16. Other Ceramic and Miscellaneous Artifacts

DAVID C. GROVE

The overwhelming quantity of potsherds and anthropomorphic figurines recovered at Chalcatzingo and their importance in archaeological interpretation tend to obscure the minor quantity of other ceramic artifacts recovered. Nevertheless, these various kinds of artifacts provide a wealth of data on different aspects of daily life at Chalcatzingo, and may also be used to compare and contrast Middle Formative culture here and elsewhere in Mesoamerica.

The ceramic artifacts described in this chapter have been classified into three categories: personal adornment, ritual, and utilitarian. Objects of personal adornment include clay beads, earspools, pendants, and stamps which were presumably used for body decoration. Artifacts which may have been used in rituals are whistles, flutes, masks, miniature vessels, and animal figurines. Ceramic bars are included in this category as well because some of them are decorated and all lack wear marks. Easily identifiable utilitarian artifacts are spindle whorls and ceramic molds. In addition, ceramic "bananas" are classed with the utilitarian artifacts because they show wear patterns. There is also a fourth catch-all category of artifacts of unknown function. Within this last category are solid ceramic balls, ground sherds of various shapes, and hollow spheres.

The second part of this chapter describes artifacts manufactured from a variety of other materials—iron ore, shell, bone, and sinew. The chapter concludes with a description of the remarkable artifacts from Cave 2, many of them of wood and other perishable materials, which were apparently part of a tool kit related to spinning, weaving, and the manufacture of agave fiber cordage.

OTHER CERAMIC ARTIFACTS

Personal Adornments

Tubular Beads *(5)*

Tubular clay beads are rare in our artifact sample, and, interestingly, four out of five of those which do occur are from caves. The beads range from 12 to 22 mm in length, 4 to 8.5 mm in outside diameter, and 1.5 to 4.5 mm in inside diameter. Three are brown-black, but two from Cave 1 are of white clay.

Spherical Beads *(2)*

Only two spherical beads occur in our sample. One is an orange bead from T-11, 1.7 mm in diameter and 0.7 mm thick. It is possibly Cantera phase in date. The other bead, from Cave 1, is what Charlotte Thomson (Chapter 17) calls a "bag-shaped" bead ca. 18 mm in diameter and 1.2 mm thick. This bead may date to the Postclassic.

Solid Earspools *(24; Fig. 16.1)*

The fat solid disc earspools range in diameter from 13 to 45 mm, although most have a diameter of ca. 20–30 mm. In thickness they vary from 7 to 18 mm. Their sides are slightly concave. Most are plain, but a few have incised decorations. One from our sample has traces of a fugitive white slip; another has the side (circumference) painted red and highly polished.

George C. Vaillant (1931:296) observed that earspools of this type are "as diagnostic of this Ticoman culture complex as the figurine types and pottery." However, at least nine of the Chalcatzingo solid earspools come from unquestionably earlier, Cantera phase contexts, and there is evidence that similar earspools begin late in the Middle Formative at other central Mexican sites as well. One solid earspool was recovered by the Vaillants from a Gualupita I level at that site (Vaillant and Vaillant 1934: Fig. 30, no. 2, Table 3), and Christine Niederberger (1976:235) illustrates a solid disc earspool from her Capa 3 (Middle Formative, Zacatenco phase) at Zohapilco. Angel García Cook (1976:47, Fig. 7) dates similar earspools from Tlaxcala as early as 1100 BC, with maximum percentages of this type occurring in Tlaxcala between 700 and 1 BC.

Michael Coe describes solid disc earspools from Conchas phase levels at La Victoria (1961:Fig. 60*c*). These earspools, while similar in form to Chalcatzingo and Ticoman examples, have slightly convex sides. A Francesa phase (Late Formative) Chiapa de Corzo example, with a slightly concave circumference, is illustrated by Thomas A. Lee (1969:89, Fig. 47*h*), who also cites other published examples. No such earspools are published from Gulf Coast sites.

The distribution of solid earspools at Chalcatzingo (Table 16.1) shows that only one occurred on the Plaza Central terrace, location of the site's Late Cantera subphase elite residence. Four were recovered from the T-23 house, which is also Late Cantera subphase, suggesting the possibility that this type of earspool may have been more typical of the site's non-elite. Interestingly, four solid earspools were recovered during excavations of Cave 1 on the Cerro Delgado, a cave which also yielded two Late Cantera subphase burials. A similar earspool was also found in Cave 8 excavations. Four were found during the excavation of the Middle Postclassic house on Tetla-11, including two found on the house floor itself. Because Tetla-11 is an artificial terrace with the fill containing quantities of Middle and Late Formative artifacts, the association of the earspools with the dwelling should be viewed at this time as coincidental.

Thin-walled Hollow Earspools *(14; Fig. 16.2a)*

Thin-walled ceramic earspool fragments, like their jadeite counterparts, were recovered in excavations of Cantera phase

Figure 16.1. Solid clay earspools.

