged to suggest models of the cosmos (Drucker et al. 1959; Lowe 1981; Reilly 1994; Rodriguez and Ortiz 2000; Taube 2000). Some axes were incised with cosmological, supernatural, or ruler imagery (e.g., Benson and de la Fuente 1996:nos. 114–19; Berrin and Fields 2010:Plates 88–90, 93; Drucker et al. 1959:Figures 35 and 40). A few were actually carved in the form of supernaturals (Benson and de la Fuente 1996:nos. 110–112; Berrin and Fields 2010:Plates 59, 76). Although many of the axes in offerings at La Venta show evidence of use (Drucker et al. 1959:139), others do not, and the effigy versions were clearly made to be ceremonial paraphernalia rather than utilitarian implements.

Greenstone earspools were linked to rulership in Classic Maya society and had cosmologically charged associations with breath, wind, and supernatural serpents (Taube 2005). Association of earspools with rulership at Middle

Table 27.2. Distribution of spinning and weaving equipment, sherds with fabric stamping, and bark beaters[a]

Location	Predominant Phase	Weight of Sherds (kg)	Worked-Sherd Spindle Whorl	Modeled-Clay Spindle Whorl	Batten	Weaving Pick or Spacer (Pins C and D)	Awl-Spatula	Standard Needle (Type A)	Exotic Needle (Type B)	**Total Spinning/ Weaving Tools**	Amada Black-to-Brown Rim Sherds	Bark Beater
Md. 1	Cherla	3327.4	10	4	2	8	1	7		**32**	20	1
Md. 12	Late Locona–Ocós	1438.6	3	5				7	1	**16**	40	0
Md. 32	Locona–Ocós	388.9								**0**	7	1+2[b]
Pit 32	Late Locona	247.3	4							**4**	1	
Md. 13	Cherla	77.5				1				**1**	3	
Md. 21	Locona	76.9								**0**	2	
Mz-250	Locona	59.8	1							**1**		
Md. 11	Cherla	49.3								**0**		
T1B	Cherla	41.3								**0**	1	
T1T	Cherla	37.6								**0**		
Md. 14	Locona	35.1								**0**		
P29	Cherla	8.8								**0**		

[a] The rows are ordered by sample size as measured by weight of sherds, largest sample at the top.
[b] One small fragment in an Ocós midden, one surface find, and one formally similar object in ceramic.

Formative La Venta is suggested by their prominence in the burials (or pseudo-burials) of Complex A (Clark and Colman 2014:174–83; Gillespie 2008). Carved greenstone masks, figurines, and other paraphernalia also seem to be mainly "high-end" elite goods and ceremonial objects (Benson and de la Fuente 1996:nos. 9, 42–108; Berrin and Fields 2010:Plates 71–75, 77–78, 94–99, 102–4, 106–7, 142–44).

Objects at the lower end of value gradients seem to have varied by functional class. Some greenstone objects were special versions of items of similar form and function made of more accessible materials. Particularly convincing is the series from imitation stingray spine carved in bone, to actual stingray spine, to the jadeite imitation from La Venta (Benson and de la Fuente 1996:no. 108; Flannery 1976:341). There might have been a similar gradation in value from ceramic to greenstone figurines, though to what extent the latter acquired meaning and value in relation to the former is uncertain. For one thing, the ceramic figurines were easy to make and had short use lives. It is unclear to what extent jade versions acquired meaning in relation to their ceramic counterparts used in household contexts.

Of considerable interest, then, are classes of greenstone objects that appear in burials, residences, and other use contexts outside of site cores and elite dwellings, raising the possibility of graded values *among* greenstone objects. In an analysis that ranges from Middle Preclassic to Late Postclassic, Freidel (1993) suggests that circulation of greenstone beads occurred among people of all social ranks. He suggests that different greenstone objects served as treasure, as magical devices, and as currency—just the sort of graded series I propose here. Kovacevich (2014:98) has pursued the idea of gradations of value among greenstone objects. She notes ethnohistorical evidence for the circulation of beads as currency and differentiation among different types of greenstone, with commoners in later eras having access primarily to stone of inferior quality.

For the Middle Formative, it may be that the apparently strong association of greenstone ear ornaments with the highest level of the elite at La Venta is in part the result of a concentration of excavations in the site core. Rust (2008:1328–30) reports a few fragments of jade earspools from secondary centers within La Venta's realm. At Chalcatzingo, both standard earspools (of jadeite, serpentine, or other greenstone) and thin earspools (of fuchsite or serpentine) are concentrated in elite residential terraces and the ceremonial core, but they appear in low frequencies across much of the site (Thomson 1987:Table 17.2). From the late second millennium BC and continuing into the Middle Formative, the mortuary practice of placing a single greenstone bead (or ornament fragment) beside or in the mouth of the deceased appears in scattered cases, such as the Tomaltepec cemetery (Whalen 1983) and Chalcatzingo. At Chalcatzingo, cases are concentrated in the elite residential area of the Plaza Central, but there are instanc-

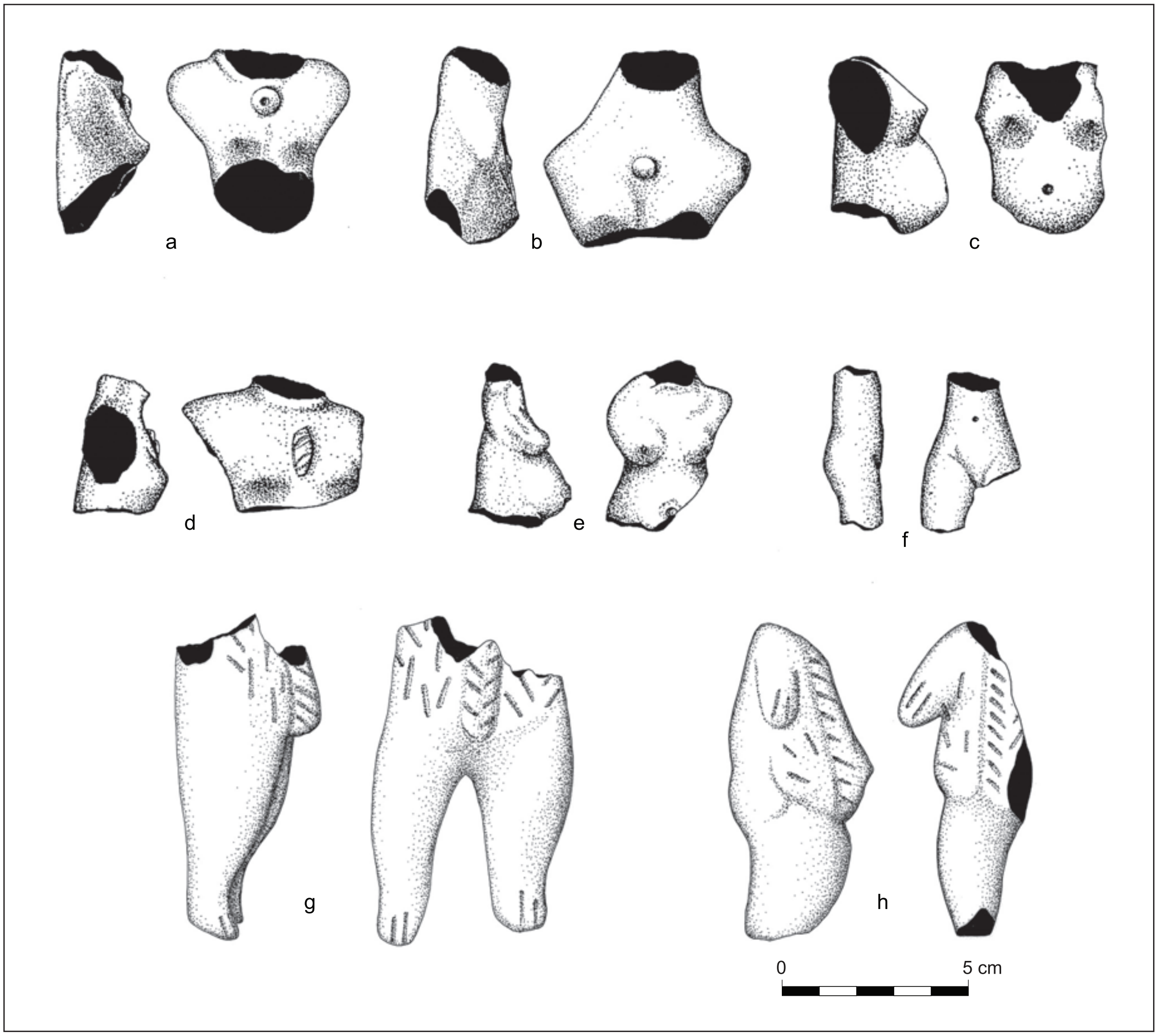


Figure 27.1. Small, solid figurines from Paso de la Amada: (a–f) standing young women of the Nicotaca type, some pregnant, some with a single ornament around the neck; (g–h) Xumay-type figurines with tassels and possible tunics. *Drawings by Helle Girey.*

es as well on Terraces 4 and 24, and cases in the public area of Terrace 25 may represent important individuals from scattered residential groups who were buried in the central location (Grove 1987c:422; Merry de Morales 1987a:96, Table 8.1; Merry de Morales 1987b). This sort of distribution is consistent with the activation of jade in horizontal as well as vertical relationships. Indeed, placement of beads in mouths or beside the deceased raises the possibility that these were not personally owned ornaments but rather part of household or kin group stores that could be divided and deployed in the negotiation of relations with other such groups—including, potentially, marriage transactions or other social payments.

To sum up, greenstone appears to have been the basis for rich gradations of value at important Middle Formative sites, with symbolically laden, elite, ritual paraphernalia acquiring value in relation to more widely available objects, some of which may have been deployed in horizontal or moderately asymmetrical relations of intermediate scale—such as the marriage transactions that figure prominently in some models of the emergence of social inequality. What about the greenstone artifacts of Paso de la Amada?

To understand the nature of greenstone as a valuable at Paso de la Amada, a comparison with later cases proves helpful. Figure 27.2 tabulates presence of various material attributes, depositional contexts, and/or assemblage characteristics of six classes of greenstone objects at Paso de la Amada and four other Formative cases: the Manatí A phase at the sacred spring of El Manatí (Veracruz), approximately contemporaneous with the occupation of Paso de la Amada; El Manatí in the Manatí B and C phases, along with the nearby major center of San Lorenzo, during the era 1400–1000 BC; and two Middle Formative cases: La Venta (Tabasco) and Chalcatzingo (Morelos), dating to approximately 1000–600 BC.

Greenstone artifact class	Description	Gradations within artifact classes	Paso de la Amada	El Manatí Manatí A	San Lorenzo and later El Manatí	La Venta	Chalcatzingo	Gradation by class of artifact
Complex objects	Figurines and celts deposited to form a scene					X		
	Mosaic-covered object						X	
	Low-relief carved plaque or pendant (> 3 cm wide)					X		
	Figurine (or pendant > 4 cm)				X	X	X	
	Mirror or other pendant (> 3 cm wide) w/o imagery		?			X	X	
Earspools	With incised supernatural imagery					X		
	Deposited with other objects as offering					?		
	Deposited with deceased but not worn					?	X	
	Deposited with deceased, worn at ears					?	X	
	Broken in domestic context					X	X	
Perforators	Complex form (incl. imitation stingray spine)					X		
	Simple form tapering to point		X			X	X	
Axes	Massive offerings of serpentine blocks					X		
	With carved imagery (three dimensional)				X	X		
	With incised imagery					X		
	Multiple, deposited in deliberate arrangement				X	X		
	Very large (c. 30+ cm in length)				X	X		
	Multiple, deposited in haphazard arrangement			X	X	X		
	Nonfunctional "pseudo-celt"			X		X		
	With human burial					X	X	
	Single, deposited as offering		X	X				
	Domestic use, discarded with refuse		X		?	?	X	
Beads	Multiple (3+) beads as cache/offering			X				
	Strand of 3+ beads worn by deceased					X	X	
	Bead in mouth of deceased						X	
	Beads much more common than pendants			X		X	X	
	Single bead as offering, with other objects		(X)	X		X		
	Considerable variety of colors, shapes		X	X	X			
	One or two with burial		X				X	
	Most recovered in domestic garbage		X		?			
Pendants	Multiple (3+) composing complex ornament					X	?	
	One or two with burial						X	
	Considerable variability in subject and skill		X				X	
	Most recovered in domestic garbage		X					
	Near parity with beads in frequency		X					

Figure 27.2. Gradations of value among greenstone objects at Paso de la Amada in comparison to other Initial, Early, and Middle Formative sites. See text for discussion. Sources of information: Coe and Diehl 1980; Drucker 1952; Drucker et al. 1959; Merry de Morales 1987a, 1987b; Ortiz and Rodríguez 2000; Thomson 1987. *Illustration by R. Lesure.*

The two columns with differential shading in Figure 27.2 suggest aspects of a complex web of graded differences among objects (or uses thereof). In the column at the far right, the classes of artifact are arranged in a rough graded series—from small pendants (personal ornaments of low alienability, with no shading); to beads and axes (more alienable objects that were likely widely available in small numbers, with light gray shading); to perforators and earspools (more specialized objects with somewhat greater potential for acquiring the memory traces characteristic of inalienable wealth items, with darker gray shading); to complex, highly specific, ritual paraphernalia that were certainly "elite goods" and likely candidates for inalienable valuables (with black shading). As suggested in the other column with shades of gray, variation in the form or uses of objects in each of the six classes suggests graded values *within* the classes as well, a pattern particularly dramatic in the case of axes, which range from utilitarian artifacts discarded in household refuse to elaborately carved, inalienable objects charged with cosmological significance.

La Venta and Chalcatzingo (the Middle Formative sites) yielded richly developed gradations, as suggested above. (At La Venta there is even more complexity that I did not manage to work into the figure.) During the last few centuries of the second millennium BC, at San Lorenzo and the nearby ritual site of El Manatí, the complexity of the value system seen in the Middle Formative cases was still in the process of formation.

As for Paso de la Amada, there are three patterns to note. First, the greenstone assemblage ranges across at least four and likely five of the artifact classes, potentially including what I envision as the most generally inalienable. No greenstone ear ornaments are known, but a single fragment of a relatively large greenstone object, potentially a pectoral (apparently without iconographic elaboration),

Table 27.3. Basic color groups of greenstone ornaments from Paso de la Amada, with distribution by hardness and artifact class

Basic Color	Munsell Ranges	Total	Distribution by Hardness on Mohs Scale				Distribution by Artifact Class			
			2–3	3	3–6	7 or more	Bead	Pendant	Fragment of Large Ornament	Unfinished Bead or Pendant
grayish green	5Y, 10Y, 5GY, values 4–6, chroma 1–4	27	1	3	3	20	9	13		5
black to very dark green	2.5Y, 5Y, 10Y 3/1 or 3/2	8	1	3		3	3	4	1	
light greenish gray	10Y, 5GY 7/1–2, 8/1	7			2	5	3	4		
light gray to pale brown	2.5Y 6/2, 7/2, 8/2	6		4	1	1	6			

comes from Zone III of the platform fill at Mound 1 (303087; see Figure 11.3u). Second, despite the range of categories, graded differentiation *within* each class is quite poorly developed in comparison with the Middle Formative cases. The third point is a qualification of the second: there are nevertheless subtle hints of emergent differentiation in the use of greenstone within the two classes with the highest potential alienability. Both cases involve use of a greenstone object as an offering: an axe buried beneath the floor of Structure 5 or 6 at Mound 6 and a bead placed in a pot at Aquiles Serdán. The objects used as offerings in these cases did not differ from their ordinary counterparts.

The Manatí A assemblage is from a special-purpose ritual site and is thus incomplete for our purposes here. Still, it appears that on the Gulf Coast, during the heyday of Paso de la Amada in the Locona and Ocós phases, greenstone had been built into a more complex gradation of values than at that point existed in the Soconusco. Yet it would be oversimplifying things to suggest that contact with San Lorenzo (beginning in the Cherla phase) introduced greenstone as a valuable to the Soconusco. People of the Mokaya tradition had already started down that path. To the cases of ritual manipulation of greenstone objects already mentioned can be added the following observations concerning color.

The greenness of jade seems already to have been an important criterion in selection of material for ornaments. Table 27.3 organizes the greenstone ornaments into four basic color groups. More than 60 percent of the ornaments have hardness of 7 or more on the Mohs scale, and many are likely jadeite. Yet lower hardness values appear in the same color classes, suggesting that color had a cultural importance similar to hardness. Most ornaments are either grayish green to olive or light greenish gray—the greenest of the stones represented. Pendants tend to be larger than beads, and 75 percent of them are of hardness 7 or more (compared to 45 percent of beads). People seem to have sought particularly high-quality stone for pendants. It is noteworthy, then, that a larger proportion of pendants are grayish green to olive or light greenish gray (81 percent compared to 57 percent for beads). Black metamorphic stone of variable hardness may have been available in larger pieces than greener greenstones: the one fragment of large ornament is in that category (hardness 7, likely jadeite), and many of the greenstone axes are of the same color (Table 12.1). Andrieu et al. (2014) note evidence of color preferences by artifact type at the Classic-period site of Cancuen. There, as at Paso de la Amada, axes are mainly black jades and ornaments are in greener shades (often more green than anything available in the Initial Formative). My point here is that some of the same kinds of discriminations based on color that we see in later Mesoamerica were already being made at Paso de la Amada, despite the relatively weak development of gradations of value.

Were any of these alienable objects? Greenstone certainly arrived at Paso de la Amada through exchange, but patterns among the ornaments suggest low numbers of objects, moving through diverse networks of linkages, ending up predominantly as relatively inalienable personal ornaments. Beads are candidates for alienable objects because they can be composed into strings of increasing specificity but then divided again for multiple uses (such as, at Chalcatzingo, placement in the mouth of the deceased). The evidence we have from Paso de la Amada suggests that beads were worn as single items. That is indicated by the depiction of ornaments on figurines (Figures 27.1a–b, 27.1d); the occurrence as individual items, apparently worn by the deceased, in burials (Burial 5); and—perhaps most important—the unusually high ratio of pendants to beads (21 to 22). The pendants are each unique and likely were personal ornaments of at least moderate specificity.

In sum, greenstone beads and pendants appear to have been personal ornaments, worn in small numbers. It seems unlikely that they were amassed in significant quantities; it is therefore hard to envision them playing more than a minor role in marriage payments. That point is reinforced by the high rate of loss or discard of greenstone beads and pendants at Paso de la Amada compared to Chalcatzingo (Lesure 1999b:43–44). The small beads and pendants were probably relatively inalienable personal possessions with fairly short life histories compared to jade ornaments in later Mesoamerica.

Most households had access to axes, also in small numbers. The best of these tools—of dense, black, metamorphic greenstone—were continually refurbished over the course of (for utilitarian tools) fairly lengthy use lives. In my initial assessment of greenstone as a valuable at Paso de la Amada (Lesure 1999b), I left open the question of whether axes might have provided a kind of anchor in ordinary experience for a gradation of value: objects that were important both as utilitarian tools and as items exchanged in the payments that mediated horizontal or moderately asymmetrical relations of intermediate scale. The problem with axes is not simply that they seem to be quite scarce but that it is difficult to see how practical experience would have reinforced their status as key symbols.

Having at long last completed analysis of the "miscellaneous" stone tools—and building both on Sinensky's argument concerning the emergence of a technological complex dedicated to maize grinding (Chapter 9) and ethnographic testimony of the continuing symbolic richness of maize processing equipment in Mesoamerica (Searcy 2011)—I now have a new candidate for what might have been a foundation in ordinary experience for an emerging gradation of value in which the color green had already acquired symbolic significance in a chain of signification potentially already including maize. The artifacts in question are the dense, metamorphic greenstone cobbles used as pecking stones to fashion and refurbish maize grinding equipment (Chapter 12). They are green to black in color (less distinctly green than the ornaments, though many of the latter have low chroma values as well). Densities are high, 2.7–2.9, within the measured range of 2.7 to 3.5 for axes. (Compare this to 2.95 for nephrite and 3.3 for jadeite.) Hardness varies from 3 to 7, with 6 to 7 common. (Compare this to 6.6 for nephrite and to 6.5–7.0 for jadeite.) These were regular objects in household artifact inventories. They were routinely used in their natural state, but the wear on some particularly dense stones indicates lengthy use lives. The idea that these were not "merely" hammerstones is suggested by their use as offerings in burials. Artifact A in Burial 11 at Paso de la Amada is a well-used pecking stone (Chapter 23). Near the head of a Locona-phase youth buried at Vivero I (wearing a headdress with a mica mirror, a likely marker of high and perhaps hereditary rank [Clark 1991]) there was a greenstone cobble (Clark 1994a:Table 25, Figure 113).

I propose that these seemingly humble tools were experientially and symbolically important in the initial emergence of greenstone as a valuable in the Soconusco (Figure 27.3). Dense green pecking stones brought manos and metates into existence. They were both practically necessary and symbolically linked with life-giving sustenance. Further, they were on the one hand sufficiently common and on the other hand sufficiently difficult to obtain to have served as alienable objects amassed in variable quantities for life-cycle payments. They therefore could have served as a basis for competitive displays and rank differentiation. During funeral rituals, one might be placed beside the head of the deceased. Metamorphic pecking stones constituted an important link in a gradation of differently valued objects.

Conclusions on Value Genesis

I view archaeology's efforts to evaluate models of the emergence of social inequality as a long-term agenda that requires significant preparatory work on the organizational and cultural specificities of individual cases. Of interest in a case like the Initial Formative of the Soconusco is whether there was a bridewealth system out of which asymmetrical relations among corporate kin groups could have emerged. The specifics of marriage arrangements is a difficult archaeological topic, but it is possible to make headway on more abstract issues. Were there alienable objects appropriate for deployment in horizontal or moderately asymmetrical relations of intermediate scale? If so, did the practical need for and use of these more alienable objects provide a kind of foil against which less alienable "elite goods" acquired the symbolic associations that allowed them to legitimize differences in social rank and access to the supernatural? At Paso de la Amada, both cotton textiles and greenstone artifacts seem promising in this regard, but in both cases more work is needed.