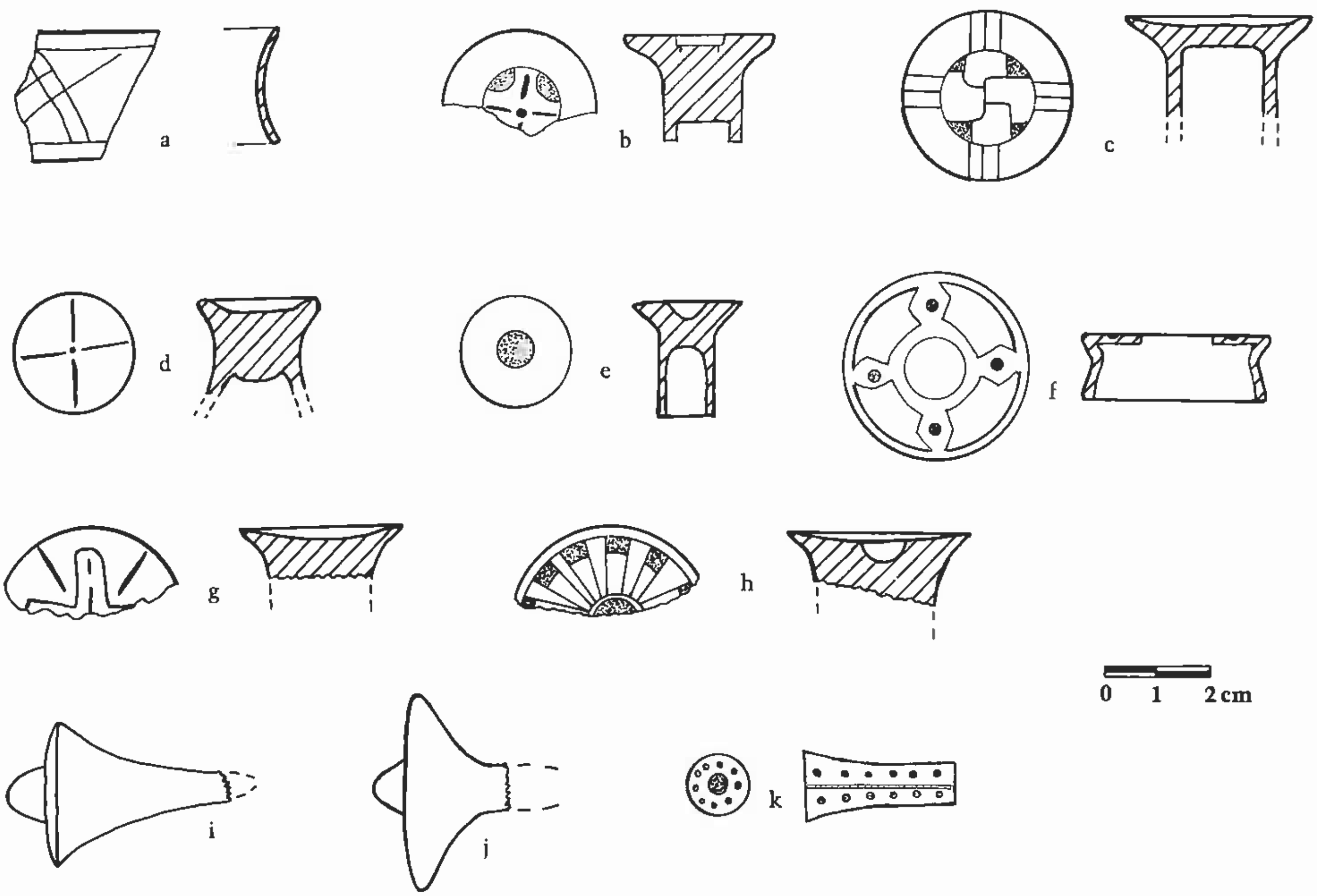

Figure 16.2. Earspools: *a*, thin-walled, hollow; *b–f*, capped, hollow and semi-hollow; *g–h*, solid flares; *i–k*, probable ear ornaments. Top and cross sections shown in *a–h*; side views in *i–j*, top and side in *k*.

deposits. For both ceramic and jadeite earspools, only fragments were found, and no whole pieces or large fragments were recovered. This earspool type is tubular, with very thin straight or very slightly convex walls, although some have a slight outward flare at one end. My impression from this limited and highly fragmentary sample is that the original length equaled or exceeded the diameter of the spool, thus setting these apart from so-called "napkin ring" earspools which also occur during the Formative period in Mesoamerica (although none were recovered at Chalcatzingo). Length of the spool fragments in our sample ranges from 22 to 35 mm, while diameters vary from 15 to 40 mm but cluster around 27–32 mm. Wall thickness is 2–3 mm. Only two of the fragments show incised surface decoration.

Our sample of this clay earspool type is small, and the distribution on the site therefore does not demonstrate any significant pattern. Two fragments were recovered from PC Structure 1, and one from the T-23 house. Significantly, while occurring in Cantera phase contexts such as the house structures, six of the fragments were recovered from Barranca phase levels.