THE SOCIAL, NATURAL, AND SUPERNATURAL WORLDS

Paso de la Amada yielded a rich collection of modeled ceramic imagery. The collection is reported only briefly in Chapter 16 because we are preparing a separate monograph on ceramic imagery from multiple projects. Preliminary interpretations offered here include consideration of the Mound 32 statuette.

Particularly striking in the corpus of imagery from Paso de la Amada (and Initial Formative Soconusco generally) is the predominance of three-dimensional modeling rather than representations in two dimensions. From 1300 BC, as in much of Mesoamerica at that time, ceramic vessels in the Soconusco were decorated with two-dimensional, schematic, Olmec-style images of supernatural creatures or forces, usually incised or excised on ceramic vessels. Adoption of the Olmec-style imagery corresponded with the abandonment of a local tradition of modeled zoomorphic images on ceramic vessels (Lesure 2000). The shift from naturalistic animals to schematized, supernaturals is striking, though it turns out to have been less stark than I originally portrayed it. Some modeled animals do continue in the Cuadros phase.

There are also intriguing cases of elaborate two-dimensional decoration in the Locona and Ocós phases: on pots of the types Gallo Pink on Red and Amada Black-to-Brown, on ceramic rattles, and on a spectacularly carved crocodile tooth from Mound 12 (Figure 27.4). The designs are curvilinear in emphasis, with trianguloid elements and spirals. I don't know to what extent these were simply complex, eye-

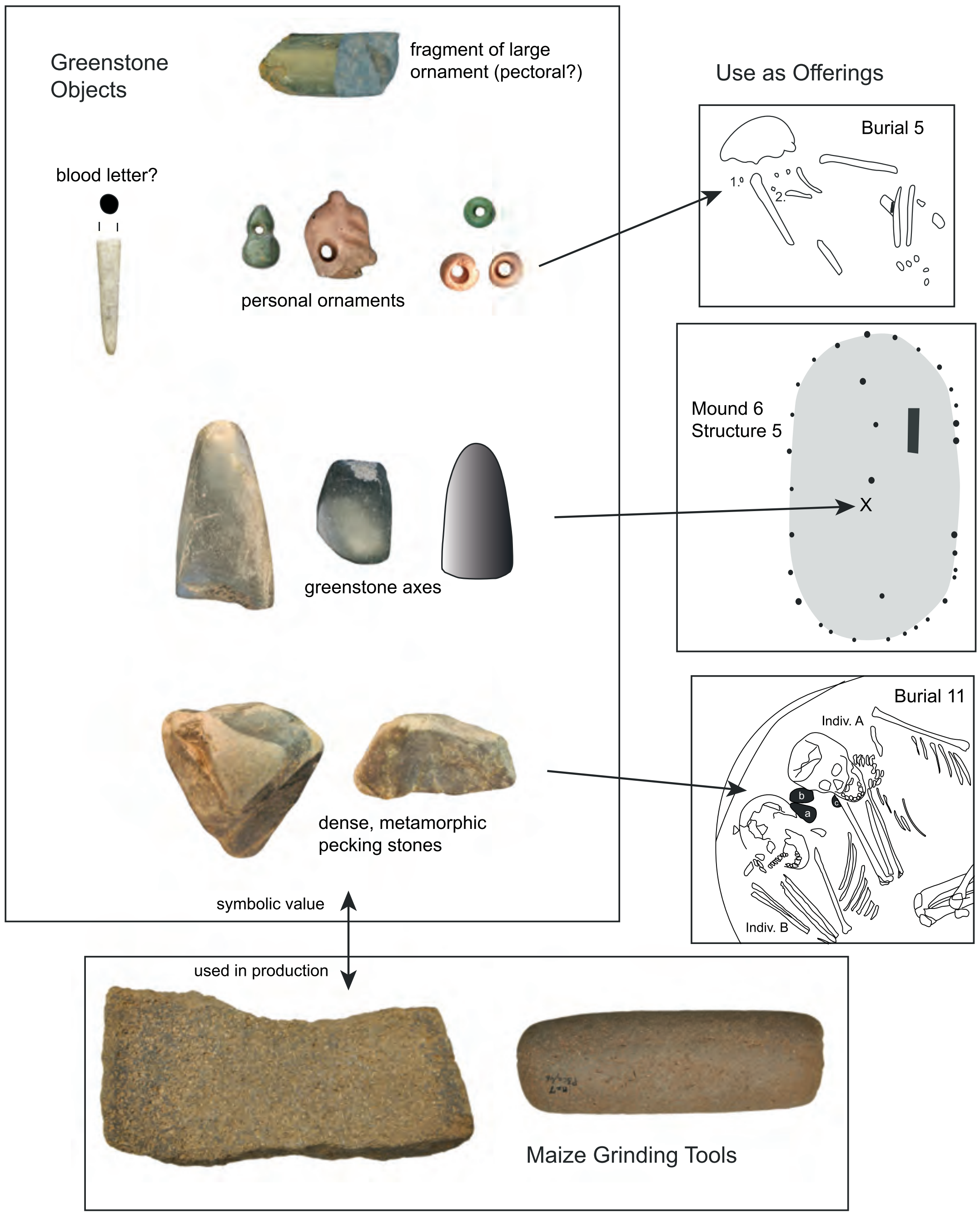


Figure 27.3. Symbolic gradation of values among greenstone objects at Paso de la Amada, from relatively common metamorphic pecking stones (below) to extremely rare large greenstone ornaments (top). See text for discussion. *Illustration by R. Lesure.*

catching designs or if they were meaningful in some way—cosmograms, for instance, or something of that sort. The lack of strong similarities of motifs across the different artifact classes perhaps points toward the eye-catching design hypothesis. On the crocodile tooth, the bold asymmetry of the image is particularly salient; the frontal view reminds me of van Gogh's *The Starry Night*. Compared to that, the pottery decorations—despite the enchanting complexity of interlocking spirals, curvilinear branches, and trianguloid elements—seem restrained. It may well be that these are completely separate phenomena with no meaningful reference beyond the designs themselves. Still, further work on a larger sample is called for.

The modeled zoomorphic imagery on pots of the Initial Formative records the rich variety of animals in the natural environment of the Soconusco (Figures 16.5–16.7; see also Lesure 2000:Figures 3–9). The naturalistic depiction of animals that the villagers would have encountered regularly suggests a symbolic system accessible to widespread engagement. The symbolism may not have re-

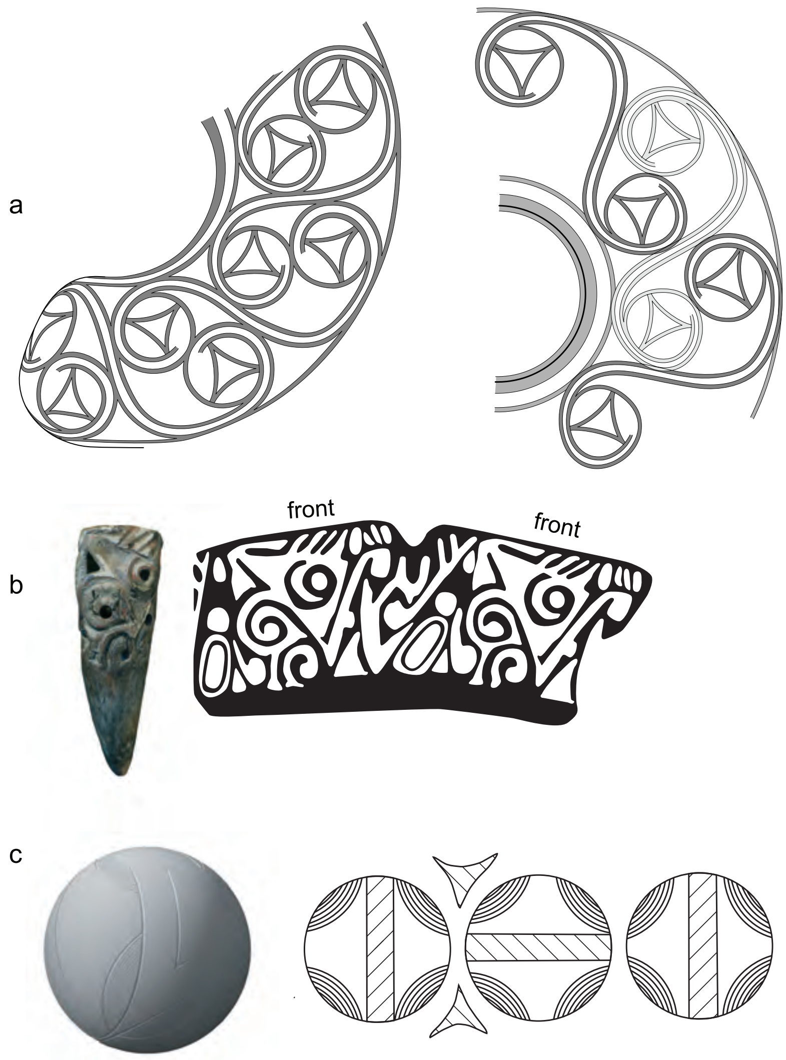


Figure 27.4. Elaborate two-dimensional decoration from Paso de la Amada: (a) rollout drawing on an Amada Black-to-Brown pot; (b) carved crocodile tooth with rollout sketch of design; (c) reconstructed rattle with elements of the design. See also Figures 8.15c–d, 8.25–8.27, and 15.3f–g. *Reconstruction drawings in (a) and (b) by Ayax Moreno; illustration composed by R. Lesure.*

quired esoteric exegesis, but there was certainly more at play than the illustration of local animals. Toads are the most consistently recurring image (Figure 16.7k–m). Having witnessed the cacophony they generate after the first downpours of the rainy season, I suspect a nest of symbolic associations for this image that included rain, water, and fertility. Coe (1961:Figure 40e) found a fragment of an effigy pot with one toad on top of the other, likely a mating pair. Dogs were also a popular subject, much more varied in formal details than the toads—perhaps the result of more intensive engagement of people with this domestic animal (Figures 16.5e, 16.6k, 16.7g; Lesure 2000:Figure 7 middle row left). Perhaps toads were merely exemplars of the symbolic qualities of Toad, whereas dogs were individuals. Yet neither toads nor dogs acquire human attributes such as human ears, ear ornaments, mirror pendants, or headdresses. Those traits appear most frequently (though not exclusively) on crocodiles (Figures 16.6f, 16.7n; Rosenswig 2012:Figure 121). Crocodiles perhaps provided a natural metaphor for power and authority.

Animals were clearly good to think with. Animal symbols were caught up in people's negotiation of social relations and relations with the natural world. None of these objects seem like images of deities. I suspect that even the toads (which arguably come closest to what might be expected of deity images in the repetition of formal attributes) referenced instead the symbolic essence of the creature (Toad), though perhaps a mythological character was involved.

Unlike effigies on pots, small, solid figurines were overwhelmingly human in subject matter. A central theme seems to have been the juxtaposition of two images: nubile (or occasionally pregnant) young women and masked, costumed elders. The young women were often naturalistically crafted, with attention to full breasts, rounded bellies, slender waists, and ample hips (Figures 27.1a–f and 16.1s–t). The images I identify as elders are shown engaged in the ritual activities that would have been vital to the health and success of the household or community (Figures 27.1g–h, 16.2g, 16.2j, 16.2l–n; also Lesure 1997b:Figure 3–4).

Recurring themes among the masks suggest efforts by different artists to depict the same subject (Lesure 1997b:Figure 6; Lesure 1999c:Figure 4). Further, Xumay-type figurines bearing the same mask have been recovered from multiple sites that were likely independent communities. These patterns do not favor the masks as personal regalia of political leaders. I think they are depictions of masks that actually existed and that, in turn, depicted spirits selected from a pantheon or corpus shared among villages of the Soconusco. A theme that builds over time among the images of young women is attention to the human body: the contours of the torso, the body embellished with ornaments, and the morphology of human faces exaggerated to the point of caricature (see Lesure 1999c). These themes among the solid figurines suggest discourses linked to relatively small-scale social interactions such as dynamics of the family, the household, and the corporate kin group—settings where powers and mutual obligations involving age, gender, ritual role, and familial authority were negotiated.

Hollow figurines were significantly larger than the solid ones, suggesting use in different social contexts (Lesure 1999c:214–16). The collection is unfortunately quite fragmentary. It appears that the masks and the limited set of tunics among Xumay figurines do not appear among the hollow figures, where faces are human (unmasked) and clothing and ornamentation varied. Based on chest morphology, both men and women were depicted. Clark (1994a:421–27) suggested that these were depictions of politically prominent people or widely revered, elite ancestors. In other words, this second class of image referenced larger-scale social relations than the solid figurines: inter-household or community-level discourses of leadership, renown, or ancestral authority.

There isn't much to add to those thoughts here. I confine my comments to the possible implications of the Mound 32 statuette (Figure 16.8). The figure is female (based on the morphology of the chest). Like many of the small, solid, female figurines (and an unknown portion of the hollow figurines), she is unclothed. She has what appears to be tonsured hair with some additional decorations of some sort. She has no definite ornamentation; the earspools reconstructed by Ayax Moreno in Figure 16.8a are based on subtle but ambiguous traces of something broken from the vicinity of the lower ear (Figure 16.8g). Unlike small figurines depicting young women, she is shown with arms and hands. The statuette probably stood at least twice as tall as most hollow figurines. It remains unclear whether she was part of the general range of discourse associated with those other figurines or if she referenced altogether different ideas.

Those two possibilities form the basis for the following suggestions. First, the statuette may depict some prominent person in the Mound 32 residential group—perhaps the founder of the kin group. In that scenario, she falls within the range of discourse of other hollow figurines.

A second suggestion (which I prefer) is that she provides a glimpse of a cultural category in Initial Formative Soconusco of which we were previously unaware. Let us call her the Mokaya Matron. In this scenario, the statuette was linked symbolically with themes from the solid figurines, but she represents the manifestation of those themes at a distinct level of discourse, a point that reflects back on our understandings of the solid figurines. For instance, maybe the Mokaya Matron encapsulated, in a mythological entity, all the themes of social power, fecundity, debt, and obligation associated with the juxtaposition of masked elders and nubile young women among the solid figurines. Indeed, if such an entity existed, it may be that by identifying the solid figurines as images of young women, we recognize only the lowest level of what was actually a more complex web of signification. These objects were also reminders that young women were (or should be) corporeal embodiments of the Mokaya Matron and should comport themselves always with that in mind.

THE OLMEC STYLE AT PASO DE LA AMADA

The decline of Paso de la Amada—and of the tradition of expressive culture and associated cultural understandings discussed in the preceding section—occurred over the course of the Cherla phase. Since Barra times, Paso de la Amada had maintained some sort of "first among equals" status among the large, independent villages of the Mazatán zone. During the Cherla phase, that position was challenged by Cantón Corralito. (For extensive discussion, see Cheetham 2009, 2010a, 2010b, 2012; Cheetham and Coe 2017; Clark 1997, 2007; Clark and Blake 1989; Clark and Pye 2000). Home to immigrants from the Gulf Coast site of San Lorenzo, Cantón Corralito became a new local source for exotic foreign goods and for dissemination of knowledge and practices associated with Olmec-style material culture. Cheetham (2010a:449–58) argues that Cantón Corralito was an autonomous enclave sponsored by San Lorenzo to facilitate access to trade routes extending to the southeast along the Pacific Coast and reaching important sources of jade and obsidian in Guatemala. He also suggests that Cantón Corralito's ability to provide a source of prestigious exotic goods and ideas allowed its inhabitants to exert a form of cultural hegemony in the Mazatán area, leading to significant stylistic changes in material culture and the abandonment of a variety of local traditions.

The Cherla phase (1400–1300 BC) was transitional in terms of material culture and appears to have involved competition among independent villages, perhaps with intermittent violence. In the subsequent Cuadros phase (1300–1200 BC)—after the abandonment of Paso de la Amada—the material culture of the Mazatán zone was thoroughly Olmec in style. At Cantón Corralito, similarities with San Lorenzo, some 400 km away, extended to detailed attributes of vessels and figurines (Cheetham 2009; Cheetham and Coe 2017). During the Cuadros phase, Cantón Corralito emerged as the paramount center of a complex chiefdom, with control over what had previously been a cluster of small, independent polities (Clark 1997). The topic for this section is how these events at the regional scale impacted Paso de la Amada during the century or so preceding its abandonment.

Cheetham's work helps clarify what constitutes "Olmec style" on the time horizon of the Cherla phase, correlated with Chicharras at San Lorenzo. In this "Initial Olmec style," certain objects that would be quintessential diagnostics in the "Early Olmec style" (equivalent to the San Lorenzo phase at San Lorenzo) had not yet appeared, including the characteristic decoration of the ceramic types Calzadas Carved and Limón Incised. On the other hand, ceramic spatulas seem to be diagnostic of the Initial Olmec style (Cheetham 2010a:433–34).

Almost the full range of Initial Olmec material culture that Cheetham reports from Cantón Corralito (Cheetham 2010a, 2012) also appears at Paso de la Amada (Figure 27.5). We would like to know the relative frequencies of these artifacts and the degree of continuity of local "Mokaya" practices. Several factors complicate progress on those issues. First, it is important to remember that the Cherla assemblage from Paso de la Amada derives overwhelmingly from the platform at Mound 1, which contains some Locona and Ocós admixture (Table 3.1). Another complication is that, compared to Cheetham, I am less confident in my ability to definitively assign individual sherds to types. In my analysis, numerous rims were assigned to "type class" rather than type (see Chapter 8). In my opinion, that is as specific an identification as is possible, but one result is that the Locona/Ocós admixture cannot be screened out merely by excluding selected types. Further, my type and form identifications in the 1990s relied heavily on the range of variation represented in the NWAF type collections at that time. Cheetham subsequently discovered several forms and types previously unknown in the Early Formative Soconusco, including the domed censer (Form C4) and most of the imported types. A more minor additional issue is that whereas I approached Cherla with a Locona-Ocós eye (and thus ended up, for instance, cramming too much into the basically Locona vessel form BR2), Cheetham approached it with a Cuadros eye, thereby missing some Ocós holdovers. For example, the two rims in the upper right and bottom middle of Cheetham 2012:Figure 104, identified by Cheetham as slipped tecomates, appear instead to be Michis Red Rim tecomates, a type he did not recognize in his Cherla collection.

Although quantification is hampered by admixture in the Mound 1 sample, most Olmec-style diagnostics appear to have been less common at Paso de la Amada than at Cantón Corralito. The density of stamps and cylinder seals—at least one of which bears a fragment of a recognizably Olmec-style motif (307005)—was 0.15/m^3 in Zone IV of the Mound 1 platform and 0.55/m^3 in Cherla midden deposits at Cantón Corralito (Cheetham 2010a:430–33, Table 9.7). Likewise, the density of ceramic spatulas in Zone IV at Mound 1 was 0.68/m^3, compared to 3.3/m^3 at Cantón Corralito (Cheetham 2010a:Table 9.7).

In my original ceramic analysis, I identified relatively few censers in the Cherla deposits. Cheetham calculated those at 0.24 percent of the vessel assemblage compared to 1.74 percent at Cantón Corralito. In 2017 I went through most of the Mound 1 Cherla bags, recounting censer and rattle fragments. (The main goal was to try to produce data comparable to what Clark [1994a] reports in his dissertation, not necessarily the same as Cheetham's standards.) I identified various definite fragments of domed censers. I also reclassified some scraped/unslipped bowls previously classified as Form B1 as likely censers. The recount revises upward the frequency of censers and probable censers in the Mound 1 Cherla deposits: 1.03 percent of rims in the samples with ceramic analysis to Levels A and B. If the small, crude plates (Forms P1 and P2, apparently absent at Cantón Corralito) are included, the percentage rises to 2.17 percent. Cheetham (2012:214) reports that the domed censer is the only form present at Cantón Corralito during Cherla; there appears to have been a greater diversity in censer forms at Paso de la Amada during that time.

Cheetham (2009, 2010a:Chapter 8) divides figurines from Cantón Corralito into "Olmec" and "local" styles, a division that does not precisely correspond to the typological distinctions based on surface treatment in Chapter 16. Solid figurines in local style from Cantón Corralito appear to be of the Pama and Nicotaca types, with smoothed surfaces. Olmec-style figurines are mainly Poposac or Zanga, with white or gray slip, but I don't believe that Cheetham classified all such figurines as Olmec. At Paso de la Amada, both surface finish techniques continued in use throughout the Cherla phase, with the juxtaposition likely deliberate and meaningful (Lesure 1999c:218–19). Interestingly, the larger, hollow, white-slipped figurines (Zanga) may have been more common than the small, solid figurines with white slip (Poposac). The excavations reported here yielded 51 fragments of Zanga figurines (six head fragments with a total of four eyes present, five torso fragments, and 40 limb or other fragments). There were 47 Poposac or kaolin figurines (one head with two eyes present, four torsos, and 42 limb fragments). Other excavations at the site revealed Olmec-style solid heads (Cheetham 2012:Figure 112). Solid figurines as a general category remained much more common than hollow figurines, but most were not slipped or burnished.

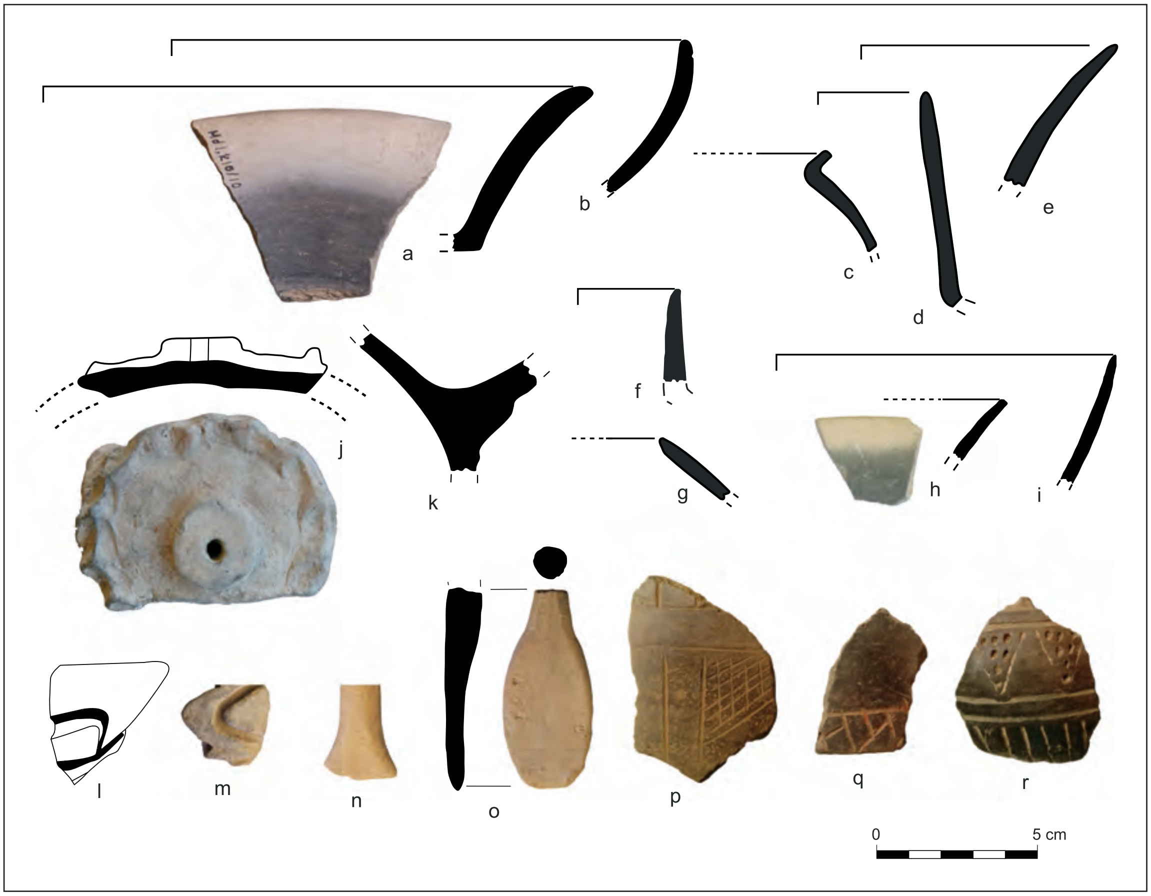


Figure 27.5. Elements of Initial Olmec style at Paso de la Amada: (a–b) locally produced, differentially fired Pino Black and White, commonly including white-rim-black as a decorative scheme; (c–e) hard-fired, imported type Extranjero Grayish White; (f) hard-fired, imported type Extranjero Glossy Gray; (g) Imported Kaolin, quite rare but striking with its pure white paste; (h–i) hard-fired, imported type Extranjero Black and White, identified by Cheetham as Perdida Black and White from San Lorenzo and with white-rim-black as a decorative scheme; (j–k) domed censers (Form C4); (l–m) cylinder seals, some with possible Olmec-style supernatural imagery; (n–o) ceramic spatulas; (p–r) sherds with incised motifs; (s–t) white-slipped, solid figurines of the locally made Poposac type; (u) figurine with smoothed (not burnished or slipped) surface characteristic of the Paqui group, but with stance characteristic of Olmec-style figurines; (v–x) white-slipped, hollow figurines of the Zanga type. *Photos and drawings by R. Lesure, Barry Brillantes, and project staff; figure composed by R. Lesure.*

The implication is that the local tradition of larger, hollow figurines (already attenuated in Ocós relative to its peak during the Locona phase) was abandoned early in the Cherla phase and replaced with white-slipped figures, at least some in clearly Olmec style. Meanwhile, the new practice of slipping and burnishing made only modest inroads among solid figurines. Among modeled human images, in other words, the Olmec style (and perhaps associated practices?) had an earlier, more dramatic impact on the larger-scale rituals involving hollow figurines (perhaps at the level of the corporate kin group and above). Ritual practices involving small, solid figurines (related to age/gender relations within the nuclear family?) changed more gradually over the course of the Cherla phase.

The ceramic vessel assemblage during the Cherla phase at Paso de la Amada includes most of the same local types reported by Cheetham at Cantón Corralito. I did not identify Tatagapa Red, but I was not specifically looking for it, and Cheetham (2010a:585) reports only seven sherds from Cantón Corralito. A few sherds of Bala White, Pino Black and White, and possible imported types have incised motifs composed with zones of hatching, cross-hatching, or punctations, directly comparable to specimens reported by Cheetham (2010a:288–92) from Cantón Corralito and San Lorenzo. (Compare Figure 27.5p–r and Figure 8.22z to Cheetham 2010a:Figure 7.2.) Tables 27.4 and 27.5 compare vessel forms of Bala White and Pino Black and White from Paso de la Amada to those reported for Cantón Corralito. The common vessel forms are shared, but in different frequencies. Comparison of rim diameters by form

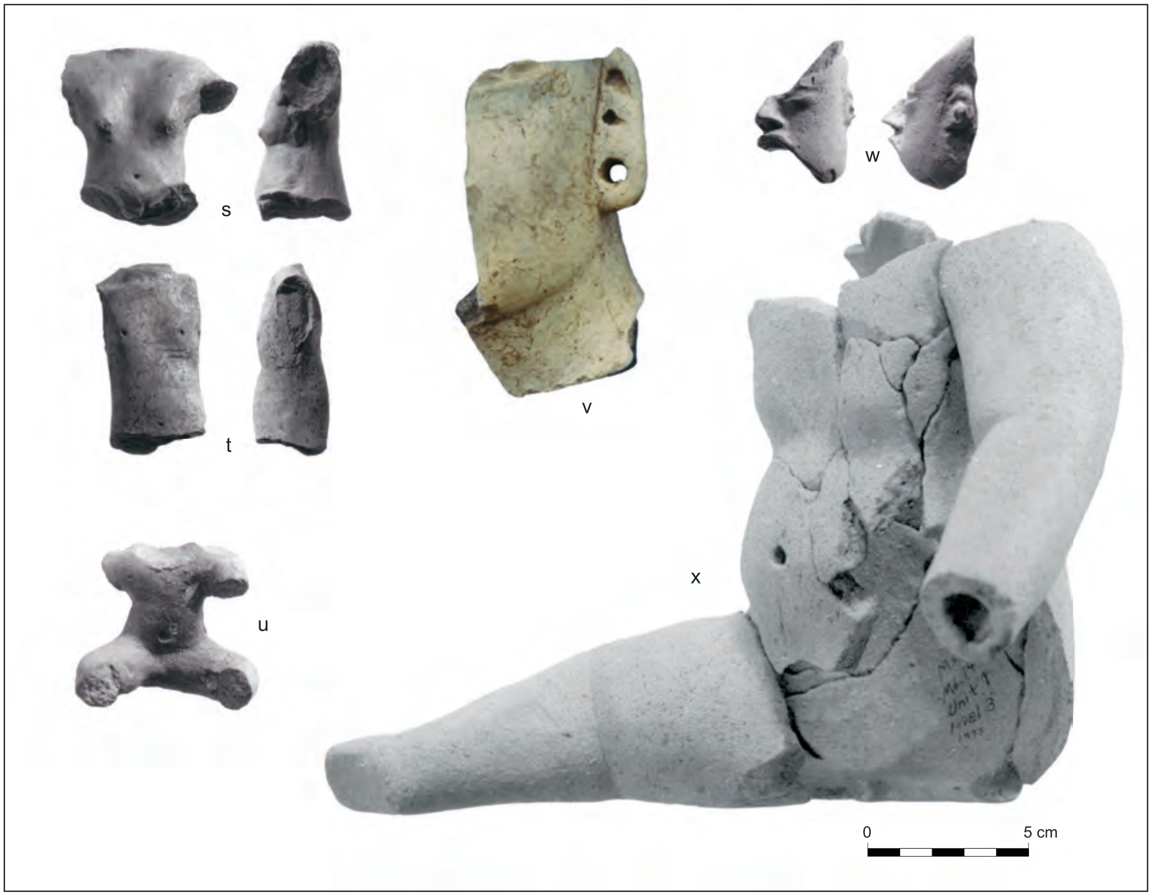


Figure 27.5. *continued*

does not reveal the astounding correspondences between Cantón Corralito and San Lorenzo reported by Cheetham and Coe (2017). The Cherla vessel assemblage at Paso de la Amada seems about as similar to that of Cantón Corralito as one would typically expect from contemporaneous sites a few kilometers apart, sharing the same ceramic complex.

Imported vessels, apparently mainly from San Lorenzo, were more common and more varied at Cantón Corralito than at Paso de la Amada. In a whirlwind review of the Mound 1 collection in 2011, including numerous bags from Zone IV that had not been previously studied, more specimens in a greater range of types were identified. (See discussions of Extranjero Black and White, Extranjero Grayish White, Extranjero Glossy Gray, and Imported Kaolin in Chapter 8.) Imported vessels were absent (or virtually so) at the site prior to the Cherla phase (Table 25.10). The revised frequency in Cherla-phase deposits from Mound 1 is still low compared to Cantón Corralito (0.65 per 100 rim sherds compared to 3.09). Surprisingly, the frequencies at non-elite Cherla locations are higher than at Mound 1 (2.27 per 100 rims). Possible explanations are discussed in Chapter 25.

What was the social context for these changes in material culture at Paso de la Amada? Various suggestive lines of evidence from the excavations give a sense of social disruption accompanying the changes in style. Mound 6 seems to have been abandoned. Mound 7 was no longer in use as a ballcourt, and there may have been habitation on top. The platforms constructed at Mounds 1 and 12 suggest a new locus for construction—and, as suggested in Chapter 7, possibly the first public buildings/temples at the site. Elite residences seem to have been concentrated in the same area.

These changes at Paso de la Amada are generally consistent with Cheetham's cultural hegemony model. The elites at the site embraced new styles of material culture, including new ritual implements, novel associated practices, and probably some altogether new rituals. It is also likely, though, that they were operating strategically in a changing sociopolitical situation. Their efforts to retain power followed a logic similar to that of modern managers in challenging situations: they reorganized. Further, it was during the Cherla phase that the elites of Paso de la Amada became properly "elite" in the sense that their domestic refuse registers a privileged access to imported goods, including obsidian, greenstone, and iron ore mirrors. During the Cherla phase, iron ore mirrors replaced a long-standing local tradition of mica mirrors. The new mirrors probably became available for the first time in Mazatán by virtue of Cantón Corralito's extensive trading connections

Table 27.4. Bala White: distribution of forms at Paso de la Amada versus Cantón Corralito

Form Codes (Lesure)	Form Codes for This Type (Cheetham)	**Percentage at Cantón Corralit**	Frequency at Paso de la Amada	**Percentage at Paso de la Amada**	Average Rim Diameter, Cantón Corralito	Average Rim Diameter, Paso de la Amada
B1a	2, 16	**22.0**	493	**54.4**	26.9 ± 6.0	21.6 ± 6.7
B1b	1, 12	**27.5**	133	**14.7**	23.0 ± 6.8	26.6 ± 5.2
B1			8			
B2b	17	**0.1**	0	**0**		
B3	3	**5.7**	9	**1.0**	22.8 ± 12.3	17.3 ± 6.8
B4, B4b, B5	4, 5, 18	**37.2**	225	**24.8**	26.7 ± 9.4, 19.3 ± 6.1	23.7 ± 7.4 (B4)
BC			1	**0.1**		
BR2	9, 11	**1.0**	4	**0.4**		
BR3, BR3b	13	**0.6**	1	**0.1**		
BR4			1	**0.1**		
BR5			7	**0.8**		
BR5 with thickened, flat rim			1	**0.1**		
BR6			1	**0.1**		
BR7	14 maybe	**0.4**	3	**0.3**		
BR9	9	**0.2**	6	**0.7**		
B			52			
T2, T2a	6	**1.4**	19	**2.1**	13.0 ± 4.4	14.0 (one specimen)
T3, T3a			3	**0.3**		
J5	7	**0.8**	0	**0**		
J3	8, 19	**2.8**	0	**0**		
bottle	15	**0.1**	0	**0**		
uncertain	20, 21	**0.2**	0	**0**		
unidentified	0		24			

to the west and northwest. Cheetham (2012:218–19) suggests that the mirrors may even have been manufactured at Cantón Corralito. This artifact is the best-known example of the sort of phenomenon we expect to see in a situation of cultural hegemony: the bearers of alternative cultural practices are able provide people with exotic foreign goods that become caught up in local processes of social competition.

CONCLUSIONS

Given that the occupation of Paso de la Amada mainly preceded the earliest pan-Mesoamerican-style horizon (the Early Olmec Horizon, 1400–1000 BC), the site has a surprisingly "Mesoamerican" archaeological record. The ballcourt is the earliest known, and the site's material culture includes familiar artifact classes such as figurines, masks, whistles, bark beaters, metates, and two-handed manos. Mirrors were already an important mark of status or authority, recognized in modeled representations of humans (and crocodiles). The color green was symbolically important, and greenstone objects of various kinds and qualities were deployed as offerings. From 1700 BC or so, the trajectory toward development of jade as a multifaceted valuable had already begun.

As a shared tradition, Mesoamerica developed during a long history of contacts among heterogeneous cultures.

Table 27.5. Pino Black and White: distribution of forms at Paso de la Amada versus Cantón Corralito

Form Codes (Lesure)	Form Codes for This Type (Cheetham)	**Percentage at Cantón Corralito**	Frequency at Paso de la Amada	**Percentage at Paso de la Amada**	Average Rim Diameter, Cantón Corralito	Average Rim Diameter, Paso de la Amada
B1a	f.02 and 11	**14.2**	374	**54.4**	22.4 ± 4.5	26.2 ± 4.7
B1b	f.01	**44.4**	107	**15.6**	26.4 ± 6.3	26.3 ± 5.9
B1			4			
B2a	f.19	**0.1**	0	**0**		
B2b	f.14	**0.3**	0	**0**		
B3	f.06	**1.9**	4	**0.6**	27.0 ± 10.6	16.0 ± 4.2
B4, B4b, B5	f.03 and 04	**35.2**	179	**26.0**	28.0 ± 6.8, 20.6 ± 7.7	24.4 ± 7.0
BC	f.13	**0.2**	0	**0**		
BR2	f.08 (my misidentification)	**0.6**	1	**0.2**		
BR3b	not identified		1	**0.2**		
BR4	f.20	**0.1**	0	**0**		
BR5	f.18?	**0.1**	5	**0.7**		
BR7	f.10	**0.3**	1	**0.1**		
BR9	f.12	**0.1**	5	**0.7**		
B			45			
T2, T2a	f.05	**1.7**	9	**1.3**	14.0 ± 2.3	10.6 ± 2.7
T3a	f.16	**0.1**	1	**0.1**		
J3	f.07 and 09	**0.6**	0	**0**		
none	f.15 and 17	**0.1**	0	**0**		
unidentified			24			

"Mesoamerican" attributes in the archaeological record of Paso de la Amada indicate that such contacts were under way already in the Initial Formative. Yet it is hardly surprising to find that this early site also has anomalous aspects. The specific supernatural entities depicted in the masks of Xumay figurines seem to have disappeared for good from the local cultural repertoire by 1300 BC. The array of animals modeled on pots during the Initial Formative is not typical in later Mesoamerica. Finally, the large residential buildings (up to 22 m in length) are surprising considering the prevalence of nuclear family houses in the highlands of Central Mexico and Oaxaca during the second millennium BC—and in later epochs as well.

There is no particular reason why family and household organization at Paso de la Amada should be recognizably "Mesoamerican." The question is: Can aspects of social organization specific to Initial Formative Soconusco be teased from the archaeological record? The hypothesis proposed here is that the large buildings were a component of multi-dwelling residential units, each probably inhabited by a corporate kin group of some sort. I interpret them more specifically as multifamily households, with perhaps 17 to as many as 30 members. (Previously, following Friedman and Rowlands [1978], I envisioned them as lineages.) The basic idea is that such residential groups constituted an important social unit of production and reproduction, already present by early Locona and thus probably developing during the Barra phase.

The multifamily household emerged as an important local productive/reproductive unit in the midst of a ferment of technological and social innovations that underwrote establishment of sedentary villages and rapid subsequent population growth. This social form was one of the adaptations that allowed a dense population to maintain itself on the delta of the lower Coatán. Multifamily residential groups could dispatch personnel simultaneously to multiple locations, including the estuary, the swamp, the various habitats of the coastal plain, and the piedmont.

Complex households would also have been effective units for intracommunity social competition. The dense concentration of people on the Coatán delta and adjacent areas—in a larger landscape still sparsely populated—suggests that people were attracted to what must have been an exciting social scene and cultural renaissance. Locona-phase potters produced some astonishing vessels, effigy sculptures, and hollow figurines. We can only speculate what their more perishable creations in wood or cloth would have looked like.

Ambitious residential groups competed to construct elaborate residences for their leaders. These buildings became the public faces of such groups. They encoded claims to status, renown, and/or ancestral authority and provided settings for feasting and ceremonies. Somehow, the residential group associated with the series of large structures in Mound 6 managed to convert elevated status into hereditary rank.

The mechanisms through which that transformation was achieved are the subject of ongoing investigation. Several important models of emerging inequality suggest that asymmetries in systems of bridewealth or other social payments (along with competitive feasting and other factors) may have been crucial. In this chapter, I have considered a preliminary question in the effort to assess the applicability of such models to Initial Formative Soconusco: Can we identify the valuables that would have been exchanged as bridewealth? Cotton cloth is of considerable interest but frustrating in terms of surviving evidence. Greenstone remains dubious if we restrict ourselves to personal ornaments or even ornaments and axes. However, if we add the dense, metamorphic cobbles used to manufacture and refurbish maize grinding tools, greenstone may become a more plausible candidate for bridewealth. We can even glimpse the beginning of a trajectory toward later, more elaborate gradations of value through which greenstone came to be associated with both rulership and cosmos (Figures 27.2, 27.3).

Despite the hereditary rank signaled so dramatically in the continually expanding platform for the Mound 6 residence, evidence for privileged access to the material accoutrements of status (or the manufacture thereof) is weak and inconsistent. That pattern persisted throughout the Locona and Ocós phases, even as the Mound 6 platform steadily grew in size. Ritual objects, on the other hand, are particularly common in refuse both at Mound 6 and at the Locona-phase platform at Mound 32, the latter identified as the leader's residence of a non-elite (though perhaps middle-ranked?) household. Was control of ritual knowledge (rather than economic factors) the basis of social inequality at Paso de la Amada? That is an issue worthy of consideration, but in my opinion that gloss doesn't capture the crux of the matter. I suspect that economic factors were at play but that certain powerful "egalitarian maintaining mechanisms" (Blake and Clark 1999) were in place—social, cultural, and ideological provisions that inhibited the emergence of differentiation in domestic artifact assemblages. A particularly important factor was that the "private" lives of powerful individuals—the village chief as well as the heads of prominent households—were "public" in that they were subject to constant surveillance. The reasoning behind the system was that the role as intercessor between the people and the supernatural (whether at the scale of the household or the community as a whole) was not conducted simply in brief rituals but also in a ritualization of the daily life of prominent people. In other words, formalism, one of the characteristics of ritual-like activities identified by Bell (1997), was elaborately developed in the social life of Paso de la Amada during the Locona phase.

Other characteristics noted by Bell seem underdeveloped. Rule governance appears at most a haphazardly elaborated aspect of public ritual life. It is striking that every known offering in Initial Formative Soconusco is unique. There was no consistent template for what constituted an offering. Further, although appeals to tradition can be glimpsed in construction sequences of large buildings at Mound 6 (Paso de la Amada) and Mound 1 (San Carlos), the specific continuities between successive structures are unique to the individual architectural sequence. The traditions seem to have referenced continuities of practice specific to an individual kin group rather than a tradition shared by the community as a whole. Finally, our glimpses of the cosmos in the modeled ceramic imagery suggest a system relatively open to public engagement—nothing requiring esoteric exegesis. The meanings of shared symbols were only loosely controlled. The ritual system thus appears orthopraxic rather than orthodoxic—emphasizing correct actions rather than correct doctrine (Bell 1997:191–97).

These patterns particularly characterize the Locona phase, especially the first half or so. Practices gradually changed during the sixteenth and fifteenth centuries BC. To what extent Cherla-phase practices were entirely new, or whether they might have emerged at least in part from a local trajectory of development, is a topic for future work. Two Ocós-phase developments seem, intriguingly, to presage changes in social or aesthetic practice during the Cherla phase. A cultural distinction between public and private spaces emerged in Ocós times, prior to (perhaps) the first temple in the Cherla phase. Among figurines, an increasing aesthetic preoccupation with naturalistic depiction is evident in Ocós, prior to adoption of (naturalistic) Olmec style. Still, it is clear that from 1400 BC, sociopolitical development at Paso de la Amada took place in a set of specific historical circumstances that involved intensive interaction with people from the Gulf Coast center of San Lorenzo and/or their intermediaries living at Cantón Corralito.