Thin-walled tubular ceramic earspools were recovered by Vaillant at Zacatenco (1930: Pl. 40, bottom row no. 3) and El Arbolillo (1935: Fig. 25, nos. 11–14). He noted that the majority of those he recovered were black, as are the Chalcatzingo examples. At Zacatenco they occur in Middle Zacatenco levels, and at El Arbolillo in Late I and Early II levels. This temporal placement is in general agreement with the Chalcatzingo data.

The Mesoamerican distribution of tubular earspools is provided by Lee (1969: 90). While the major La Venta publications do not mention clay earspools, one of Matthew Stirling's *National Geographic* articles (Stirling and Stirling 1942: 642) briefly mentions a pair of blue-painted earspools found during his La Venta excavations. The San Lorenzo excavations recovered one fragment of a clay cylindrical earspool (Coe and Diehl 1980: 288, Fig. 410) from a San Lorenzo A context.

Capped Hollow and Semi-hollow Earspools ***(8; Fig. 16.2*****b–f*****)***

Eight spools are hollow to partially hollow, but have one end "capped." This "capped" end has carved or incised designs. The designs, individual characteristics, and size of these spools are shown in Figure 16.2*b–f*. One simple spool (Fig. 16.2*e*) may be Late Barranca subphase. Other, more elaborate examples are Late Cantera subphase (Fig. 16.2*b–d*). Although our sample is small, the distribution seems general and not restricted to any particular area of the site. One Late Formative example is certain (Fig. 16.2*f*), and is very similar to carved examples from Ticoman (Vaillant 1931: Pl. 82, bottom row). Our specimen occurred with T-27 Burial 133 (see Appendix C).

Solid Flare Earspools ***(2; Fig. 16.2*****g–h*****)***

Two solid clay flares occur in our sample. Both are decorated and are apparently Cantera phase in date.

Probable Ear Ornaments ***(3; Fig. 16.2*****i–k*****)***

Two solid clay "flares" with slightly tapering stems occur in our sample (Fig. 16.2*i–j*). Both are from the Cantera phase. They are not stamps and may have functioned as ear ornaments.

One smaller artifact is enigmatic but may have served as ear ornamentation (Fig. 16.2*k*). It is a hollow tube, 30 mm long, with a diameter of 12 mm at one end and 10 mm at the other. The inside diameter is 5 mm at each end but tapers to ca. 2.5 mm in the center. The wide end is decorated with small punctations, and three sections of punctations run along the length of the tube, separated by incised lines.

Pendants ***(7; Fig. 16.3)***

The sample of clay pendants is quite small. They vary from a small bird (Fig. 16.3*a*) to sherd discs which were drilled near the edge for suspension (Fig. 16.3*d–f*). One disc (Fig. 16.3*e*) was manufactured originally to be a suspended disc and the holes were perforated prior to firing. The most interesting of the pendants is from a Cantera phase context but unfortunately is a broken fragment apparently representing about one-half of the original piece (Fig. 16.3*c*). The pendant fragment depicts a shark-like face. The majority of the design is incised, but the eye is raised ca. 4 mm. Two suspension holes occur on the "fin." The pendant's broken length is 3.5 cm, and its original length must have been about 6 cm. Numerous small gold mica flecks occur in the temper of the clay of this artifact, an inclusion not found in local Chalcatzingo ceramics. Thus, the pendant is non-local in origin. While no similar pieces are known from other Formative sites in the highlands or the Gulf Coast, the shark-like profile suggests a provenience associated with the sea.

Roller Stamps ***(26; Fig. 16.4)***

Roller stamps, or seals, both hollow and solid, were found at Chalcatzingo. Such artifacts have been discussed by Frederick U. Field (1967) and illustrated by Jorge Encisco (1947; 1953). In central Mexico

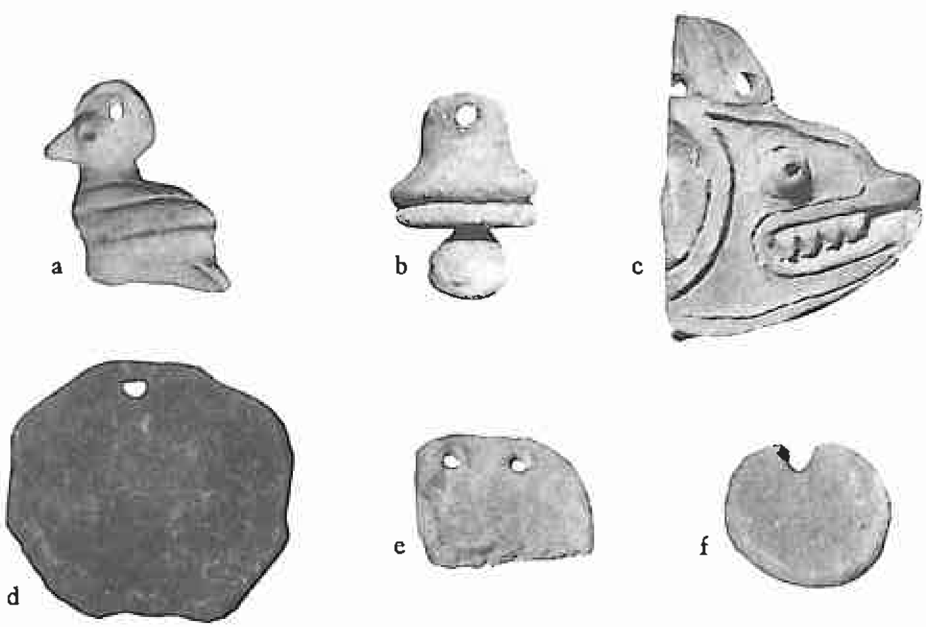

Figure 16.3. Pendants: *a*, small bird; *b*, bell-like; *c*, shark-like face; *d–f*, disc pendants.