Appendix of Proveniences with Notes on Data Records A1 through A5

WHAT FOLLOWS IS a list of minimal proveniences (in stratigraphic order by excavation unit) along with some associated information. See Chapter 2 for description of provenience nomenclature, explanation of refuse sample labels, and discussion of different types of contexts identified in the excavations. EF stands for Early Formative.

See also the five digital data records included as appendices. All are provided as spreadsheets.

Data Record A1 is an expanded version of this Appendix of Proveniences. It includes expanded information about the individual contexts as well as data on artifact counts by minimal provenience. Not all artifacts recovered are registered there because those from unscreened units (discussed in some of the chapters) were not included in the spreadsheet.

Data Record A2 provides the basic data recorded for ceramics analyzed to Level A, while Data Record A3 does the same for Levels A and B and Data Record A4 for Levels A, B, and C. For discussion of the levels of ceramic analysis, see Chapter 2.

Data Record A5 provides obsidian source and use wear data.

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 1 E10/1			plow zone	Cherla		
Md. 1 E10/2			platform fill	Cherla		
Md. 1 E10/5			platform fill	Cherla		
Md. 1 E10/7			platform fill	Cherla		
Md. 1 E10/8			platform fill	Cherla		
Md. 1 E10/9			platform fill	Cherla		
Md. 1 E10/10	0110D	Cherla	platform fill	Cherla	0.464	16.225
Md. 1 E10/11	0104A	Cherla	platform fill	Cherla	0.4	14.78
Md. 1 E10/12	0111C	Cherla	platform fill	Cherla	0.424	9.035
Md. 1 E10/F.4	0108A	Cherla	midden	Cherla	0.193	8.59
Md. 1 E10/25			ancient ground surface	Locona-Cherla		
Md. 1 E10/F.15	0103A	Late Locona	pit fill	Late Locona	0.548	26.675
Md. 1 E11/1			plow zone	Cherla		
Md. 1 E11/5			platform fill	Cherla		
Md. 1 E11/7-9			platform fill	Cherla		
Md. 1 E11/10	0112D	Cherla	platform fill	Cherla	0.507	10.655
Md. 1 E11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.1	1.776
Md. 1 E12/14			plow zone	Cherla		
Md. 1 E12/15			slope wash			
Md. 1 E12/16			slope wash			
Md. 1 E12/F.12			post hole			
Md. 1 E12/17			ancient ground surface?			
Md. 1 F9/1			plow zone	Cherla	0.8	18.7

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 F9/2			platform fill	Cherla	0.232	4.3
Md. 1 F9/5			platform fill	Cherla	0.424	21.2
Md. 1 F9/7			platform fill	Cherla		
Md. 1 F9/8	0113C	Cherla	platform fill	Cherla	0.4	13.5
Md. 1 F9/9-10	0114C	Cherla	platform fill	Cherla	0.8	30.645
Md. 1 F9/11	0115D	Cherla	platform fill	Cherla	0.976	46.955
Md. 1 F10/1			plow zone	Cherla		
Md. 1 F10/2			platform fill	Cherla		
Md. 1 F10/5			platform fill	Cherla		
Md. 1 F10/7			platform fill	Cherla		
Md. 1 F10/8			platform fill	Cherla		
Md. 1 F10/9-10	0116C	Cherla	platform fill	Cherla	0.78	30.405
Md. 1 F10/11	0117C	Cherla	platform fill	Cherla	0.39	11.97
Md. 1 F10/12	0118C	Cherla	platform fill	Cherla	0.376	19.04
Md. 1 F10/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.188	2.684
Md. 1 F10/25	0173B	Md1-IV	ancient ground surface	Locona-Cherla	0.707	5.365
Md. 1 F10/ F.15	0103A	Late Locona	pit fill	Late Locona		
Md. 1 F11/1			plow zone	Cherla	0.72	13.9
Md. 1 F11/2			platform fill	Cherla	0.2	2.8
Md. 1 F11/5			platform fill	Cherla	0.464	12.9
Md. 1 F11/7	0119C	Cherla	platform fill	Cherla	0.384	14.3
Md. 1 F11/8	0119C	Cherla	platform fill	Cherla	0.432	16.8
Md. 1 F11/9-10	0120B	Cherla	platform fill	Cherla	0.792	25.58
Md. 1 F11/11	0121C	Cherla	platform fill	Cherla	0.48	15.625
Md. 1 F11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.717
Md. 1 F11/25	0174B	Md1-IV	ancient ground surface	Locona-Cherla	0.942	8.2
Md. 1 F11/F.15	0103A	Late Locona	pit fill	Late Locona		
Md. 1 F12/1			plow zone	Cherla		
Md. 1 F12/4			platform fill	Cherla		1.38
Md. 1 F12/17			ancient ground surface?		0.32	6.26
Md. 1 F12/25	0175B	Md1-IV	ancient ground surface	Locona-Cherla	0.945	11.815
Md. 1 F12/F.14			grave pit		missing data	5.4
Md. 1 F13/14			plow zone	Cherla		
Md. 1 F13/15			slope wash	Locona, Ocós, Cherla		
Md. 1 F13/16			slope wash	Locona, Ocós, Cherla		
Md. 1 F13/F.14			grave pit			
Md. 1 G8/1			plow zone	Cherla		
Md. 1 G8/2			platform fill	Cherla		
Md. 1 G8/5			platform fill	Cherla		
Md. 1 G8/7-11			platform fill	Cherla		
Md. 1 G9/1			plow zone	Cherla		
Md. 1 G9/2			platform fill	Cherla		
Md. 1 G9/5			platform fill	Cherla	0.456	8.7
Md. 1 G9/F.1			platform fill	Cherla		
Md. 1 G9/7			platform fill	Cherla		
Md. 1 G9/8			platform fill	Cherla		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 G9/9-10			platform fill	Cherla		
Md. 1 G9/11	0122C	Cherla	platform fill	Cherla	0.9	25.6
Md. 1 G9/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.244
Md. 1 G9/25	0179B	Md1-IV	ancient ground surface	Locona-Cherla	0.498	3.525
Md. 1 G10/1			plow zone	Cherla		
Md. 1 G10/2			platform fill	Cherla	0.48	18.9
Md. 1 G10/5			platform fill	Cherla	0.44	7.2
Md. 1 G10/F.1			platform fill	Cherla		
Md. 1 G10/7	0123C	Cherla	platform fill	Cherla	0.408	10.3
Md. 1 G10/8	0123C	Cherla	platform fill	Cherla	0.4	14.8
Md. 1 G10/9-10			platform fill	Cherla		
Md. 1 G10/11	0125C	Cherla	platform fill	Cherla	0.568	24.79
Md. 1 G10/F.7			post hole			
Md. 1 G10/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.088
Md. 1 G10/25	0176B	Md1-IV	ancient ground surface	Locona-Cherla	0.769	4.9
Md. 1 G11/1			plow zone	Cherla		
Md. 1 G11/2			platform fill	Cherla		
Md. 1 G11/5			platform fill	Cherla		
Md. 1 G11/7-8			platform fill	Cherla		
Md. 1 G11/9-10	0126C	Cherla	platform fill	Cherla	0.8	28.195
Md. 1 G11/11	0106A	Cherla	platform fill	Cherla	0.408	19.47
Md. 1 G11/F.7			post hole			
Md. 1 G11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.911
Md. 1 G11/25	0177B	Md1-IV	ancient ground surface	Locona-Cherla	0.711	4.045
Md. 1 G12/1			plow zone	Cherla		
Md. 1 G12/4			platform fill	Cherla		
Md. 1 G12/2			platform fill	Cherla		
Md. 1 G12/5			platform fill	Cherla		
Md. 1 G12/7			platform fill	Cherla		
Md. 1 G12/8-10			platform fill	Cherla		
Md. 1 G12/19	0187B	Md1-IV	ancient ground surface	Locona-Cherla	0.177	4.065
Md. 1 G12/25	0178B	Md1-IV	ancient ground surface	Locona-Cherla	0.82	3.745
Md. 1 G13/1			plow zone	Cherla		
Md. 1 G13/4			platform fill	Cherla		1.38
Md. 1 G14/14			plow zone	Locona, Ocós, Cherla		
Md. 1 H7/1			plow zone	Cherla		
Md. 1 H7/2			platform fill	Cherla		
Md. 1 H7/5			platform fill	Cherla		
Md. 1 H7/7-11			platform fill	Cherla		
Md. 1 H7/Floor B	0171B	Md1-IV(Str1-2)	floor or destroyed wall			
Md. 1 H8/1			plow zone	Cherla	0.86	24.7
Md. 1 H8/2			platform fill	Cherla	0.44	10.4
Md. 1 H8/5			platform fill	Cherla	0.464	9.8
Md. 1 H8/7	0124D	Cherla	platform fill	Cherla	0.32	12.5
Md. 1 H8/8	0132C	Cherla	platform fill	Cherla	0.472	14.7
Md. 1 H8/9-10	0133C	Cherla	platform fill	Cherla	0.784	26.28

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 H8/11	0109A	Cherla	platform fill	Cherla	0.72	29.91
Md. 1 H8/Floor B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.013	0.122
Md. 1 H9/1			plow zone	Cherla	0.88	28.6
Md. 1 H9/2			platform fill	Cherla	0.656	13
Md. 1 H9/5			platform fill	Cherla		
Md. 1 H9/7			platform fill	Cherla		
Md. 1 H9/8			platform fill	Cherla		
Md. 1 H9/9-10			platform fill	Cherla		
Md. 1 H9/11	0134C	Cherla	platform fill	Cherla	0.76	30.075
Md. 1 H9/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.188	2.291
Md. 1 H9/25	0180B	Md1-IV	ancient ground surface	Locona-Cherla	0.584	3.35
Md. 1 H10/1			plow zone	Cherla	0.81	14.9
Md. 1 H10/2			platform fill	Cherla	0.664	22.9
Md. 1 H10/5			platform fill	Cherla	0.456	7.7
Md. 1 H10/7	0127C	Cherla	platform fill	Cherla	0.344	10.5
Md. 1 H10/8	0127C	Cherla	platform fill	Cherla	0.416	11.8
Md. 1 H10/9-10	0128C	Cherla	platform fill	Cherla	1.208	49.285
Md. 1 H10/F.3			post hole			
Md. 1 H10/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.136
Md. 1 H10/20	0193B	Md1-IV	depositional process uncertain	Locona-Cherla	0.27	2.005
Md. 1 H10/22	0194B	Md1-IV	depositional process uncertain	Locona-Cherla	0.83	1.635
Md. 1 H11/1			plow zone	Cherla	0.83	19.3
Md. 1 H11/2			platform fill	Cherla		
Md. 1 H11/5			platform fill	Cherla		
Md. 1 H11/7			platform fill	Cherla		
Md. 1 H11/8			platform fill	Cherla		
Md. 1 H11/9-10	0129B	Cherla	platform fill	Cherla	1	49.525
Md. 1 H11/10B			platform fill	Cherla		
Md. 1 H11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	1.619
Md. 1 H11/20	0195B	Md1-IV	depositional process uncertain	Locona-Cherla	0.347	2.055
Md. 1 H11/21	0196D	Md1-IV	depositional process uncertain	Locona-Cherla	0.246	1.555
Md. 1 H11/22			depositional process uncertain	Locona-Cherla	0.34	
Md. 1 H11/F.13			post hole			
Md. 1 H12/1			plow zone	Cherla	0.75	16.7
Md. 1 H12/2			platform fill	Cherla		
Md. 1 H12/5			platform fill	Cherla	0.408	13.6
Md. 1 H12/7	0130C	Cherla	platform fill	Cherla	0.368	13.6
Md. 1 H12/8	0130C	Cherla	platform fill	Cherla	0.432	17.4
Md. 1 H12/9-10	0131B	Cherla	platform fill	Cherla	1.08	41.66
Md. 1 H12/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.074
Md. 1 H12/20	0197B	Md1-IV	depositional process uncertain	Locona-Cherla	0.256	1.25
Md. 1 H12/21			depositional process uncertain	Locona-Cherla	missing data	0.145
Md. 1 H12/22	0198B	Md1-IV	depositional process uncertain	Locona-Cherla	0.337	1.075
Md. 1 H13/1			plow zone	Cherla		
Md. 1 H13/4			platform fill	Cherla	0.35	12.1
Md. 1 H13/2			platform fill	Cherla		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 1 H13/5			platform fill	Cherla	0.225	6.7
Md. 1 H13/7-10			platform fill	Cherla		
Md. 1 H13/19	0188B	Md1-IV	ancient ground surface	Locona-Cherla	0.232	4.54
Md. 1 H14/14			plow zone			
Md. 1 I6/1			plow zone	Cherla	0.74	11.8
Md. 1 I6/2			platform fill	Cherla	0.07	0.51
Md. 1 I6/5			platform fill	Cherla	0.4	10.9
Md. 1 I6/7			platform fill	Cherla	0.384	12.7
Md. 1 I6/8	0140C	Cherla	platform fill	Cherla	0.424	14.3
Md. 1 I6/9	0141D	Cherla	platform fill	Cherla	0.424	16.095
Md. 1 I6/10	0141D	Cherla	platform fill	Cherla	0.448	19.13
Md. 1 I6/11	0107A	Cherla	platform fill	Cherla	0.432	16.045
Md. 1 I6/24	0191B	Md1-IV	ancient ground surface	Locona-Cherla	0.92	6.855
Md. 1 I7/1			plow zone	Cherla	0.85	17.3
Md. 1 I7/2			platform fill	Cherla	0.216	6.6
Md. 1 I7/5			platform fill	Cherla	0.424	15.5
Md. 1 I7/7	0142C	Cherla	platform fill	Cherla	0.4	17.1
Md. 1 I7/8	0142C	Cherla	platform fill	Cherla	0.416	4.7
Md. 1 I7/9-10	0143B	Cherla	platform fill	Cherla	0.8	33.51
Md. 1 I7/11	0170C	Cherla	platform fill	Cherla	0.552	22.67
Md. 1 I7/24	0192B	Md1-IV	ancient ground surface	Locona-Cherla	0.831	6.043
Md. 1 I8/1			plow zone	Cherla	0.92	17
Md. 1 I8/2			platform fill	Cherla	0.568	2.02
Md. 1 I8/5			platform fill	Cherla	0.368	10.8
Md. 1 I8/7	0144C	Cherla	platform fill	Cherla	0.336	14.6
Md. 1 I8/8	0144C	Cherla	platform fill	Cherla	0.424	12.1
Md. 1 I8/9-10	0145B	Cherla	platform fill	Cherla	0.76	24.445
Md. 1 I8/11	0146B	Cherla	platform fill	Cherla	0.528	23.588
Md. 1 I8/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.163	1.767
Md. 1 I9/1			plow zone	Cherla	0.77	13
Md. 1 I9/2			platform fill	Cherla	0.704	18.6
Md. 1 I9/5			platform fill	Cherla	0.424	9.5
Md. 1 I9/7	0147C	Cherla	platform fill	Cherla	0.328	15.4
Md. 1 I9/8	0147C	Cherla	platform fill	Cherla	0.432	21.1
Md. 1 I9/9-10	0148B	Cherla	platform fill	Cherla	0.76	36.745
Md. 1 I9/11	0149C	Cherla	platform fill	Cherla	0.576	17.37
Md. 1 I9/11A	0149C	Cherla	platform fill	Cherla	0.156	8.22
Md. 1 I9/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.2	2.716
Md. 1 I9/25	0181B	Md1-IV	ancient ground surface	Locona-Cherla	0.87	3.615
Md. 1 I11/1			plow zone	Cherla	0.86	17.1
Md. 1 I11/2			platform fill	Cherla	0.528	14.5
Md. 1 I11/5			platform fill	Cherla	0.432	11
Md. 1 I11/7	0135D	Cherla	platform fill	Cherla	0.392	11.8
Md. 1 I11/8	0135D	Cherla	platform fill	Cherla	0.4	20.2
Md. 1 I11/9-10	0136D	Cherla	platform fill	Cherla	0.56	25.785
Md. 1 I11/10-A	0136D	Cherla	platform fill	Cherla	0.2	12.93

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 I11/F.2			post hole			
Md. 1 I11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.188	3.387
Md. 1 I11/20-A	0186B	Md1-IV	depositional process uncertain		0.274	4.285
Md. 1 I11/20-B	0186B	Md1-IV	depositional process uncertain		0.412	1.565
Md. 1 I11/21	0185B	Md1-IV	depositional process uncertain	Locona-Cherla	0.449	1.24
Md. 1 I11/22			depositional process uncertain	Locona-Cherla		
Md. 1 I11/27	0183B	Md1-IV	pre-occupation deposit		0.856	0.61
Md. 1 I13/1			plow zone	Cherla	0.82	14.7
Md. 1 I13/5			platform fill	Cherla	0.376	14.7
Md. 1 I13/7	0137C	Cherla	platform fill	Cherla	0.384	15.4
Md. 1 I13/8	0138C	Cherla	platform fill	Cherla	0.44	27.8
Md. 1 I13/9-10	0139B	Cherla	platform fill	Cherla	0.81	39.94
Md. 1 I13/19	0189B	Md1-IV	ancient ground surface	Locona-Cherla	0.184	2.07
Md. 1 I13/20	0190B	Md1-IV	depositional process uncertain	Locona-Cherla	0.6	4.195
Md. 1 I13/22	0190B	Md1-IV	depositional process uncertain	Locona-Cherla	0.408	1.17
Md. 1 I13/23	0190B	Md1-IV	depositional process uncertain	Locona-Cherla	0.64	0.815
Md. 1 J7/1			plow zone	Cherla		
Md. 1 J7/2			platform fill	Cherla	0.23	9
Md. 1 J7/5			platform fill	Cherla	0.384	17
Md. 1 J7/7	0152C	Cherla	platform fill	Cherla	0.424	16.3
Md. 1 J7/8	0152C	Cherla	platform fill	Cherla	0.4	19.5
Md. 1 J7/9-10	0153C	Cherla	platform fill	Cherla	0.724	41.775
Md. 1 J7/11	0105A	Cherla	platform fill	Cherla	0.324	13.39
Md. 1 J8/1			plow zone	Cherla		
Md. 1 J8/2			platform fill	Cherla		
Md. 1 J8/5			platform fill	Cherla		
Md. 1 J8/9-10			platform fill	Cherla		
Md. 1 J9/1			plow zone	Cherla		
Md. 1 J9/2			platform fill	Cherla	0.608	16.3
Md. 1 J9/5			platform fill	Cherla	0.464	14.2
Md. 1 J9/7	0154C	Cherla	platform fill	Cherla	0.352	24.1
Md. 1 J9/8	0154C	Cherla	platform fill	Cherla	0.45	29.1
Md. 1 J9/9	0155D	Cherla	platform fill	Cherla	0.416	27.55
Md. 1 J9/10	0155D	Cherla	platform fill	Cherla	0.68	35.27
Md. 1 J10/1			plow zone	Cherla		
Md. 1 J10/2			platform fill	Cherla		
Md. 1 J10/5			platform fill	Cherla		
Md. 1 J10/7-10			platform fill	Cherla		
Md. 1 J10/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.12	1.942
Md. 1 J11/1			plow zone	Cherla		
Md. 1 J11/2			platform fill	Cherla		
Md. 1 J11/5			platform fill	Cherla		
Md. 1 J11/7			platform fill	Cherla		
Md. 1 J11/8			platform fill	Cherla		
Md. 1 J11/9	0150C	Cherla	platform fill	Cherla	0.618	32.405
Md. 1 J11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.068	1.327

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 1 J12/1			plow zone	Cherla	1.02	21.45
Md. 1 J12/2			platform fill	Cherla	0.2	7.3
Md. 1 J12/5			platform fill	Cherla	0.336	14.3
Md. 1 J12/7	0151C	Cherla	platform fill	Cherla	0.448	18.7
Md. 1 J12/8	0151C	Cherla	platform fill	Cherla	0.392	23.6
Md. 1 J12/9			platform fill	Cherla		
Md. 1 J12/F.6			post hole			
Md. 1 J12/F.9			post hole			
Md. 1 J12/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.098	1.702
Md. 1 J13/1			plow zone	Cherla		
Md. 1 J13/2			platform fill	Cherla		
Md. 1 J13/5			platform fill	Cherla		
Md. 1 J13/7-9			platform fill	Cherla		
Md. 1 J13/F.5			post hole			
Md. 1 J13/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.12	3.272
Md. 1 K6/1			plow zone	Cherla		
Md. 1 K7/1			plow zone	Cherla		
Md. 1 K8/1			plow zone	Cherla	0.83	21
Md. 1 K8/2			platform fill	Cherla	0.256	5.84
Md. 1 K8/5			platform fill	Cherla	0.448	14.8
Md. 1 K8/7	0159C	Cherla	platform fill	Cherla	0.368	23.6
Md. 1 K8/8	0159C	Cherla	platform fill	Cherla	0.376	39.4
Md. 1 K8/9			platform fill	Cherla		
Md. 1 K8/10	0160C	Cherla	platform fill	Cherla	0.664	35.333
Md. 1 K9/1			plow zone	Cherla		
Md. 1 K9/2			platform fill	Cherla	0.568	8.8
Md. 1 K9/5			platform fill	Cherla		
Md. 1 K9/7-10			platform fill	Cherla		
Md. 1 K10/1			plow zone	Cherla	0.7	14.6
Md. 1 K10/2			platform fill	Cherla	0.664	16.7
Md. 1 K10/5			platform fill	Cherla	0.44	18.3
Md. 1 K10/7	0156C	Cherla	platform fill	Cherla	0.352	25.7
Md. 1 K10/8	0156C	Cherla	platform fill	Cherla	0.384	28.2
Md. 1 K10/9	0157C	Cherla	platform fill	Cherla	0.408	31.575
Md. 1 K10/10	0157C	Cherla	platform fill	Cherla	0.65	29.41
Md. 1 K10/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.06	0.865
Md. 1 K11/1			plow zone	Cherla		
Md. 1 K11/3			platform fill	Cherla		
Md. 1 K11/5			platform fill	Cherla		
Md. 1 K11/7-9			platform fill	Cherla		
Md. 1 K11/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.09	1.499
Md. 1 K12/1			plow zone	Cherla		
Md. 1 K12/3			platform fill	Cherla	0.856	24.1
Md. 1 K12/5			platform fill	Cherla		
Md. 1 K12/7			platform fill	Cherla		
Md. 1 K12/8			platform fill	Cherla		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 K12/9	0158C	Cherla	platform fill	Cherla	0.496	27.565
Md. 1 K12/18			platform fill	Cherla		
Md. 1 K12/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.12	2.258
Md. 1 K13/1-8			platform fill	Cherla		
Md. 1 K13/9			platform fill	Cherla		
Md. 1 K13/F.5			post hole			
Md. 1 K13/Floor A/B	0171B	Md1-IV(Str1-2)	floor or destroyed wall		0.12	4.003
Md. 1 L6/1			plow zone	Cherla		
Md. 1 L7/1			plow zone	Cherla		
Md. 1 L8/1			plow zone	Cherla	0.82	19.5
Md. 1 L9/1			plow zone	Cherla	0.69	17.6
Md. 1 L9/3			platform fill	Cherla	0.376	9.6
Md. 1 L9/6			platform fill	Cherla	0.392	18.8
Md. 1 L9/7	0165C	Cherla	platform fill	Cherla	0.392	22.8
Md. 1 L9/8	0165C	Cherla	platform fill	Cherla	0.376	26.5
Md. 1 L9/9	0166C	Cherla	platform fill	Cherla	0.44	28.674
Md. 1 L9/10	0166C	Cherla	platform fill	Cherla	0.624	36.005
Md. 1 L10/1			plow zone	Cherla	0.76	21
Md. 1 L10/3			platform fill	Cherla	0.408	9.2
Md. 1 L10/5			platform fill	Cherla	0.424	6.7
Md. 1 L10/6			platform fill	Cherla	0.4	11.4
Md. 1 L10/7	0161C	Cherla	platform fill	Cherla	0.384	20.5
Md. 1 L10/8	0161C	Cherla	platform fill	Cherla	0.39	26.3
Md. 1 L10/9	0162D	Cherla	platform fill	Cherla	0.39	51.145
Md. 1 L10/10	0162D	Cherla	platform fill	Cherla	0.587	19.995
Md. 1 L11/1			plow zone	Cherla	0.66	12.5
Md. 1 L11/3			platform fill	Cherla	0.256	4.4
Md. 1 L11/6			platform fill	Cherla	0.416	16.1
Md. 1 L11/7	0163C	Cherla	platform fill	Cherla	0.376	6.79
Md. 1 L11/8			platform fill	Cherla		
Md. 1 L11/9	0164D	Cherla	platform fill	Cherla	0.392	21.8
Md. 1 L11/10	0164D	Cherla	platform fill	Cherla	0.529	34.435
Md. 1 M10/1			plow zone	Cherla		
Md. 1 M10/3			platform fill	Cherla	0.078	2.05
Md. 1 M10/6			platform fill	Cherla		
Md. 1 M10/7			platform fill	Cherla		
Md. 1 M10/8			platform fill	Cherla		
Md. 1 M10/9			platform fill	Cherla		
Md. 1 M10/10	0167D	Cherla	platform fill	Cherla	0.424	26.02
Md. 1 M10/11	0168C	Cherla	platform fill	Cherla	0.39	16.31
Md. 1 M10/12	0169C	Cherla	platform fill	Cherla	0.32	8.605
Md. 1 M10/26	0182B	Md1-IV	ancient ground surface	Locona-Cherla	0.88	6.325
Md. 1 M10/F.10	0101A	Early Locona	pit fill	Early Locona		
Md. 1 Tr.1 (S)/1			slope wash?	post-Cherla		
Md. 1 Tr.1 (S)/2			slope wash?	post-Cherla		
Md. 1 Tr.1 (S)/3			slope wash?	Cherla or later	0.233	3.035

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 1 Tr.1 (S)/4	0199B	Md1-IV	ancient ground surface	Ocós	0.584	6.95
Md. 1 Tr.1 (S)/F.8	0102A	Locona	pit fill	Locona	0.147	5.532
Md. 1 Tr.1 (S)/5	0199B	Locona	pre-occupation deposit	Locona and Ocós	0.605	1.71
Md. 1 Tr.2 (N)/1			slope wash?	post-Cherla	0.615	13.185
Md. 1 Tr.2 (N)/2			slope wash?	post-Cherla	0.635	22.03
Md. 1 Tr.2 (N)/3			slope wash?	post-Cherla	0.6	26.305
Md. 1 Tr.2 (N)/4			slope wash?	post-Cherla	0.605	22.39
Md. 1 Tr.2 (N)/5			slope wash?	post-Cherla	0.57	10.9
Md. 1 Tr.2 (N)/6	0100B	Md1-IV	ancient ground surface	Ocós, Cherla	0.58	2.444
Md. 1 Tr.2 (N)/7	0100B	Locona	ancient ground surface	Locona, Ocós	0.64	1.23
Md. 1 Tr.2 (N)/8			pre-occupation deposit	Locona		0.065
Md. 1 Tr.2 (N)/8-rodent			disturbance (modern)	modern?		0.125
Md. 1 Tr.2 (N)/9			pre-occupation deposit	Locona		0.29
Md. 1 Tr.2 (N)/10			pre-occupation deposit	Locona		0.05
Md. 1 Tr.3 (W)/1			plow zone	post-Cherla	0.6	7.78
Md. 1 Tr.3 (W)/2			slope wash?	post-Cherla	0.6	12.025
Md. 1 Tr.3 (W)/3			slope wash?	post-Cherla	0.595	12.355
Md. 1 Tr.3 (W)/4			slope wash?	post-Cherla	0.59	16.705
Md. 1 Tr.3 (W)/5			platform fill and underlying ground surface	Locona, Ocós, Cherla	0.615	7.035
Md. 1 Tr.3 (W)/6	0101A	Early Locona	ancient ground surface	Locona	0.57	3.72
Md. 1 Tr.3 (W)/F.10	0101A	Early Locona	pit fill	Early Locona	0.772	7.37
Md. 11 Pit 1/1			plow zone		0.4	5.31
Md. 11 Pit 1/2 F.2	1101A	Cherla	midden		0.4	16.67
Md. 11 Pit 1/3 F.2	1101A	Cherla	midden		0.4	12.43
Md. 11 Pit 1/4-A			depositional process uncertain		0.16	2.73
Md. 11 Pit 1/4-B			depositional process uncertain		0.24	2.54
Md. 11 Pit 1/5			plaza leveling?	Locona	0.4	5.17
Md. 11 Pit 1/6			plaza leveling?	Locona	0.4	2.76
Md. 11 Pit 1/7			plaza leveling?	Locona	0.44	0.88
Md. 11 Pit 1/F.1			depositional process uncertain	Locona	0.056	0.62
Md. 11 Pit 1/8			pre-occupation deposit		0.368	0.15
Md. 11 Pit 1/9			pre-occupation deposit		0.2	0.05
Md. 11 Pit 1/10			pre-occupation deposit		0.16	
Md. 12 T1A/1			plow zone	Cherla	0.555	
Md. 12 T1A/2			platform fill	Cherla	0.57	5.475
Md. 12 T1A/3			platform fill	Cherla	0.606	6.89
Md. 12 T1A/4	1285C	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.606	7.635
Md. 12 T1A/5	1286C	Ocós	depositional process uncertain	Ocós	0.594	4.395
Md. 12 T1A/6	1286C	Ocós	depositional process uncertain		0.6	3.35
Md. 12 T1A/7			surface		0.132	0.595
Md. 12 T1A/8			surface		0.169	0.68
Md. 12 T1A/F.6			pit fill		0.027	0.055
Md. 12 T1A/F.7			pit fill		0.022	0.039
Md. 12 T1B/1			plow zone	Cherla	0.456	5.16
Md. 12 T1B/2			platform fill	Cherla	0.618	6.07
Md. 12 T1B/3			platform fill	Cherla	0.576	7.92

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 T1B/4			platform fill and underlying ground surface	Cherla	0.642	11.965
Md. 12 T1B/5	1287C	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.532	5.76
Md. 12 T1B/6	1287C	Md12-IV	depositional process uncertain	Ocós	0.716	8.49
Md. 12 T1B/7	1288D	Ocós	midden	Ocós	0.634	11.69
Md. 12 T1B/8	1289D	Late Locona	midden	Late Locona	0.475	9.94
Md. 12 T1B/8-A			pre-occupation deposit	pre-occupation	0.278	2.37
Md. 12 T1B/F.2 fin F.2	1290C	Late Locona	ditch fill	Late Locona		
Md. 12 T1B/9			pre-occupation deposit	pre-occupation	0.487	0.66
Md. 12 T1B/10			pre-occupation deposit	pre-occupation	0.525	
Md. 12 T1C/1			plow zone	Cherla	0.606	8.805
Md. 12 T1C/2			platform fill	Cherla	0.654	8.875
Md. 12 T1C/3			platform fill	Cherla	0.552	8.155
Md. 12 T1C/4			platform fill	Cherla	0.186	1.545
Md. 12 T1C/5			platform fill	Cherla	0.51	10.6
Md. 12 T1C/6	1281C	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.558	12.785
Md. 12 T1C/7	1282C	Ocós	depositional process uncertain	Ocós	0.282	5.07
Md. 12 T1C/8	1282C	Ocós	midden	Ocós	0.292	8.29
Md. 12 T1C/F.2	1283C	Ocós	ditch fill	Ocós	0.187	10.57
Md. 12 T1C/9	1283C	Ocós	midden	Ocós	0.358	7.11
Md. 12 T1C/9-A F.2	1283C	Ocós	ditch fill	Ocós	0.178	1.31
Md. 12 T1C/10	1284C	Late Locona	midden	Late Locona	0.731	9.865
Md. 12 T1C/F.2 fin F.2	1284C	Late Locona	ditch fill	Late Locona	0.526	24.845
Md. 12 T1C/11			pre-occupation deposit	pre-occupation	0.468	0.15
Md. 12 T1C/12			pre-occupation deposit	pre-occupation	0.435	
Md. 12 T1D/1			plow zone	Cherla	0.69	7.555
Md. 12 T1D/2			platform fill	Cherla	0.612	8.26
Md. 12 T1D/3			platform fill	Cherla	0.534	8.015
Md. 12 T1D/4			platform fill	Cherla	0.772	11.26
Md. 12 T1D/5			platform fill and underlying ground surface		0.281	9.62
Md. 12 T1D/6 F.11	1276C	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.382	11.475
Md. 12 T1D/7 F.11	1277C	Ocós	pit fill	Ocós	0.368	3.765
Md. 12 T1D/8 F.11	1277C	Ocós	pit fill	Ocós	0.221	5.285
Md. 12 T1D/9 F.11	1277C	Ocós	pit fill	Ocós	0.195	4.775
Md. 12 T1D/10-A F.3 in F.11	1278C	Ocós	pit fill	Ocós	0.42	14.15
Md. 12 T1D/10-B			surface	Ocós	0.29	4.105
Md. 12 T1D/10-C F.3 in F.11	1278C	Ocós	pit fill	Ocós	0.091	3.02
Md. 12 T1D/11-A F.3 in F.11	1278C	Ocós	pit fill	Ocós	0.342	3.24
Md. 12 T1D/11-B			surface	Locona or Ocós	0.259	2.08
Md. 12 T1D/12	1279C	Ocós	midden	Ocós	0.413	1.925
Md. 12 T1D/13 F.11	1279C	Ocós	pit fill	Ocós	0.282	4.71
Md. 12 T1D/14			pre-occupation deposit	pre-occupation	0.185	0.45
Md. 12 T1D/15 F.11	1280C	Late Locona	pit fill	Late Locona	0.301	4.68
Md. 12 T1D/F. 4 in F.11	1279C	Ocós	pit fill	Ocós	0.016	0.845
Md. 12 T1D/16 F.11	1280C	Late Locona	pit fill	Late Locona	0.778	9.73

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 T1E/1			plow zone	Locona, Ocós, Cherla	0.582	8.765
Md. 12 T1E/2			platform fill	Cherla	0.672	9.3
Md. 12 T1E/3			platform fill	Cherla	0.63	10
Md. 12 T1E/4			platform fill	Cherla	0.589	9.58
Md. 12 T1E/5			platform fill	Cherla	0.514	8.56
Md. 12 T1E/6 F.11	1225A	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.608	16.39
Md. 12 T1E/7 F.11	1224A	Ocós	pit fill	Ocós	0.569	14.065
Md. 12 T1E/7-A F.11	1224A	Ocós	pit fill	Ocós	0.019	1.35
Md. 12 T1E/8 F.11	1223A	Ocós	pit fill	Ocós	0.604	7.74
Md. 12 T1E/9 F.11	1223A	Ocós	pit fill	Ocós	0.578	5.355
Md. 12 T1E/10 F.11	1222A	Ocós	pit fill	Ocós	0.476	4
Md. 12 T1E/11 F.11	1222A	Ocós	pit fill	Ocós	0.375	6.13
Md. 12 T1E/ F. 4 in F.11	1222A	Ocós	pit fill	Ocós	0.004	2.61
Md. 12 T1E/12 F.11	1221A	Late Locona	pit fill	Late Locona	0.873	20.935
Md. 12 T1E/13 F.11	1220A	Late Locona	pit fill	Late Locona	0.645	9.805
Md. 12 T1E/14 F.11	1220A	Late Locona	pit fill	Late Locona	0.765	13.16
Md. 12 T1E/15 F.11	1219A	Late Locona	pit fill	Late Locona	0.581	10.8
Md. 12 T1E/16 F.11	1219A	Late Locona	pit fill	Late Locona	0.536	8.905
Md. 12 T1E/17 F.11	1218A	Late Locona	pit fill	Late Locona	0.334	5.535
Md. 12 T1E/18 F.11	1218A	Late Locona	pit fill	Late Locona	0.171	2.14
Md. 12 T1E/a (19) F.11	1218A	Late Locona	pit fill	Late Locona	0.139	2.895
Md. 12 T1E/b (20) F.11	1218A	Late Locona	pit fill	Late Locona		2.77
Md. 12 T1E/c (21) F.11	1218A	Late Locona	pit fill	Late Locona		0.17
Md. 12 T1F/1			plow zone	Locona, Ocós, Cherla	0.612	8.365
Md. 12 T1F/2			platform fill	Cherla	0.588	7
Md. 12 T1F/3			platform fill	Cherla	0.384	5.925
Md. 12 T1F/4			platform fill	Cherla	0.506	8.035
Md. 12 T1F/5			platform fill and underlying ground surface	Locona, Ocós, Cherla	0.444	6.68
Md. 12 T1F/6 F.11	1291C	Md12-IV	pit fill	Ocós/Cherla transition	0.468	7.21
Md. 12 T1F/7 F.11	1292C	Ocós	pit fill	Ocós	0.285	4.41
Md. 12 T1F/8 F.11	1292C	Ocós	pit fill	Ocós	0.222	3.555
Md. 12 Pit 1/1			plow zone	Cherla	0.5	6.18
Md. 12 Pit 1/2			platform fill	Cherla	0.3	3.41
Md. 12 Pit 1/3			platform fill	Cherla	0.4	3.31
Md. 12 Pit 1/4			platform fill	Cherla	0.4	4.21
Md. 12 Pit 1/5			platform fill	Cherla	0.4	5.79
Md. 12 Pit 1/6	1293B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.4	7.43
Md. 12 Pit 1/7			depositional process uncertain	Ocós	0.4	3.34
Md. 12 Pit 1/8			depositional process uncertain	Ocós	0.4	1.79
Md. 12 Pit 1/9			depositional process uncertain	Ocós	0.4	2.48
Md. 12 Pit 1/10			depositional process uncertain	Locona	0.4	1.1
Md. 12 Pit 1/11			pre-occupation deposit	Locona	0.4	0.22
Md. 12 Pit 1/12			pre-occupation deposit		0.4	0.04
Md. 12 Pit 1/13			pre-occupation deposit		0.4	0.01
Md. 12 Pit 2/1			plow zone	mixed	0.364	3.505
Md. 12 Pit 2/2			slope wash	mixed	0.376	6.385

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 Pit 2/3			slope wash	mixed	0.412	5.52
Md. 12 Pit 2/4	1273C	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.396	2.215
Md. 12 Pit 2/5			depositional process uncertain		0.34	1.575
Md. 12 Pit 2/6			depositional process uncertain	Ocós or Locona	0.252	0.28
Md. 12 Pit 2/ F.8a			depositional process uncertain	Locona or Ocós	0.062	0.09
Md. 12 Pit 2/7			pre-occupation deposit		0.433	
Md. 12 Pit 3/1			plow zone	Locona, Ocós, Cherla	0.424	4.54
Md. 12 Pit 3/2			platform fill	Cherla	0.336	4.92
Md. 12 Pit 3/3			platform fill	Cherla	0.396	4.005
Md. 12 Pit 3/4			platform fill	Cherla	0.384	5.11
Md. 12 Pit 3/5	1274C	Md12-IV	ancient ground surface	Ocós, Cherla	0.4	2.45
Md. 12 Pit 3/6			depositional process uncertain	Ocós	0.368	1.09
Md. 12 Pit 3/7-A			post hole		0.032	0.56
Md. 12 Pit 3/7-B			surface	Locona	0.39	1.665
Md. 12 Pit 3/8			surface	Locona	0.08	0.75
Md. 12 Pit 3/F.9			post hole		0.013	
Md. 12 Pit 3/9			midden	Locona	0.072	0.87
Md. 12 Pit 3/10 F.28	1299C	Locona	ditch fill	Locona	0.027	1
Md. 12 Pit 3/11	1294C	Locona	surface	Locona	0.182	1.275
Md. 12 Pit 3/12			depositional process uncertain	Locona	0.203	0.62
Md. 12 Pit 3/13			depositional process uncertain	Locona	0.396	0.51
Md. 12 Pit 3/14			pre-occupation deposit	Locona	0.565	
Md. 12 Pit 3/15			pre-occupation deposit	Locona	0.17	0
Md. 12 Pit 5/1			plow zone	Locona, Ocós, Cherla	0.332	2.93
Md. 12 Pit 5/2			slope wash	Locona, Ocós, Cherla	0.412	3.41
Md. 12 Pit 5/3	1275C	Md12-IV	ancient ground surface	Ocós, Cherla	0.396	7.07
Md. 12 Pit 5/4			depositional process uncertain	Ocós	0.42	3.98
Md. 12 Pit 5/5	1295C	Late Locona	depositional process uncertain	Late Locona	0.27	6.95
Md. 12 Pit 5/6	1296C	Late Locona	midden	Locona	0.113	5.7
Md. 12 Pit 5/6-A			pit fill?	Locona		
Md. 12 Pit 5/7			surface	Locona	0.303	2.745
Md. 12 Pit 5/8			surface	Locona	0.416	1.66
Md. 12 Pit 5/9			depositional process uncertain	Locona	0.448	1.19
Md. 12 Pit 5/10			depositional process uncertain	Locona	0.412	1.24
Md. 12 Pit 5/11 F.13	1297B	Early Locona	pit fill?	Early Locona	0.404	0.45
Md. 12 Pit 5/12 F.13	1297B	Early Locona	pit fill?	Early Locona	0.372	0.79
Md. 12 Pit 5/13 F.13	1297B	Early Locona	pit fill?	Early Locona	0.059	0.33
Md. 12 E1/1			platform fill	Cherla		
Md. 12 E1/2			platform fill	Cherla		
Md. 12 E1/3			platform fill	Cherla		
Md. 12 E1/6	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.15	3.125
Md. 12 E1/8	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.196	2.76
Md. 12 E1/9	1236C	Ocós	depositional process uncertain	Ocós	0.208	1.36
Md. 12 E1/10	1235C	Ocós	depositional process uncertain	Ocós	0.284	2.25
Md. 12 E1/21	1232B	Late Locona	surface	Late Locona	with E2	
Md. 12 F1/1			platform fill	Cherla		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 F1/2			platform fill	Cherla		
Md. 12 F1/3			platform fill	Cherla		
Md. 12 F1/6			platform fill	Cherla	0.18	1.27
Md. 12 F1/8	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.176	4.255
Md. 12 F1/9	1236C	Ocós	depositional process uncertain	Ocós	0.224	2.96
Md. 12 F1/10	1235C	Ocós	depositional process uncertain	Ocós	0.423	11.67
Md. 12 F1/17 F.10	1234C	Ocós	midden	Ocós	0.365	2.48
Md. 12 F1/21	1232B	Late Locona	surface	Late Locona	with E2	
Md. 12 F1/23 F.10	1233C	Ocós	midden	Locona or Ocós		
Md. 12 F1/24 F.10	1217C	Late Locona	midden	Late Locona		
Md. 12 E2/1			platform fill	Cherla		
Md. 12 E2/2			platform fill	Cherla		
Md. 12 E2/3			platform fill	Cherla		
Md. 12 E2/6	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.296	5.95
Md. 12 E2/8	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.384	4.855
Md. 12 E2/9	1236C	Ocós	depositional process uncertain	Ocós	0.432	5.66
Md. 12 E2/10	1235C	Ocós	depositional process uncertain	Ocós	0.768	5.595
Md. 12 E2/17 F.10	1234C	Ocós	midden	Ocós	0.653	7.205
Md. 12 E2/21	1232B	Late Locona	surface	Late Locona	0.471	1.29
Md. 12 E2/23 F.10	1233C	Ocós	midden	Locona or Ocós	1.028	11.78
Md. 12 E2/24 F.10	1217C	Late Locona	midden	Late Locona	0.816	6.225
Md. 12 F2/1			platform fill	Cherla		
Md. 12 F2/2			platform fill	Cherla		
Md. 12 F2/3			platform fill	Cherla		
Md. 12 F2/6			platform fill	Cherla	0.344	2.52
Md. 12 F2/8	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.392	10.845
Md. 12 F2/9	1236C	Ocós	depositional process uncertain	Ocós	0.4	7.745
Md. 12 F2/10	1235C	Ocós	depositional process uncertain	Ocós	0.992	17.915
Md. 12 F2/17 F.10	1234C	Ocós	midden	Ocós	1.051	24.49
Md. 12 F2/23 F.10	1233C	Ocós	midden	Locona or Ocós		
Md. 12 F2/24 F.10	1217C	Late Locona	midden	Late Locona		
Md. 12 E3/ F.1			pit fill	post-EF		
Md. 12 E3/1			platform fill	Cherla		
Md. 12 E3/2			platform fill	Cherla		
Md. 12 E3/3			platform fill	Cherla		
Md. 12 E3/6	1237C	Md12-IV	ancient ground surface		0.232	5.905
Md. 12 E3/8	1237C	Md12-IV	ancient ground surface	Ocós, Cherla	0.36	5.14
Md. 12 E3/9	1236C	Ocós	depositional process uncertain	Ocós	0.472	4.55
Md. 12 E3/10-A	1229C	Ocós	depositional process uncertain	Ocós	0.676	10.23
Md. 12 E3/16	1239B	Late Locona	depositional process uncertain	Late Locona	0.198	4.89
Md. 12 E3/17	1240C	Ocós	depositional process uncertain	Ocós	0.507	15.89
Md. 12 E3/12 F.2	1226C	Ocós	ditch fill	Ocós	0.297	4.325
Md. 12 E3/18	1240C	Ocós	depositional process uncertain	Ocós	0.171	2.77
Md. 12 E3/15 F.2	1208A	Late Locona	ditch fill	Late Locona	0.228	6.39
Md. 12 E3/19 F.2	1207A	Late Locona	ditch fill	Late Locona		
Md. 12 E3/20 F.10	1238C	Ocós	midden	Ocós	0.263	3.595