0 1 2 cm

***Table 16.1.* Distribution of Ceramic Personal Ornaments**

	Beads			Earspools				Roller Stamps		Flat Stamps	
Area	Tubular	Spherical	Solid	Thin-Walled Hollow	Capped Hollow & Semi-Hollow	Solid Flare	Pendants	Hollow	Solid	Foot	Other
PC Str. 1	1			2				3	1	1	
PC Str. 2					1	1		1	1		1
PC Str. 3											
PC Str. 4							3	1			
PC Str. 6										2	
PC other			1	3				1		2	3
ER Drainage									1		
T-4											2
T-6				1							
T-9A					1						
T-9B											
T-11		1			1				1		
T-15			1				2	5	1		1
T-17				1							
T-20					1					1	1
T-21			2						1	1	
T-23			4	1					1		
T-24					1		1	1			
T-25				1				1	1	1	
T-27			7		2	1		1			
T-29				3	1				2		
T-37											
S-39											
N-2											
N-5											
N-7											
CT-1											
CT-2											1
Tetla			4				1				3
Cave 1	3	1	4								
Cave 2											
Cave 3				1							
Cave 4											
Cave 8	1		1	1							
Other caves											
Surface									2		
Telixtac											
Huazulco											
Totals	5	2	24	14	8	2	7	14	12	8	12

they have been mistakenly termed "Olmec" seals, either directly (Field 1967) or by implication (Coe 1965a:54, Figs. 170–173). However, the distribution of such artifacts (e.g., Lee 1969:73–77) shows that they occur over a wide area of southern Mesoamerica and apparently continue in some areas at least into the Late Formative.

There are two regions in which their occurrence is limited either temporally or in quantity. It is my impression that roller stamps occur in greatest quantity in central Mexico (Valley of Mexico, Morelos, Puebla) in the Early Formative (to ca. 900 BC). Roller seals are found with Early Formative Tlatilco burials (Porter 1953:41–42, Fig. 16), in Ayotla (Early Formative) and Manantial phase (transitional Early–Middle Formative) levels at Zohapilco (Niederberger 1976: 240, Pl. 89), at Las Bocas (Early Formative: Coe 1965a:Figs. 170–172; Field 1967:Figs. 33–46), and from Early Formative Tlatilco culture sites in Morelos including Nexpa (Grove 1974b:Fig. 13) and Cacahuamilpa (Jorge Angulo V., personal communication).

It is also my impression that the presence of roller stamps at Gulf Coast "Olmec" sites is very limited, but this may reflect biases in sampling and excavation. Gulf Coast examples are illustrated from San Lorenzo (Coe and Diehl 1980: 289, Fig. 412), La Venta (P. Drucker 1952:141–142, Fig. 43*a*, Pl. 42, left *a*, *e* [?]), Tres Zapotes (P. Drucker 1943a:130, 132, Pls. 32*s*, 41*aa*, *bb*; Weiant 1943: 82, 117, Pl. 63), and Cerro de las Mesas (P. Drucker 1943b:66–67, Figs. 200–202). The temporal position of most of these artifacts is unclear, although the San Lorenzo example is Early Formative, while both the Tres Zapotes and La Venta stamps appear to be Middle Formative on the basis of the associated artifacts.

Chalcatzingo's roller stamps are all fragmentary. Two general categories can be defined (as with other Mesoamerican examples): solid and hollow stamps. There is no significant difference in quantity between solid and hollow in our sample (Table 16.1). Designs range from simple linear motifs to elaborate ones. The designs fall within the range depicted by Field (1967: Figs. 17–29, 33–46) and Lee (1969: Figs. 36–38). The distribution on the site is general enough to suggest that roller stamps were used by all members of the society (apparently for body decoration) and were not restricted to the elite or to elite areas.

This statement must be qualified, however, with the understanding that the sample is relatively small and that the contexts and temporal placements of these stamp fragments are questionable. While half come from Cantera or Barranca phase levels, only three occur associated with Cantera phase floors. The remainder are surface finds or from fill which includes Amate phase debris. Based on the dating of other central Mexican roller stamps, it is quite possible that the majority of Chalcatzingo's are Early Formative Amate phase fragments which in one way or another were introduced into the Middle Formative levels. In other words, it is still unclear how long into the Middle Formative the use of such stamps extended.

Flat Stamps ***(20; Fig. 16.5)***

The majority of flat stamps excavated have a small stemmed handle on the back. Eight of the stamps are human feet (Fig. 16.5*a–e*), a common motif at Tlatilco (Field 1967: 23, Figs. 30, 32; Porter 1953: 42). Three of the Chalcatzingo foot stamps come from good Amate phase contexts; the remainder are from Cantera phase levels but may represent Amate phase stamps somehow introduced into later deposits. One Amate phase stamp shows a human figure with the head represented as concentric circles (Fig. 16.5*f*), again repeating a design found at Tlatilco (Encisco 1947: 128, no. iv). Stamps similar to those recovered from Formative period deposits at Chalcatzingo have been illustrated from Ticoman (Vaillant 1931: Pl. 83, bottom row, nos. 1–2) and Gualupita (Vaillant and Vaillant 1934: Fig. 29, no. 5). Illustrated Gulf Coast examples (Coe and Diehl 1980: Fig. 413; P. Drucker 1943a: Pls. 41*x–ff*, 42*s–t*, 43*d*, 47*m*; Weiant 1943: Pls. 62, 73, nos. 4–6) appear to be post–Middle Formative.

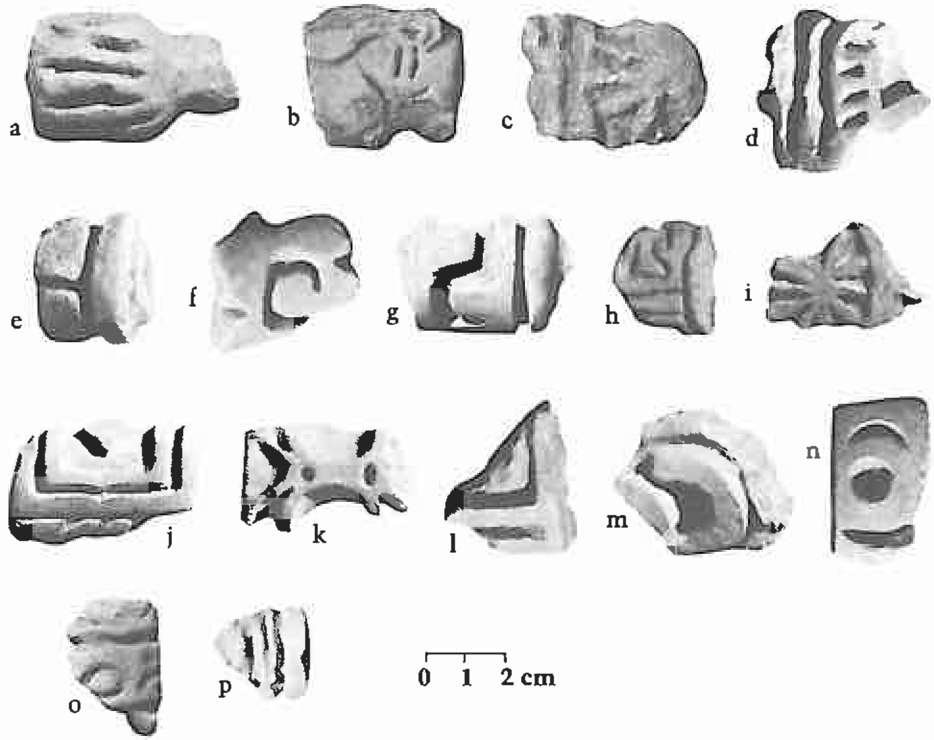

Figure 16.4. Roller stamp fragments: *a–i*, solid; *j–p*, hollow.