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 E3/22 F.2	1206A	Late Locona	ditch fill	Late Locona		
Md. 12 F3/ F.1			pit fill	post-EF	3.141	
Md. 12 F3/1			platform fill	Cherla		
Md. 12 F3/2			platform fill	Cherla		
Md. 12 F3/3			platform fill	Cherla		
Md. 12 F3/4			platform fill	Cherla	0.24	4.84
Md. 12 F3/5	1231B	Md12-IV	ancient ground surface	Ocós	0.384	8.275
Md. 12 F3/7	1230C	Ocós	ancient ground surface	Ocós	0.48	9.605
Md. 12 F3/10	1235C	Ocós	depositional process uncertain	Ocós	0.987	25.04
Md. 12 F3/17			depositional process uncertain	Ocós	0.604	16.465
Md. 12 F3/18	1240C	Ocós	depositional process uncertain	Ocós	0.2	7.48
Md. 12 F3/15 F.2	1208A	Late Locona	ditch fill	Late Locona	0.604	2.395
Md. 12 F3/19 F.2	1207A	Late Locona	ditch fill	Late Locona		
Md. 12 E4/1			platform fill	Cherla		
Md. 12 E4/ F.5			disturbance (modern)	unknown, possibly modern		
Md. 12 E4/2			platform fill	Cherla		
Md. 12 E4/3			platform fill	Cherla		
Md. 12 E4/4			platform fill	Cherla	0.128	1.74
Md. 12 E4/5	1214A	Md12-IV	ancient ground surface	Ocós	0.48	8.775
Md. 12 E4/7	1213A	Ocós	ancient ground surface	Ocós	0.368	5.97
Md. 12 E4/10A/B	1212A	Ocós	midden	Ocós	0.384	8.775
Md. 12 E4/10C	1211A	Ocós	midden	Ocós	0.416	12.27
Md. 12 E4/11	1210A	Ocós	midden	Ocós	0.404	17.725
Md. 12 E4/12 F.2	1209A	Ocós	midden	Ocós	0.413	10.25
Md. 12 E4/13 F.2	1209A	Ocós	midden	Ocós	0.347	10.705
Md. 12 E4/15 F.2	1208A	Late Locona	ditch fill	Late Locona	0.521	7.6
Md. 12 E4/19 F.2	1207A	Late Locona	ditch fill	Late Locona	0.798	15.685
Md. 12 E4/22 F.2	1206A	Late Locona	ditch fill	Late Locona	0.359	2.57
Md. 12 F4/1			platform fill	Cherla		
Md. 12 F4/F.5			disturbance (modern)	unknown, possibly modern		
Md. 12 F4/2			platform fill	Cherla		
Md. 12 F4/3			platform fill	Cherla		
Md. 12 F4/4			platform fill	Cherla		
Md. 12 F4/5	1231B	Md12-IV	ancient ground surface	Ocós	0.672	11.07
Md. 12 F4/7	1230C	Ocós	ancient ground surface	Ocós	0.464	5.385
Md. 12 F4/10-A	1229C	Ocós	midden	Ocós	0.264	13.73
Md. 12 F4/10-C	1228C	Ocós	midden	Ocós	0.224	11.75
Md. 12 F4/11	1227C	Ocós	midden	Ocós	0.36	12.305
Md. 12 F4/12 F.2	1226C	Ocós	midden	Ocós	0.22	11.785
Md. 12 F4/14	1241C	Late Locona	surface	Late Locona	0.04	1.64
Md. 12 F4/18	1240C	Ocós	depositional process uncertain	Ocós	0.146	7.52
Md. 12 F4/"19"			depositional process uncertain		0.05	0.81
Md. 12 F4/15 F.2	1208A	Late Locona	ditch fill	Late Locona	0.334	6.57
Md. 12 F4/19 F.2	1207A	Late Locona	ditch fill	Late Locona	0.712	12.89

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 F4/22 F.2	1206A	Late Locona	ditch fill	Late Locona	0.204	6.005
Md. 12 H4/25			platform fill	Cherla		
Md. 12 H4/28	1242B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.392	6.17
Md. 12 H4/29			depositional process uncertain	Ocós		
Md. 12 H4/30			depositional process uncertain	Ocós		
Md. 12 H4/32	1205A	Late Locona	surface	Late Locona	0.151	2.86
Md. 12 H4/Floor 7			surface	Locona		
Md. 12 H4/38			depositional process uncertain	Locona		
Md. 12 H4/Floor 9			depositional process uncertain	Locona		
Md. 12 H4/40			depositional process uncertain	Locona		
Md. 12 H4/Floor 11			surface	Locona		
Md. 12 I4/25			platform fill	Cherla		
Md. 12 I4/28	1243B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.432	2.54
Md. 12 I4/29			depositional process uncertain	Ocós		
Md. 12 I4/30			depositional process uncertain			
Md. 12 I4/32	1205A	Late Locona	surface	Late Locona	0.186	1.54
Md. 12 I4/ F.27	1298D	Locona	hearth	Locona		
Md. 12 I4/Floor 2			surface			
Md. 12 I4/38			depositional process uncertain	Locona		
Md. 12 I4/F.27A	1298D	Locona	organic	Locona	0.038	
Md. 12 I4/40			depositional process uncertain	Locona		
Md. 12 I4/Floor 11			surface	Locona		
Md. 12 J4/25			platform fill	Cherla		
Md. 12 J4/28	1244B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.296	3.63
Md. 12 J4/29			depositional process uncertain	Ocós		
Md. 12 J4/30			depositional process uncertain			1.83
Md. 12 J4/32	1205A	Late Locona	surface	Late Locona	with I4	
Md. 12 J4/Floor 2			surface			
Md. 12 J4/37	1203A	Locona	surface	Locona	0.05	0.12
Md. 12 J4/38			depositional process uncertain	Locona		
Md. 12 J4/40			depositional process uncertain	Locona		
Md. 12 J4/42 F.28			ditch fill	Locona		
Md. 12 J4/Floor 11			surface	Locona		
Md. 12 J4/Floor 10			surface	Locona		
Md. 12 K4/plow zone			plow zone			
Md. 12 K4/F.24			offering	Cherla or later		
Md. 12 K4/25			platform fill	Cherla		
Md. 12 K4/28	1245B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.288	6.34
Md. 12 K4/29			depositional process uncertain	Ocós		
Md. 12 K4/30 F.23	1265C	Ocós	midden	Ocós	0.123	4.83
Md. 12 K4/29-A			depositional process uncertain		0.311	4.62
Md. 12 K4/30-A			depositional process uncertain			
Md. 12 K4/Floor 2			surface			
Md. 12 K4/37	1203A	Locona	surface	Locona	0.1	0.2
Md. 12 K4/38			depositional process uncertain	Locona		
Md. 12 K4/46	1202A	Locona	surface	Locona	0.045	0.15

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 K4/47			depositional process uncertain	Locona		
Md. 12 K4/Floor 10			surface	Locona		
Md. 12 G5/25			platform fill	Cherla		
Md. 12 G5/28			ancient ground surface	Ocós	0.264	5.28
Md. 12 G5/29-A	1270B	Md12-IV	ancient ground surface	Ocós	0.646	8.07
Md. 12 G5/30			depositional process uncertain	Ocós		
Md. 12 G5/34	1269B	Ocós	midden	Ocós	0.031	2.96
Md. 12 G5/F.21b	1262B	Ocós	midden	Ocós		2.75
Md. 12 G5/32	1205A	Late Locona	surface	Late Locona		
Md. 12 G5/F.21d	1264B	Ocós	midden	Ocós		0.44
Md. 12 G5/Floor 1a			surface	Late Locona		
Md. 12 G5/F.26			rodent burrow	modern		1.02
Md. 12 G5/Floor 2			surface	Locona		
Md. 12 H5/plow zone			platform fill	Cherla		
Md. 12 H5/Burial 10			grave pit	Ocós		
Md. 12 H5/25			platform fill	Cherla		
Md. 12 H5/28	1246B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.344	4.69
Md. 12 H5/29			depositional process uncertain	Ocós		
Md. 12 H5/30			depositional process uncertain	Ocós	0.471	3.03
Md. 12 H5/F.21A	1261B	Ocós	trash concentration	Ocós		
Md. 12 H5/32	1205A	Late Locona	surface	Late Locona	0.388	7.01
Md. 12 H5/Floor 2			surface	Locona		
Md. 12 H5/37	1203A	Locona	surface	Locona	0.166	1.59
Md. 12 H5/38			depositional process uncertain	Locona		
Md. 12 H5/39			depositional process uncertain	Locona		
Md. 12 H5/41			depositional process uncertain	Locona		
Md. 12 H5/Floor 11			surface	Locona		
Md. 12 I5/25			platform fill	Cherla		
Md. 12 I5/28	1247B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.688	2.87
Md. 12 I5/29			depositional process uncertain	Ocós		
Md. 12 I5/30			depositional process uncertain		0.35	1.11
Md. 12 I5/36	1204A	Late Locona	surface	Late Locona	0.2	0.9
Md. 12 I5/Floor 2			surface			
Md. 12 I5/37	1203A	Locona	surface	Locona	0.2	0.74
Md. 12 I5/38			depositional process uncertain	Locona		
Md. 12 I5/39			depositional process uncertain	Locona		
Md. 12 I5/F.27A	1298D	Locona	depositional process uncertain	Locona		
Md. 12 I5/46	1202A	Locona	surface	Locona	0.014	0.205
Md. 12 I5/41			depositional process uncertain	Locona		
Md. 12 I5/42 F.28			ditch fill	Locona		
Md. 12 I5/Floor 11			surface	Locona		
Md. 12 I5/Floor 10			surface	Locona		
Md. 12 J5/25			platform fill	Cherla		
Md. 12 J5/28	1248B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.4	4.85
Md. 12 J5/29			depositional process uncertain	Ocós		
Md. 12 J5/30			depositional process uncertain		0.104	0.61

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 12 J5/32	1205A	Late Locona	surface	Late Locona	0.236	1.04
Md. 12 J5/36	1204A	Late Locona	surface	Late Locona	0.093	0.31
Md. 12 J5/Floor 2			surface			
Md. 12 J5/37	1203A	Locona	surface	Locona	0.12	0.49
Md. 12 J5/38			depositional process uncertain	Locona		
Md. 12 J5/46	1202A	Locona	surface	Locona	0.166	0.67
Md. 12 J5/47			depositional process uncertain	Locona		
Md. 12 J5/42 F.28			ditch fill	Locona		
Md. 12 J5/Floor 10			surface	Locona		
Md. 12 K5/25			platform fill	Cherla		
Md. 12 K5/28	1249B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.432	8.37
Md. 12 K5/29			depositional process uncertain	Ocós		
Md. 12 K5/30			depositional process uncertain		0.293	3.65
Md. 12 K5/F.18	1260B	Late Locona	trash concentration	Late Locona		0.31
Md. 12 K5/36	1204A	Late Locona	surface	Late Locona		
Md. 12 K5/Floor 2			surface			
Md. 12 K5/37	1203A	Locona	surface	Locona	0.12	0.53
Md. 12 K5/38			depositional process uncertain	Locona		
Md. 12 K5/46	1202A	Locona	surface	Locona	0.293	1.27
Md. 12 K5/47			depositional process uncertain	Locona		
Md. 12 K5/Floor 10			surface	Locona		
Md. 12 G6/25			platform fill	Cherla		
Md. 12 G6/28	1250B	Md12-IV	ancient ground surface	Ocós	0.176	6.41
Md. 12 G6/29			depositional process uncertain	Ocós		
Md. 12 G6/30			depositional process uncertain	Ocós		
Md. 12 G6/33 F.11	1271B	Ocós	pit fill	Ocós/Cherla transition		7.12
Md. 12 G6/F.21C in F.11	1263B	Ocós	pit fill	Ocós		0.57
Md. 12 G6/35 F.11			pit fill	Ocós		
Md. 12 G6/Floor 2			surface	Locona		
Md. 12 H6/25			platform fill	Cherla		
Md. 12 H6/26			platform fill	Cherla	0.16	4.11
Md. 12 H6/27			platform fill	Cherla	0.638	7.95
Md. 12 H6/28	1251B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.357	3.4
Md. 12 H6/29			depositional process uncertain	Ocós		
Md. 12 H6/30			depositional process uncertain	Ocós	0.412	1.76
Md. 12 H6/Floor 2			surface	Locona		
Md. 12 H6/37	1203A	Locona	surface	Locona	0.21	1.52
Md. 12 H6/38			depositional process uncertain	Locona		
Md. 12 H6/39	1272B	Locona	depositional process uncertain	Locona	0.52	1.45
Md. 12 H6/41			depositional process uncertain	Locona	0.793	1.23
Md. 12 H6/F.28			ditch fill	Locona		
Md. 12 H6/45 F.28	1299C	Locona	ditch fill	Locona	0.246	1.34
Md. 12 H6/48	1272B	Locona	surface	Locona	0.214	0.26
Md. 12 H6/49	1272B	Locona	surface	Locona	0.178	0.48
Md. 12 H6/50 F.28	1201A	Locona	ditch fill	Locona	0.896	5.17
Md. 12 H6/51 F.28	1201A	Locona	ditch fill	Locona	0.936	0.77

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 H6/52 F.28	1201A	Locona	ditch fill	Locona	0.11	0.51
Md. 12 I6/25			platform fill	Cherla		
Md. 12 I6/26			platform fill	Cherla	0.274	3.72
Md. 12 I6/28	1252B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.152	1.46
Md. 12 I6/29			depositional process uncertain	Ocós		
Md. 12 I6/30			depositional process uncertain		0.141	0.64
Md. 12 I6/Floor 2			surface			
Md. 12 I6/37	1203A	Locona	surface	Locona	0.072	0.05
Md. 12 I6/38			depositional process uncertain	Locona		
Md. 12 I6/46	1202A	Locona	surface	Locona	0.054	0.539
Md. 12 I6/47			depositional process uncertain	Locona		
Md. 12 I6/Floor 10			surface	Locona		
Md. 12 J6/25			platform fill	Cherla		
Md. 12 J6/26			platform fill	Cherla	0.692	11.74
Md. 12 J6/28	1253B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.456	5.33
Md. 12 J6/29			depositional process uncertain	Ocós		
Md. 12 J6/30			depositional process uncertain		0.084	0.54
Md. 12 J6/36	1204A	Late Locona	surface	Late Locona	0.176	0.37
Md. 12 J6/Floor 2			surface			
Md. 12 J6/37	1203A	Locona	surface	Locona	0.19	0.79
Md. 12 J6/38			depositional process uncertain	Locona		
Md. 12 J6/46	1202A	Locona	surface	Locona	0.19	0.78
Md. 12 J6/47			depositional process uncertain	Locona		
Md. 12 J6/Floor 10			surface	Locona		
Md. 12 K6/25			platform fill	Cherla		
Md. 12 K6/F.15	1257D	Ocós	burnt feature	Ocós		0.04
Md. 12 K6/F.16	1258B	Ocós	trash concentration	Ocós		1.6
Md. 12 K6/31			depositional process uncertain		0.808	6.61
Md. 12 K6/F.19	1215A	Ocós	midden	Ocós		
Md. 12 K6/36	1204A	Late Locona	surface	Late Locona	0.037	0.97
Md. 12 K6/Floor 2			surface			
Md. 12 K6/37	1203A	Locona	surface	Locona	0.053	0.22
Md. 12 K6/46	1202A	Locona	surface	Locona	0.053	0.35
Md. 12 K6/47			depositional process uncertain	Locona		
Md. 12 K6/Floor 10			surface	Locona		
Md. 12 G7/25			platform fill	Cherla		
Md. 12 G7/28			platform fill	Cherla	0.296	7.14
Md. 12 G7/29			platform fill and underlying ground surface	Ocós to Cherla		
Md. 12 G7/28-A	1267B	Md12-IV	ancient ground surface	Ocós	0.224	4.36
Md. 12 G7/30 F.11			pit fill	Ocós		
Md. 12 G7/35 F.11			pit fill	Ocós		
Md. 12 G7/ F.21E in F.11	1216A	Ocós	midden	Ocós	0.116	7.3
Md. 12 H7/25			platform fill	Cherla		
Md. 12 H7/28	1268B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.44	4.42
Md. 12 H7/29			depositional process uncertain	Ocós		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 H7/30			depositional process uncertain		0.56	3.44
Md. 12 H7/35 F.11			pit fill			
Md. 12 H7/Floor 2			surface			
Md. 12 H7/37	1203A	Locona	surface	Locona	0.156	0.74
Md. 12 H7/38			depositional process uncertain	Locona		
Md. 12 H7/39			depositional process uncertain	Locona		
Md. 12 H7/41			depositional process uncertain	Locona		
Md. 12 H7/Floor 8			surface	Locona		
Md. 12 H7/Floor 10			surface	Locona		
Md. 12 I7/25			platform fill	Cherla		
Md. 12 I7/28	1254B	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.252	0.52
Md. 12 I7/29			depositional process uncertain	Ocós		
Md. 12 I7/F.20			grave pit with dog burial	Ocós		
Md. 12 I7/30			depositional process uncertain			3.37
Md. 12 I7/Burial 12			grave pit with infant			
Md. 12 I7/F.22			grave pit	Locona, Ocós		
Md. 12 I7/Burial 11			grave pit with two adults			
Md. 12 I7/36	1204A	Late Locona	surface	Late Locona	0.288	1.76
Md. 12 I7/Floor 2			surface			
Md. 12 I7/37	1203A	Locona	surface	Locona	0.15	0.52
Md. 12 I7/38			depositional process uncertain	Locona		
Md. 12 I7/46	1202A	Locona	surface	Locona	0.218	1.96
Md. 12 I7/47			depositional process uncertain	Locona		
Md. 12 I7/Floor 10			surface	Locona		
Md. 12 J7/25			platform fill	Cherla		
Md. 12 J7/F.14	1256B	Ocós	ancient ground surface	Ocós or Cherla	0.041	1.94
Md. 12 J7/31			depositional process uncertain		0.789	4.7
Md. 12 J7/F.16	1258B	Ocós		Ocós		0
Md. 12 J7/F.17	1259B	Ocós	depositional process uncertain	Ocós		0.59
Md. 12 J7/36	1204A	Late Locona	surface	Late Locona	with I7	
Md. 12 J7/Floor 2			surface			
Md. 12 J7/37	1203A	Locona	surface	Locona	0.067	0.43
Md. 12 J7/38			depositional process uncertain	Locona		
Md. 12 J7/46	1202A	Locona	surface	Locona	with i7	
Md. 12 J7/47			depositional process uncertain	Locona		
Md. 12 J7/Floor 10			surface	Locona		
Md. 12 K7/25			platform fill	Cherla		
Md. 12 K7/28	1255D	Md12-IV	ancient ground surface	Ocós/Cherla transition	0.432	2.71
Md. 12 K7/F.19	1215A	Ocós	midden	Ocós	0.355	31.265
Md. 12 K7/29			depositional process uncertain	Ocós		
Md. 12 K7/30			depositional process uncertain			1.26
Md. 12 K7/43			depositional process uncertain		0.756	0.32
Md. 12 K7/44			pre-occupation deposit		0.664	0.02
Md. 12 H8/25			platform fill	Cherla		
Md. 12 H8/F.25	1266D	Ocós	hearth	Ocós		
Md. 12 H8/29			depositional process uncertain	Ocós		