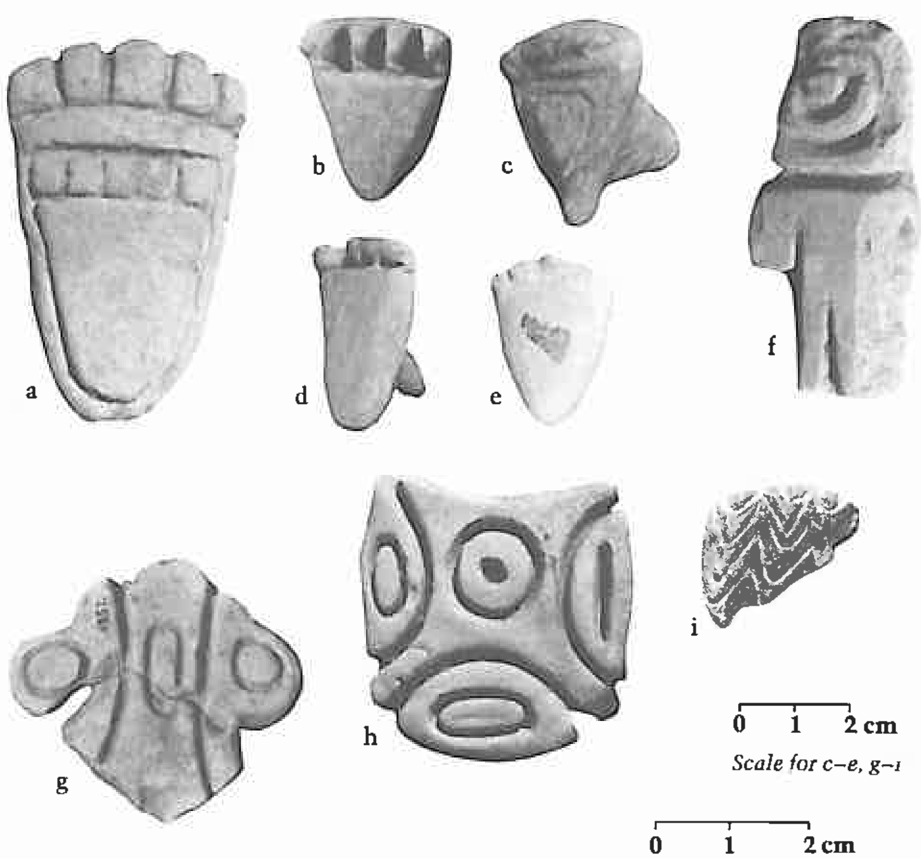

Figure 16.5. Flat stamps: *a–e*, feet; *f*, anthropomorphic figure; *g–i*, others.

Ritual Artifacts

Whistles and Ocarinas *(105; Fig. 16.6)*
Our artifact sample includes whistles, ocarinas, and flutes, most of which are from the Cantera phase. However, because we are working primarily with fragmentary artifacts, I have divided the sample into only two categories, whistles and flutes. Although I recognize the importance of the distinction Lee (1969: 65–66) makes between whistles (single note) and ocarinas (multi-note), it is difficult to ascertain whether most of our whistle-ocarina examples were originally single or multi-toned. Whistles are subdivided into four categories below, and mouthpiece types are also described. Flutes are discussed in a separate section.

Most whistles are manufactured from a sandy tan clay and are relatively simple in form. A few, however, are well-made zoomorphic representations. The majority of the whistle sherds recovered were fragments of the hollow oval sound (resonating) chambers. However, at least thirty percent of these have tab "wings" or other filleted appendages which suggest that many simple whistles are also bird effigies. Other fragmentary raised areas on some sound chambers also indicate that other large, possibly zoomorphic representations were appended as part of the whistles. Some artifacts have suspension holes.

Specific Zoomorphic or Anthropomorphic Whistles (11; Fig. 16.6*a*): Rather than being zoomorphic or anthropomorphic representations appended to the oval sound chambers, as in the case of the single and double chamber whistles discussed below, whistles in this category were created in the form of a particular animal. The animal is realistically depicted, and the form of the animal dictates the form of the whistle.

Single-Chamber Whistles (74; Fig. 16.6*b–h*): These are the most common whistle sherds from our excavations. The sound chamber is usually ellipsoidal, with outside diameters averaging 2–4 cm and lengths 2.5–5 cm. The chamber has one 3–4 mm hole at one end. The mouthpiece tab (see below) is constructed onto the chamber at this point. In addition, various appendages were often added to create a zoomorphic form. In all instances the animal or other representation is secondary to the oval shape of the sound chamber. In our sample most of the external appendages are broken and missing, and it is difficult to recreate the original forms that these whistles had. From a few recovered fragments, it appears that the forms include ducks, turtles, and small mammals (possibly opossums). If these identifications are correct, it is interesting to note that some cultures consider these same animals as intermediaries due to their ambiguous natures.

Double-Chamber Whistles (7; Fig. 16.6*i–j*): These are identical to the sound chambers on single-chamber whistles except that they are often larger and contain two chamber holes, one at each end. These holes apparently were functional, and all samples of this type show scars of some additional previous appendage around the second hole. Two whistle fragments from T-20 excavations have remains of clay tubes extending outward from the second hole. It is therefore possible that a second tubular, flute-like chamber was added to provide a two-tone or multi-tone effect.

Fat-Cheeked Human Faces (2; Fig. 16.6*k–l*): These two artifacts are pudgy-cheeked heads, termed by some as representing the "Old Fat God." Both of our examples are double whistles. On Figure 16.6*l* the forehead strap forms dual mouthpieces, one above each eye opening. These direct the air down into the eyes, the entrances to the sound chambers formed by the hollow cheeks. Neither head shows signs of having been attached to a body. A similar whistle was recovered by Niederberger at Zohapilco (1976: Fig. 2, no. 8).

Mouthpiece Types: Three different mouthpiece types (in addition to the specialized mouthpieces on fat-cheeked human face whistles) can be defined: *Direct or tab mouthpiece* (36; Fig. 16.6*c–d*). The mouthpiece is a clay protrusion or tab below the hole in the sound chamber. Usually 1–2 cm long, this tab serves to keep the lower lip the proper distance from the sound chamber. In about one-third of our sample, the mouthpiece tab was a wing-like fillet apparently representing a bird's tail. *Tab-strap mouthpieces* (15; Fig. 16.6*b*). In addition to the projecting tab, a thin, flat strap of clay has been appended in a small loop above the tab. This loop acts as a tunnel to direct air over the hole in the sound chamber. The clay strap and tab are normally the same size. Both vary in size in proportion to the size of the whistle's sound chamber. *Tubular mouthpieces* (4; Fig. 16.6*m*). A clay tube, attached to the sound chamber in front of the chamber hole, directs air to the hole.