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 12 H8/Floor 1			surface	Late Locona		
Md. 12 H8/30			depositional process uncertain			
Md. 12 H8/Floor 2			surface			
Md. 13 Pit 1/1			plow zone		0.4	5.29
Md. 13 Pit 1/2	1302A	Cherla	pit fill	Cherla	0.4	7.46
Md. 13 Pit 1/3	1302A	Cherla	pit fill	Cherla	0.4	10.36
Md. 13 Pit 1/4	1302A	Cherla	pit fill, mixed with platform fill	Cherla	0.4	10.15
Md. 13 Pit 1/5			surface of platform?		0.4	1.2
Md. 13 Pit 1/6	1304C	Locona	surface of platform?	Locona	0.3	0.65
Md. 13 Pit 1/7-A	1303B	Locona	platform fill	Locona	0.374	1.02
Md. 13 Pit 1/7-B	1303B	Locona	platform fill	Locona	0.443	0.11
Md. 13 Pit 1/8			pre-occupation deposit		0.58	0.02
Md. 13 Pit 1/9			pre-occupation deposit		0.4	
Md. 13 Pit 2/1			plow zone	Cherla	0.776	
Md. 13 Pit 2/2	1305B	Cherla	depositional process uncertain	Cherla	0.644	9.5
Md. 13 Pit 2/3-A	1305B	Cherla	pit fill	Cherla	0.337	5.712
Md. 13 Pit 2/3-B			surface of platform?	Ocós	0.273	3.33
Md. 13 Pit 2/4			platform fill	Ocós	0.76	10.93
Md. 13 Pit 2/5	1301A	Late Locona	trash concentration	Late Locona	0.576	6.47
Md. 13 Pit 2/6	1304C	Locona	surface of platform?	Locona	0.553	2.55
Md. 13 Pit 2/7	1303B	Locona	depositional process uncertain	Locona	0.624	1.33
Md. 13 Pit 2/8	1303B	Locona	platform fill	Locona	0.65	1.37
Md. 21 Pit 1/1			plow zone	Ocós or later	0.396	2.28
Md. 21 Pit 1/2			slope wash	Ocós or later	0.388	2.755
Md. 21 Pit 1/3			slope wash	Ocós or later	0.328	1.49
Md. 21 Pit 1/4			ancient ground surface	Locona	0.372	1.295
Md. 21 Pit 1/5 F.4			platform fill	Locona	0.336	1.02
Md. 21 Pit 1/6	2102A	Locona	ancient ground surface	Locona	0.4	0.525
Md. 21 Pit 1/7	2102A	Locona	pre-occupation deposit	Locona	0.348	0.095
Md. 21 Pit 2/1			plow zone	Ocós	0.396	4.61
Md. 21 Pit 2/2 F.4			platform fill	Ocós	0.396	7.93
Md. 21 Pit 2/3 F.4			platform fill	Ocós	0.392	7.139
Md. 21 Pit 2/4 F.4			ground surface plus some of overlying platform	Locona	0.4	9.325
Md. 21 Pit 2/5	2102A	Locona	ancient ground surface	Locona	0.392	1.31
Md. 21 Pit 2/6	2102A	Locona	pre-occupation deposit	Locona	0.38	0.09
Md. 21 Pit 3/1			plow zone	Ocós or later	0.504	2.585
Md. 21 Pit 3/2			slope wash	Ocós or later	0.396	4.105
Md. 21 Pit 3/3			slope wash	Ocós or later	0.43	1.95
Md. 21 Pit 3/4			ancient ground surface	Locona	0.428	2.4
Md. 21 Pit 3/5			ancient ground surface	Locona	0.604	0.2
Md. 21 Pit 3/6	2102A	Locona	pre-occupation deposit	Locona	0.335	0.065
Md. 21 Pit 4/1			plow zone	Ocós or later	0.44	2.9
Md. 21 Pit 4/2			slope wash	Ocós or later	0.368	2.865
Md. 21 Pit 4/3			slope wash	Ocós or later	0.4	2.3
Md. 21 Pit 4/4			ancient ground surface	Locona or Ocós	0.116	1.84

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 21 Pit 4/5			platform fill?	Locona	0.278	1.825
Md. 21 Pit 4/6	2102A	Locona	ancient ground surface	Locona	0.076	1.21
Md. 21 Pit 4/7	2102A	Locona	depositional process uncertain	Locona	0.272	2.085
Md. 21 Pit 4/ F.1	2102A	Locona	ancient ground surface	Locona	0.046	0.525
Md. 21 Pit 4/ F.2	2102A	Locona	ancient ground surface	Locona	0.03	0.095
Md. 21 Pit 4/8	2102A	Locona	pre-occupation deposit	Locona	0.412	0.22
Md. 21 Pit 5/1			plow zone	Ocós	0.42	0.78
Md. 21 Pit 5/2 F.4			platform fill	Ocós	0.404	2.5
Md. 21 Pit 5/3 F.4			platform fill	Ocós	0.288	0.88
Md. 21 Pit 5/4 F.4			platform fill	Ocós	0.112	0.1
Md. 21 Pit 5/5	2101A	Locona	midden	Locona	0.392	4.395
Md. 21 Pit 5/6	2102A	Locona	depositional process uncertain	Locona	0.256	0.99
Md. 21 Pit 5/7	2102A	Locona	ancient ground surface	Locona	0.196	0.11
Md. 21 Pit 5/8			pre-occupation deposit	Locona	0.36	0.12
Md. 14 Pit 1/1			plow zone		1.04	
Md. 14 Pit 1/2			platform fill	Cherla	0.72	7.73
Md. 14 Pit 1/3			platform fill	Cherla	0.72	5.32
Md. 14 Pit 1/4					0.72	11.54
Md. 14 Pit 1/5					0.72	19.79
Md. 14 Pit 1/6	1401A	Locona	midden	Locona	0.88	14.85
Md. 14 Pit 1/7	1401A	Locona	midden	Locona	0.4	20.28
Md. 14 Pit 1/8			pre-occupation deposit		0.8	2.29
Md. 14 Pit 1/9			pre-occupation deposit		0.8	1.3
Md. 14 Pit 1/10			pre-occupation deposit		0.8	0.145
Md. 14 Pit 1/ F.4						0.695
Md. 15 Pit 1/1			plow zone	Cherla?	0.368	
Md. 15 Pit 1/2			depositional process uncertain	uncertain	0.368	0.64
Md. 15 Pit 1/3			pre-occupation deposit		0.348	0.094
Md. 15 Pit 1/4			pre-occupation deposit		0.348	0
Md. 15 Pit 1/5			pre-occupation deposit		0.404	0
Md. 15 Pit 1/6			pre-occupation deposit		0.46	0
Md. 15 Pit 2/1			plow zone	Cherla or later	0.384	0.18
Md. 15 Pit 2/2			ancient ground surface	Cherla	0.38	2.65
Md. 15 Pit 2/3			ancient ground surface		0.36	2.19
Md. 15 Pit 2/4			depositional process uncertain		0.408	0.68
Md. 15 Pit 2/5			pre-occupation deposit		0.36	0.022
Md. 15 Pit 2/6			depositional process uncertain		0.42	0.054
Md. 32 Pit 1 (T1A)/1			plow zone		0.368	0.38
Md. 32 Pit 1 (T1A)/F.1			post hole		0.082	0.04
Md. 32 Pit 1 (T1A)/F.4 (orig. F.2a)	3202B	Md32-plat	platform fill		0.269	0.32
Md. 32 Pit 1 (T1A)/F.4	3202B	Md32-plat	platform fill		0.099	0.17
Md. 32 Pit 1 (T1A)/2 F.4	3202B	Md32-plat	platform fill		0.244	0.43
Md. 32 Pit 1 (T1A)/3			depositional process uncertain		0.198	0.35
Md. 32 Pit 1 (T1A)/4	3208B	Md32-surf	ancient ground surface		0.348	0.13
Md. 32 Pit 1 (T1A)/5	3208B	Md32-surf	depositional process uncertain		0.416	0.095

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 32 Pit 1 (T1A)/6	3208B	Md32-surf	pre-occupation deposit		0.464	
Md. 32 Pit 2 (T2F)/1			plow zone		0.356	1.99
Md. 32 Pit 2 (T2F)/2			slope wash		0.404	1.13
Md. 32 Pit 2 (T2F)/3			depositional process uncertain		0.408	1.635
Md. 32 Pit 2 (T2F)/4			depositional process uncertain		0.384	1.345
Md. 32 Pit 2 (T2F)/5			ancient ground surface		0.324	0.29
Md. 32 Pit 2 (T2F)/F.3	3201A	Ocós	pit fill	Ocós	0.116	4.265
Md. 32 Pit 3 (T2B)/1			plow zone		0.436	0.365
Md. 32 Pit 3 (T2B)/2 F.4	3202B	Md32-plat	platform fill		0.364	0.21
Md. 32 Pit 3 (T2B)/3 F.4	3202B	Md32-plat	platform fill		0.288	0.33
Md. 32 Pit 3 (T2B)/4			depositional process uncertain		0.248	0.355
Md. 32 Pit 3 (T2B)/5	3208B	Md32-surf	ancient ground surface		0.352	0.125
Md. 32 Pit 3 (T2B)/6	3208B	Md32-surf	depositional process uncertain		0.404	0.11
Md. 32 Pit 3 (T2B)/7	3208B	Md32-surf	pre-occupation deposit		0.408	0.065
Md. 32 T1D/3			plow zone		0.48	0.44
Md. 32 T1D/6 F.4	3202B	Md32-plat	platform fill	Locona	0.49	1.377
Md. 32 T1D/11 F.4	3202B	Md32-plat	platform fill	Locona	0.3	0.85
Md. 32 T1D/14 F.4	3202B	Md32-plat	platform fill	Locona	0.5	0.541
Md. 32 T1D/16 F.4	3202B	Md32-plat	platform fill	Locona	0.2	0.22
Md. 32 T1E/21			plow zone			
Md. 32 T1E/23 F.4	3202B	Md32-plat	platform fill	Locona		0.338
Md. 32 T1E/46 F.4	3202B	Md32-plat	platform fill	Locona		0.326
Md. 32 T1E/54 F.4	3202B	Md32-plat	platform fill	Locona		0.268
Md. 32 T1F/22			plow zone	Locona		0.05
Md. 32 T1F/28 F.4	3202B	Md32-plat	platform fill	Locona		0.204
Md. 32 T1F/51 F.4	3202B	Md32-plat	platform fill	Locona		0.59
Md. 32 T1F/59 F.4	3202B	Md32-plat	platform fill	Locona		0.059
Md. 32 T1F/218	3208B	Md32-surf	ancient ground surface	Locona		0.23
Md. 32 T1G/37			plow zone			0.044
Md. 32 T1G/41			platform fill and slope wash	Locona		0.419
Md. 32 T1G/47			platform fill and slope wash	Locona		0.62
Md. 32 T1G/57			platform fill and/or underlying ground surface	Locona		0.6
Md. 32 T1G/77			ancient ground surface	Locona	0.436	0.67
Md. 32 T1G/82			pre-occupation deposit	pre-occupation	0.28	0.34
Md. 32 T1G/84			pre-occupation deposit	pre-occupation	0.376	0.234
Md. 32 T1H/1			plow zone	post-EF	0.32	0.44
Md. 32 T1H/2			slope wash	post-EF	0.41	1.96
Md. 32 T1H/5			slope wash	post-EF	0.34	2.63
Md. 32 T1H/12			slope wash	post-EF	0.13	0.762
Md. 32 T1H/17			ancient ground surface	Locona-Jocotal	0.18	0.339
Md. 32 T1H/19			pre-occupation deposit	pre-occupation	0.4	0.346
Md. 32 T1H/26			pre-occupation deposit	pre-occupation	0.43	0.076
Md. 32 T1H/30			pre-occupation deposit	pre-occupation	0.42	0.018
Md. 32 T1I/34			plow zone	post-EF	0.46	0
Md. 32 T1I/39			slope wash	post-EF	0.48	0.81

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 32 T1I/43			slope wash	post-EF	0.14	0.42
Md. 32 T1I/45			slope wash	Cherla or later	0.4	2.064
Md. 32 T1I/48			slope wash	Ocós or later	0.348	0.56
Md. 32 T1I/52			ancient ground surface	Locona-Ocós	0.36	0.099
Md. 32 T1I/73			pre-occupation deposit	pre-occupation	0.404	0.038
Md. 32 T1J/56			pre-occupation deposit	pre-occupation	0.36	0.5
Md. 32 T1J/60			slope wash	post-EF	0.484	3.13
Md. 32 T1J/63			slope wash	Jocotal or later	0.452	3.77
Md. 32 T1J/66			ancient ground surface	Ocós or later	0.48	3.05
Md. 32 T1J/69			pre-occupation deposit	pre-occupation	0.436	0.51
Md. 32 T1J/76			pre-occupation deposit	pre-occupation	0.344	0.32
Md. 32 T1K/4			plow zone	post-EF	0.408	0.93
Md. 32 T1K/7			slope wash	post-EF	0.468	2.798
Md. 32 T1K/10			slope wash	post-EF	0.384	4.43
Md. 32 T1K/15			slope wash	Cherla or later	0.392	3.03
Md. 32 T1K/20			ancient ground surface	Ocós	0.384	4.41
Md. 32 T1K/29 F.6	3205A	Ocós	pit fill?	Ocós	0.384	3.35
Md. 32 T1K/33 F.6	3205A	Ocós	pit fill?	Ocós	0.464	1.19
Md. 32 T1K/42			pre-occupation deposit	pre-occupation	0.38	0.27
Md. 32 T1L/50			plow zone	post-EF	0.16	1.57
Md. 32 T1L/55			slope wash	post-EF	0.444	3.93
Md. 32 T1L/62			slope wash	post-Cherla	0.296	3.22
Md. 32 T1L/64			rodent burrow	post-EF		0.06
Md. 32 T1L/65			slope wash	post-Ocós	0.404	4.28
Md. 32 T1L/67			ancient ground surface	Ocós	0.18	1.96
Md. 32 T1L/70			ancient ground surface	Ocós		0.745
Md. 32 T1L/72 F.6	3205A	Ocós	pit fill?	Ocós	0.048	1.55
Md. 32 T1L/75 F.6	3205A	Ocós	pit fill?	Ocós		2.54
Md. 32 T1L/78 F.6	3205A	Ocós	pit fill?	Ocós	0.236	0.87
Md. 32 T1L/80 F.6	3205A	Ocós	pit fill?	Ocós	0.38	1.53
Md. 32 T1L/85			pre-occupation deposit	pre-occupation	1.328	0.169
Md. 32 T1M/146			plow zone	post-EF	0.522	0.72
Md. 32 T1M/149			slope wash	post-EF	0.564	1.47
Md. 32 T1M/153			slope wash	post-Ocós	0.432	3.07
Md. 32 T1M/156			slope wash	Ocós or later	0.402	3.18
Md. 32 T1M/158			ancient ground surface	Ocós	0.344	1.63
Md. 32 T1M/162			pre-occupation deposit	Ocós	0.408	0.81
Md. 32 T1M/164			pre-occupation deposit	pre-occupation	0.456	0.023
Md. 32 T1M/168			pre-occupation deposit	pre-occupation	0.864	
Md. 32 T2C/31 F.4	3202B	Md32-plat	platform fill	Locona	0.852	0.502
Md. 32 T2C/36 F.4	3202B	Md32-plat	platform fill	Locona		0.279
Md. 32 T2C/58	3208B	Md32-surf	ancient ground surface	Locona	0.047	0.067
Md. 32 T2C/79	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.132	0.068
Md. 32 T2D/25			plow zone	post-EF		
Md. 32 T2D/44 F.4			platform fill	Locona	0.746	0.455
Md. 32 T2D/49 F.4	3202B	Md32-plat	platform fill	Locona	0.408	0.9

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
Md. 32 T2D/53	3208B	Md32-surf	ancient ground surface	Locona	0.485	0.65
Md. 32 T2D/79	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.649	0.19
Md. 32 T2D/83	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.504	0.035
Md. 32 T2E/25			plow zone	post-EF		0.364
Md. 32 T2E/40			platform fill, probably an extension to original platform	Locona or Ocós	0.388	0.143
Md. 32 T2E/61			platform fill, probably an extension to original platform	Locona or Ocós	0.392	0.47
Md. 32 T2E/68			ancient ground surface	Locona or Ocós	0.208	0.34
Md. 32 T2E/71			ancient ground surface	Locona	0.172	0.105
Md. 32 T2E/81			pre-occupation deposit	Locona	0.488	0.03
Md. 32 T2E/87			pre-occupation deposit	Locona	0.668	0.052
Md. 32 T2G/8			plow zone	post-EF	0.453	0.117
Md. 32 T2G/9			slope wash	post-Ocós	0.588	1.635
Md. 32 T2G/13/loc. 4 F.5	3207D	Ocós	midden	Ocós		1.954
Md. 32 T2G/13/loc. 1-3 F.5	3207D	Ocós	midden	Ocós		
Md. 32 T2G/18			slope wash or platform fill	Locona or Ocós	0.084	0.944
Md. 32 T2G/24			slope wash or platform fill	Locona or Ocós	0.384	1.07
Md. 32 T2G/27			ancient ground surface	Locona or Ocós	0.32	0.75
Md. 32 T2G/32			ancient ground surface	Locona or Ocós	0.136	
Md. 32 T2G/35			pre-occupation deposit	pre-occupation	0.236	0.036
Md. 32 T2G/38			pre-occupation deposit	pre-occupation	0.236	
Md. 32 T3D/86			plow zone	post-EF		
Md. 32 T3D/88 F.4			platform fill/plow zone	Locona	0.252	
Md. 32 T3D/91 F.4	3202B	Md32-plat	platform fill	Locona	0.356	0.507
Md. 32 T3D/94 F.4	3202B	Md32-plat	platform fill	Locona	0.3	0.6
Md. 32 T3D/97 F.4	3202B	Md32-plat	platform fill	Locona	0.244	0.261
Md. 32 T3D/98	3208B	Md32-surf	ancient ground surface	Locona	0.3	0.191
Md. 32 T3D/101	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.308	0.033
Md. 32 T3D/104	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.36	0.035
Md. 32 T3E/86			plow zone	post-EF		
Md. 32 T3E/105			plow zone	post-EF	0.384	0.404
Md. 32 T3E/108			slope wash		0.44	3.5
Md. 32 T3E/116			slope wash		0.384	1.31
Md. 32 T3E/121			ancient ground surface	Locona	0.44	0.299
Md. 32 T3E/128			pre-occupation deposit	Locona	0.456	0.095
Md. 32 T3F/133			plow zone	post-EF	0.312	
Md. 32 T3F/138			slope wash	post-EF	0.56	3.15
Md. 32 T3F/144			slope wash	post-EF	0.324	1.23
Md. 32 T3F/147			ancient ground surface	Ocós or later	0.356	0.54
Md. 32 T3F/150			pre-occupation deposit		0.468	0.337
Md. 32 T3G/151			plow zone	post-EF	0.34	
Md. 32 T3G/155			slope wash	post-EF	0.612	2.92
Md. 32 T3G/157			ancient ground surface		0.392	2.2
Md. 32 T3G/160			ancient ground surface	Ocós or later	0.384	0.358

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 32 T3G/161			pre-occupation deposit		0.292	0.214
Md. 32 T3H/86			plow zone	post-EF		
Md. 32 T3H/89			plow zone	post-EF	0.242	
Md. 32 T3H/92			slope wash	post-EF	0.296	1.35
Md. 32 T3H/95			slope wash	post-EF	0.37	2.117
Md. 32 T3H/99			slope wash	Ocós or later	0.328	1.5
Md. 32 T3H/102			ancient ground surface	Ocós or later	0.396	0.49
Md. 32 T3H/106			natural or Locona/Ocós feature?	pre-occupation	0.424	0.118
Md. 32 T3H/109			pre-occupation deposit	pre-occupation	0.336	0.033
Md. 32 T3I/86			plow zone	post-EF		
Md. 32 T3I/111			plow zone	post-EF	0.388	
Md. 32 T3I/114			slope wash	post-EF	0.444	0.5
Md. 32 T3I/118			ancient ground surface	Ocós or later	0.492	0.129
Md. 32 T3I/124			ancient ground surface	Ocós or later	0.208	0.056
Md. 32 T3I/125			natural or Locona/Ocós feature?	pre-occupation	0.324	
Md. 32 T3I/130			pre-occupation deposit	pre-occupation	0.396	
Md. 32 T3J/86			plow zone	post-EF		
Md. 32 T3J/112			plow zone	post-EF	0.476	
Md. 32 T3J/115			slope wash	post-EF	0.368	0.88
Md. 32 T3J/119			slope wash	post-EF	0.312	1.29
Md. 32 T3J/134			slope wash	Cherla or later	0.348	0.77
Md. 32 T3J/141			ancient ground surface	Cherla or later	0.352	0.082
Md. 32 T3K/86			plow zone	post-EF		
Md. 32 T3K/123			plow zone	post-EF	0.38	
Md. 32 T3K/127			slope wash	post-EF	0.416	0.87
Md. 32 T3K/131			slope wash	post-EF	0.316	0.56
Md. 32 T3K/135			slope wash	post-EF	0.324	0.416
Md. 32 T3K/137			ancient ground surface	Cherla or later	0.376	0.426
Md. 32 T3K/139			pre-occupation deposit	pre-occupation	0.416	0.084
Md. 32 T3L/86			plow zone	post-EF		
Md. 32 T3L/90			plow zone	post-EF	0.161	
Md. 32 T3L/93			slope wash	post-EF	0.321	1.07
Md. 32 T3L/96			slope wash	post-EF	0.278	1.75
Md. 32 T3L/100			slope wash	post-EF	0.36	1.86
Md. 32 T3L/103			slope wash	post-EF	0.324	1.27
Md. 32 T3L/107			ancient ground surface	Cherla or later	0.352	0.141
Md. 32 T3L/110			pre-occupation deposit	pre-occupation	0.372	0.029
Md. 32 T3M/86			plow zone	post-EF		
Md. 32 T3M/113			plow zone	post-EF	0.372	
Md. 32 T3M/117			slope wash	post-EF	0.356	
Md. 32 T3M/120			slope wash	post-EF	0.408	0.627
Md. 32 T3M/122			ancient ground surface	Ocós or later	0.392	
Md. 32 T3M/126			pre-occupation deposit	pre-occupation	0.42	
Md. 32 T3N/129			plow zone	post-EF	0.32	0.276
Md. 32 T3N/132			slope wash	post-EF	0.376	0.542
Md. 32 T3N/136			slope wash	post-EF	0.388	0.492