Comments: The majority of the whistles come from Barranca and Cantera phase contexts. Both "Old Fat God" whistles come from subfloor levels of PC Structure 1, although one (Fig. 16.6*k*) is Barranca phase, the other (Fig. 16.6*l*) Cantera phase.

Few Chalcatzingo artifacts show close similarities to artifacts from Gulf Coast sites. One exception is the zoomorphic single chamber whistles. Certain Chalcatzingo examples portray animals with their paws held to their heads (Fig. 16.6*e–f*). Similar poses occur on Tres Zapotes whistles (P. Drucker 1943a: Pls. 28*r–s*, 41*i–j*; Weiant 1943: Pl. 50, nos. 1, 3–5, 7). General similarities occur with single chamber whistles (Coe and Diehl 1980: Fig. 405*a*; P. Drucker 1943a: Pl. 41*l–m*, *o–p*; Weiant 1943: 108–111, Pls. 47–52). Whistles similar to those from the Chalcatzingo sample were recovered by Vaillant at El Arbolillo (1935: 234–236), Zacatenco (1931: 155–156, Pl. 38, top row, nos. 1, 3–5, Pl. 40, top row, no. 4), Gualupita (Vaillant and Vaillant 1934: 98, Fig. 29, nos. 7–12), and Ticoman (Vaillant 1931: 400, top row, nos. 3–4).

Flutes *(39; Fig. 16.7)*
These are tubular ceramic pieces which range in outside diameter from ca. 1.5 to 3.5 cm. Wall thickness is usually no more than 3–4 mm. Fifteen come from excavations in Classic contexts. However, others are from unquestionable Middle Formative Cantera phase levels. Of these, several of the tubular sections have one finished end and one single hole penetrating the side of the tube. As mentioned in the description of ceramic whistles, several whistle chambers have tubular sections attached and interconnecting air holes. Thus, at least some of our Middle Formative "flute" sections may originally have been part of ceramic whistles (see Fig. 16.6*i*).

The distribution of ceramic flutes does not seem as general as that of ceramic whistles (see Table 16.2). T-23 had the largest number of flutes (sixteen), and they were rare on the Plaza Central, unlike the whistles.

Miniature Vessels *(43; Fig. 16.8)*
Miniature vessels were recovered which duplicate both common and special ceramic forms. Among the forms, miniature wide-mouth bowls appear most common (sixteen), followed by restricted neck olla forms (eleven), dishes (two), and double-loop handle censers (six, including handle fragments). Some of the olla forms include those similar to *can-*