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 32 T3N/140			ancient ground surface	Ocós or later	0.424	0.036
Md. 32 T3N/142			pre-occupation deposit	pre-occupation	0.24	0.082
Md. 32 T4C/145 F.4			platform fill/plow zone	Locona	0.52	
Md. 32 T4C/148 F.4	3202B	Md32-plat	platform fill	Locona	0.384	1.072
Md. 32 T4C/154 F.7			modern post hole	modern		
Md. 32 T4C/165 F.4	3202B	Md32-plat	platform fill	Locona	0.352	0.65
Md. 32 T4C/166 F.4	3202B	Md32-plat	platform fill and underlying ground surface	Locona	0.388	0.435
Md. 32 T4C/169	3208B	Md32-surf	ancient ground surface	Locona	0.372	0.695
Md. 32 T4C/174	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.332	0.09
Md. 32 T4C/181	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.36	0.085
Md. 32 T4D/152 F.8	3206A	Cherla	pit fill, disturbed by plow	Cherla	0.436	10.965
Md. 32 T4D/159			platform fill, probably an extension to original platform	Late Locona?	0.296	1.968
Md. 32 T4D/172			platform fill, probably an extension to original platform	Late Locona?	0.3	0.96
Md. 32 T4D/183			platform fill, probably an extension to original platform	Locona	0.468	0.801
Md. 32 T4D/185			ancient ground surface	Locona	0.368	0.105
Md. 32 T4D/188			pre-occupation deposit	pre-occupation	0.34	0.021
Md. 32 T4E/163			plow zone	Ocós or later	0.408	1.9
Md. 32 T4E/167			platform fill or slope wash	Ocós or later	0.36	3.8
Md. 32 T4E/170	3204A	Ocós	platform fill and midden	Locona or Ocós	0.136	1.945
Md. 32 T4E/173	3204A	Ocós	platform fill and midden	Locona or Ocós	0.308	3.48
Md. 32 T4E/175	3204A	Ocós	platform fill and midden	Locona or Ocós	0.28	3.43
Md. 32 T4E/179	3203A	Locona	ancient ground surface	Locona	0.368	2.7
Md. 32 T4E/189	3203A	Locona	pre-occupation deposit	pre-occupation	0.372	0.95
Md. 32 T4F/192			slope wash/plow zone	post-Ocós	0.316	2.96
Md. 32 T4F/194			slope wash?	post-Ocós	0.352	3.33
Md. 32 T4F/197			slope wash?	post-Ocós	0.3	4.72
Md. 32 T4F/201	3204A	Ocós	midden	Ocós	0.292	9.47
Md. 32 T4F/205	3204A	Ocós	midden	Ocós	0.22	9.74
Md. 32 T4F/210	3203A	Locona	midden	Locona	0.248	4.9
Md. 32 T4F/212	3203A	Locona	midden	Locona	0.144	2.64
Md. 32 T4F/214	3203A	Locona	ancient ground surface	Locona	0.172	1.58
Md. 32 T4F/216	3203A	Locona	pre-occupation deposit	pre-occupation	0.332	1.96
Md. 32 T5A/176			plow zone	Locona		0.212
Md. 32 T5A/178 F.4	3202B	Md32-plat	platform fill and slope wash	Locona	0.444	0.82
Md. 32 T5A/180 F.4	3202B	Md32-plat	platform fill and slope wash	Locona	0.408	0.81
Md. 32 T5A/184			platform fill and underlying ground surface	Locona	0.69	1.1
Md. 32 T5A/187	3208B	Md32-surf	ancient ground surface	pre-occupation	0.606	0.3
Md. 32 T5A/207	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.324	0.112
Md. 32 T5B/191			slope wash	post-Ocós	0.474	2.7
Md. 32 T5B/195			slope wash	post-Ocós	0.738	1.45
Md. 32 T5B/198			ancient ground surface	Locona-Jocotal	0.444	0.93
Md. 32 T5B/209			pre-occupation deposit	pre-occupation	0.534	0.63
Md. 32 T6A/203			plow zone	Locona	0.522	0.7
Md. 32 T6A/208 F.4	3202B	Md32-plat	platform fill	Locona	0.75	1.03

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Md. 32 T6A/215 F.4	3202B	Md32-plat	ancient ground surface	Locona	0.498	0.67
Md. 32 T6A/217	3208B	Md32-surf	ancient ground surface	Locona	0.456	0.11
Md. 32 T6A/222	3208B	Md32-surf	pre-occupation deposit	pre-occupation	0.113	0.039
Md. 32 T6B/223			plow zone	Locona	0.594	0.215
Md. 32 T6B/225 F.4	3202B	Md32-plat	platform fill and slope wash	Locona	0.612	1.21
Md. 32 T6B/228			ancient ground surface	Locona	0.498	0.715
Md. 32 T6B/229			ancient ground surface	Locona	0.582	0.3
Md. 32 T6B/233			pre-occupation deposit	pre-occupation	0.528	
Md. 32 T6C/232			plow zone	post-Ocós	0.52	0.3
Md. 32 T6C/234			slope wash	post-Ocós	0.32	0.81
Md. 32 T6C/236			ancient ground surface	Locona-Jocotal	0.4	0.185
Md. 32 T6C/238			pre-occupation deposit	pre-occupation	0.504	
Md. 32 Unit 1/171			plow zone	mixed	0.04	5.52
Md. 32 Unit 1/177			slope wash	mixed	0.628	6.41
Md. 32 Unit 1/182			slope wash	mixed	1.93	8.32
Md. 32 Unit 1/186			slope wash or underlying ground surface	mixed	0.264	3.89
Md. 32 Unit 1/190			slope wash or underlying ground surface	mixed	0.246	2.55
Md. 32 Unit 1/193 F.6	3205A	Ocós	midden	Ocós	0.332	7.5
Md. 32 Unit 1/196 F.6	3205A	Ocós	midden	Ocós	0.335	9.84
Md. 32 Unit 1/199 F.6	3205A	Ocós	midden	Ocós		
Md. 32 Unit 1/200 F.6	3205A	Ocós	midden	Ocós	0.081	4.09
Md. 32 Unit 1/202 F.6	3205A	Ocós	midden	Ocós	0.257	9.4
Md. 32 Unit 1/204 F.6	3205A	Ocós	midden	Ocós	0.059	0.121
Md. 32 Unit 1/206 F.6	3205A	Ocós	midden	Ocós	0.287	14.1
Md. 32 Unit 1/211 F.6	3205A	Ocós	midden	Ocós	0	2.81
Md. 32 Unit 1/213 F.6	3205A	Ocós	midden	Ocós	0.008	1.58
Md. 32 Unit 1/219 F.6	3205A	Ocós	midden	Ocós	0.173	5.28
Md. 32 Unit 1/220			pre-occupation deposit	Ocós	0.094	0.023
Md. 32 Unit 1/221			pre-occupation deposit	Ocós	0.033	0.186
Md. 32 Unit 2/224			slope wash/plow zone	post-Ocós	0.284	2.46
Md. 32 Unit 2/227			slope wash?	post-Ocós	0.448	5.74
Md. 32 Unit 2/231	3204A	Ocós	midden	Ocós	0.385	7.46
Md. 32 Unit 2/239			grave pit	Cherla	0.108	0.325
Md. 32 Unit 2/241	3204A	Ocós	midden	Ocós	0.388	8.41
Md. 32 Unit 2/243	3203A	Locona	ancient ground surface	Locona and Ocós?	0.652	8.16
Md. 32 Unit 2/245	3203A	Locona	pre-occupation deposit	pre-occupation	0.228	1.69
Md. 32 Unit 3/223			slope wash/plow zone	post-Ocós	0.224	1.68
Md. 32 Unit 3/226			slope wash?	post-Ocós	0.464	4.16
Md. 32 Unit 3/230			slope wash?	post-Ocós	0.396	4.83
Md. 32 Unit 3/235	3204A	Ocós	midden	Ocós	0.148	3.65
Md. 32 Unit 3/237	3204A	Ocós	midden	Ocós	0.112	9
Md. 32 Unit 3/240	3204A	Ocós	midden	Ocós	0.256	7.52
Md. 32 Unit 3/242	3204A	Ocós	ancient ground surface	Late Locona or Ocós	0.488	1.56
Md. 32 Unit 3/244			pre-occupation deposit	pre-occupation	0.177	
Md. 32 Unit 3/Profile						0.64
P32/1			plow zone	Ocós	0.423	3.435

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
P32/2			slope wash	Ocós	0.49	5.2
P32/3			ancient ground surface?	Ocós	0.347	7.63
P32/4	0001A	Late Locona	pit fill	Late Locona	0.53	11.92
P32/5-A			pre-occupation deposit	Late Locona	0.305	0.435
P32/5-B	0001A	Late Locona	pit fill	Late Locona	0.152	2.137
P32A/1			plow zone	Ocós	0.477	3.55
P32A/2			slope wash	Ocós	0.428	3.605
P32A/3			ancient ground surface?	Ocós	0.365	10.42
P32A/4-A	0001A	Late Locona	midden	Late Locona	0.227	10.24
P32A/4-B	0001A	Late Locona	midden	Late Locona	0.13	12.076
P32A/5-A1	0001A	Late Locona	midden	Late Locona	0.135	9.042
P32A/5-A2			pre-occupation deposit	Late Locona	0.291	3.38
P32A/5-B	0001A	Late Locona	midden	Late Locona	0.142	3.635
P32B-1/1				Ocós		
P32B-1/2				Ocós		
P32B-1/3					0.187	2.06
P32B-1/4					0.193	3.21
P32B-1/5			pre-occupation deposit	Late Locona	0.21	2.56
P32B-1/6			pre-occupation deposit	Late Locona	0.34	2.155
P32B-2/1						
P32B-2/2						
P32B-2/3					0.223	1.065
P32B-2/4	0010D	Late Locona	pit fill	Late Locona	0.217	0.42
P32B-2/5			pre-occupation deposit	Late Locona	0.197	1.355
P32B-2/F.2	0010D	Late Locona	pit fill	Late Locona	0.051	1.955
P32B-3/1						
P32B-3/2						
P32B-3/3						
P32B-3/4						
P32B-3/5						0.085
P32B-3/F.3	0002A	Late Locona	pit fill	Late Locona	0.065	1.395
P32B-4/1			plow zone	Ocós		
P32B-4/2			ancient ground surface?	Ocós		
P32B-4/3A	0003A	Locona	pit fill	Locona	0.292	5.945
P32B-4/3B			pre-occupation deposit	Locona	0.201	0.8
P32B-4/F.4	0003A	Locona	pit fill	Locona	0.283	16.538
P32C/1			plow zone			
P32C/2			slope wash		0.363	2.595
P32C/3			ancient ground surface?		0.15	1.445
P32C/4 F.1	0001A	Late Locona	pit fill	Late Locona	0.163	3.72
P32C/5 F.1	0001A	Late Locona	pit fill	Late Locona	0.21	5.355
P32C/6 F.1	0001A	Late Locona	pit fill	Late Locona	0.167	5.081
P32C/7-A F.1	0001A	Late Locona	pit fill	Late Locona		2.175
P32C/7-B			pre-occupation deposit	Late Locona		0.245
P32C/8 F.1	0001A	Late Locona	pit fill	Late Locona	0.028	0.415
P32D/1			slope wash			

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m^3)	Weight of Sherds (kg)
P32D/2 F.3A			ancient ground surface?		0.666	7.87
P32D/3 F.3A			pit fill			1.35
P32E-1/1					0.448	3.96
P32E-1/2					0.408	3.93
P32E-1/3					0.376	2.195
P32E-1/4						
P32E-2/1			uncertain		0.52	5.98
P32E-2/2					0.424	3.375
P32E-2/3					0.368	1.981
P32E-2/4						
P32E-3/1					0.44	3.38
P32E-3/2					0.376	4.685
P32E-3/3					0.384	2.93
P32E-3/4						9.705
P32E-3/F.3	0002A	Late Locona	pit fill		with P32B3/F.3	
P32E-4/1			plow zone		0.44	3.175
P32E-4/2			slope wash		0.42	4.5
P32E-4/3			ancient ground surface?		0.35	2.585
P32E-4/4			pit fill		0.408	9.675
P32E-4/F.4	0003A	Locona	pit fill		with P32B4/F.4	
P32E/Burial 5			burial			
Mz-250 1/1			modern dirt road surface		0.49	0.284
Mz-250 1/4			disturbed modern		0.39	0.261
Mz-250 1/6			EF occupation surface		0.37	0.128
Mz-250 1/8					0.43	0.022
Mz-250 1/10			pre-occupation deposit		0.42	
Mz-250 1/14			pre-occupation deposit		0.2	0.008
Mz-250 1/16			pre-occupation deposit		0.17	0.006
Mz-250 1/17			pre-occupation deposit		0.24	
Mz-250 2/2			modern dirt road surface		0.4	0.244
Mz-250 2/3			disturbed modern		0.38	0.442
Mz-250 2/5			EF occupation surface		0.44	1
Mz-250 2/7			EF occupation surface		0.36	0.194
Mz-250 2/9			EF occupation surface		0.38	0.163
Mz-250 2/11					0.46	0.095
Mz-250 2/15			pre-occupation deposit		0.21	
Mz-250 2/18			pre-occupation deposit		0.24	
Mz-250 2/19			pre-occupation deposit		0.18	0.015
Mz-250 2/20			pre-occupation deposit		0.21	
Mz-250 3/12			modern dirt road surface		0.37	0.076
Mz-250 3/27			EF occupation surface		0.2	0.059
Mz-250 3/26			disturbed modern		0.44	0.201
Mz-250 3/28			rodent burrow		0.22	0.035
Mz-250 3/32			pre-occupation deposit		4	0.135
Mz-250 3/33a					0.26	0.032
Mz-250 4/13			modern dirt road surface		0.76	0.096

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Mz-250 4/21			modern dirt road surface		0.51	0.227
Mz-250 4/22			EF occupation surface	Locona	0.53	1.47
Mz-250 4/23	0009A	Locona	pit fill	Locona	0.67	2.75
Mz-250 4/24	0009A	Locona	pit fill	Locona	0.45	3.2
Mz-250 4/25	0008A	Locona	pit fill	Locona	0.44	3.73
Mz-250 4/29	0008A	Locona	pit fill		0.06	1.09
Mz-250 4/30	0008A	Locona	pit fill	Locona	0.07	3
Mz-250 4/31	0008A	Locona	pit fill	Locona	0.06	1.3
Mz-250 4/41	0009A	Locona	pit fill	Locona	0.05	0.162
Mz-250 4/43	0009A	Locona	pre-occupation deposit		0.36	0.17
Mz-250 4/44	0009A	Locona	pit fill	Locona	0.68	0.141
Mz-250 4/36	0009A	Locona	pit fill	Locona	0.03	0.341
Mz-250 4/40	0009A	Locona	pre-occupation deposit		0.18	0.041
Mz-250 5/42			modern dirt road surface		0.46	0.165
Mz-250 5/45			disturbed modern	Locona	0.4	1.64
Mz-250 5/46			EF occupation surface	Locona	0.37	0.184
Mz-250 5/47	0009A	Locona	pit fill		0.38	0.42
Mz-250 5/48	0009A	Locona	pit fill	Locona	0.42	0.733
Mz-250 5/51	0009A	Locona	pit fill	Locona	0.15	0.448
Mz-250 5/52	0009A	Locona	pit fill		0.03	0
Mz-250 5/54	0009A	Locona	pit fill		0.06	0.082
Mz-250 5/55	0009A	Locona	pit fill		0.17	0.059
Mz-250 5/56			pit fill	Locona	0.44	0.024
Mz-250 5/58	0009A	Locona	pit fill	Locona	0.46	0.034
Mz-250 5/74						0
Mz-250 5/47	0009A	Locona	pit fill	Locona	0.38	1.42
Mz-250 6/33b			modern dirt road surface		0.41	0.164
Mz-250 6/34			disturbed modern		0.42	0.215
Mz-250 6/35			EF occupation surface		0.44	0.3
Mz-250 6/37					0.32	0.129
Mz-250 6/38					0.0006	0.019
Mz-250 6/39					0.39	0.033
Mz-250 7/49			disturbed modern		0.73	0.075
Mz-250 7/50			disturbed modern		0.712	0.083
Mz-250 7/53			EF occupation surface	Locona	0.98	0.91
Mz-250 7/57 Zone D	0009A	Locona	pit fill	Locona	0.77	1.06
Mz-250 7/59			pit fill	Locona	0.71	0.239
Mz-250 7/60	0009A	Locona	pit fill	Locona	0.14	0.72
Mz-250 7/50			disturbed modern			0.208
Mz-250 8/61			disturbed modern	Locona	1.03	1.6
Mz-250 8/62	0009A	Locona	EF occupation surface	Locona	0.37	4.95
Mz-250 8/63	0008A	Locona	pit fill	Locona	0.09	0.97
Mz-250 8/64	0008A	Locona	pit fill	Locona	0.38	6.356
Mz-250 8/65	0008A	Locona	pit fill	Locona	0.034	0.72
Mz-250 8/66	0008A	Locona	pit fill	Locona	0.1	1.9
Mz-250 8/67	0008A	Locona	pit fill	Locona	0.15	3.89

Provenience	Initial Refuse Sample	Phase of Sample	Brief Description of Context	Phase of Deposition	Volume Excavated (m³)	Weight of Sherds (kg)
Mz-250 8/68	0009A	Locona	pit fill		0.32	0.042
Mz-250 8/69	0009A	Locona	pit fill		0.09	0.1
Mz-250 8/70	0009A	Locona	pit fill		0.14	0.054
Mz-250 8/71	0008A	Locona	pit fill	Locona	0.08	0.88
Mz-250 9/72	0008A	Locona	pit fill	Locona		0.95
Mz-250 9/73	0009A	Locona	pit fill	Locona	0.9407	0.43
Mz-250 9/74	0009A	Locona	pit fill			
Mz-250 9/75	0009A	Locona	pit fill	Locona	0.1075	0.188
Mz-250 10/78			disturbed modern			0.76
Mz-250 10/79			disturbed modern			0.93
Mz-250 10/80			EF occupation surface			0.11
Mz-250 10/81			EF occupation surface			0.24
Mz-250 10/82			pit fill	Locona		0.05
Mz-250 11/83			disturbed modern			1.43
Mz-250 11/84			EF occupation surface	Locona	0.416	1.91
Mz-250 11/85	0009A	Locona	pit fill	Locona	0.436	0.304
Mz-250 11/86 F.1	0009A	Locona	pit fill	Locona	0.37	0.15
Mz-250 11/87 F.1	0009A	Locona	pit fill		0.325	0.359
Mz-250 11/88 F.1	0009A	Locona	pit fill		0.46	0.088
Pit 29/1			slope wash	post-Jocotal	0.375	
Pit 29/2			slope wash	post-Jocotal	0.4	
Pit 29/3			slope wash	Jocotal or post-Jocotal	0.4	
Pit 29/4			depositional process uncertain	Cherla	0.4	
Pit 29/5			depositional process uncertain	Cherla	0.4	
Pit 29/6	0004A	Cherla	pit fill	Cherla	with f.1	
Pit 29/7			occupation surface?	Locona	0.312	
Pit 29/8			pre-occupation deposit	pre-occupation	0.4	
Pit 29/9			pre-occupation deposit	pre-occupation	0.4	
Pit 29/10			pre-occupation deposit	pre-occupation	0.4	
Pit 29/11			pre-occupation deposit	pre-occupation		
Pit 29/F.1	0004A	Cherla	pit fill	Cherla	0.51	8.7544
Tr.1B(1995)/F.1	0005A	Cherla	pit	Cherla	0.27	41.3
Tr. 1T/60–100 cm	0006A	Cherla	unknown	Cherla	2	37.6

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Paso de la Amada

AN EARLY MESOAMERICAN CEREMONIAL CENTER

PASO DE LA AMADA, an archaeological site in the Soconusco region of the Pacific coast of Mexico, was among the earliest sedentary, ceramic-using villages of Mesoamerica. It was also one of the largest communities of its era, with an occupation extending across 140 hectares in 1600 BC. First settled around 1900 BC, the site was abandoned 600 years later during what appears to have been a period of local political turmoil. The decline of Paso de la Amada corresponded with a rupture in local traditions of material culture and local adoption of the Early Olmec style. Stylistically, the material culture of Paso de la Amada corresponds predominantly to the pre-Olmec Mokaya tradition. Excavations at the site have revealed significant earthen constructions from as early as 1700 BC, including the earliest known Mesoamerican ball court and a series of high-status residences. This volume covers all aspects of excavations and artifacts and includes interpretive chapters dealing with subsistence, social inequality, and the organizational history of the site.

CONTRIBUTORS

RICHARD G. LESURE · JOHN E. CLARK · MICHAEL BLAKE · THOMAS A. WAKE
KRISTIN HOFFMEISTER · R. J. SINENSKY · TERRY G. POWIS · KATELYN J. BISHOP
PAOLA DEMATTÈ · NILESH W. GAIKWAD · LOUIS GRIVETTI

ABOVE: Reconstruction drawing of an Amada Black-to-Brown tecomate from Mound 12, top view.

COVER IMAGE: The same vessel, side view. Both drawings by Ayax Moreno.

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