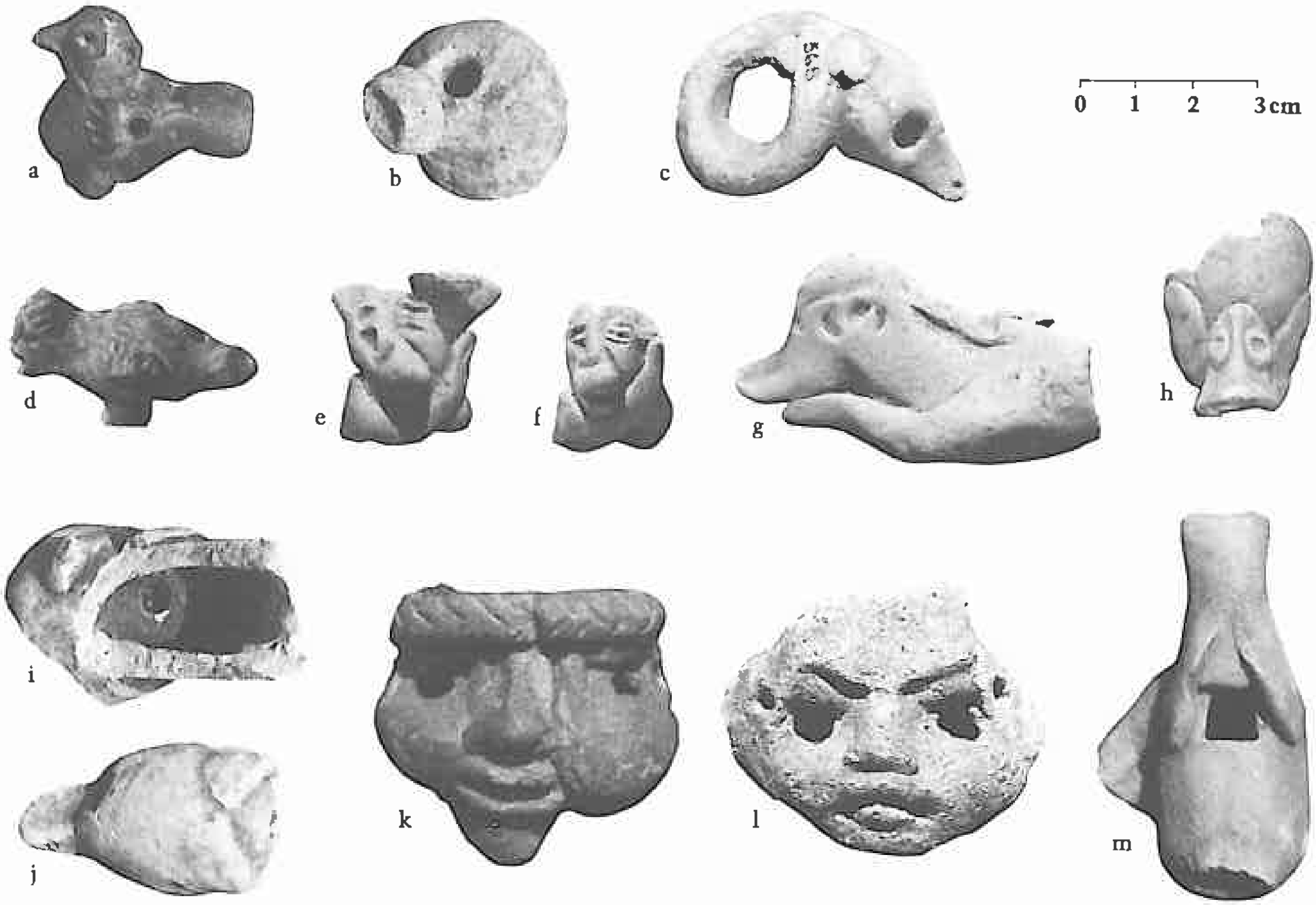

Figure 16.6. Whistles and ocarinas: *a*, bird; *b–h*, single chamber zoomorphics; *i–j*, double chamber; *k–l*, fat-cheeked human faces; *m*, whistle with tubular mouthpiece. Scale is approximate.

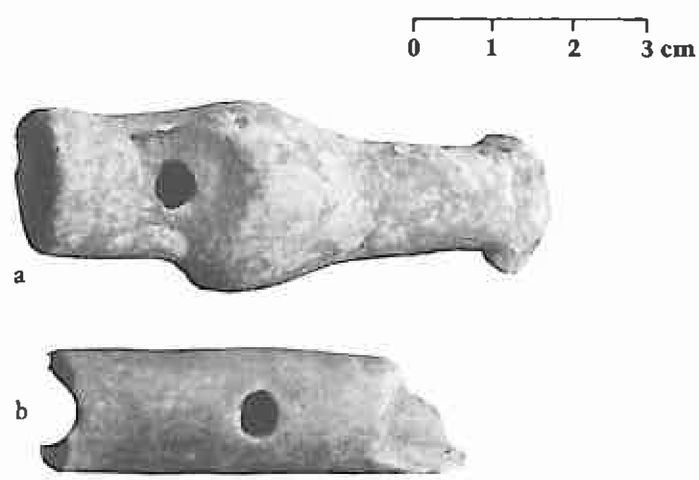

Figure 16.7. Flute fragments.

Table 16.2. **Distribution of Ceramic Ritual Artifacts**

	Whistles and Ocarinas								
Area	*Zoomorph*	*Single Chamber*	*Double Chamber*	*Fat-Cheeked Faces*	*Not Classified*	*Flutes*	*Miniature Vessels*	*Masks*	*Bars*
PC Str. 1	2	14	1	2		1	8	2	
PC Str. 2	1	16				3	5	1	1
PC Str. 3									
PC Str. 4									
PC Str. 6									
PC other		8				1	3		1
ER Drainage									
T-4	1	3				1	2	1	
T-6		1					1	1	
T-9A		2						1	
T-9B					1		1		
T-11	2	3					1		1
T-15		1			2	5	1	1	
T-17									
T-20	1	4	2		1	7	2		
T-21		2			1	1	2		1
T-23		3			1	16	4	2	
T-24	2	2	1				3		
T-25		3	2			1	2		
T-27	1	3			1	3	2	3	
T-29		2	1				1	1	
T-37		1			2		5		
S-39		2			1			2	3
N-2	1								
N-5									
N-7		1							
CT-1									
CT-2									
Tetla		2			1				
Cave 1									
Cave 2									
Cave 3									
Cave 4									
Cave 8									
Other caves		1							
Surface									
Telixtac									
Huazulco									
Totals	11	74	7	2	11	39	43	15	7

taritos, the small plain bottles often associated with higher status burials (see Chapter 8). Among the miniature vessels are small Amatzinac White bowls and Peralta Orange punctate bowls and ollas. Diameters of the bowls are approximately 8 cm, while miniature bowls and ollas range from 1.6 to 8 cm, although most average 2.5–5 cm. The double-loop handle censers average 2.4–2.8 cm in diameter. The distribution of miniature vessels on the site (Table 16.2) seems nonspecific, as they were found on most terraces excavated, but they are primarily associated with house structures on those terraces.

Circular Masks ***(14; Fig. 16.9)***

Circular, slightly convex artifacts, usually depicting a simple human face, occur in Cantera phase contexts. Such artifacts are commonly referred to in the literature as masks (e.g., Coe 1965a: Figs. 161–169). No complete examples were found at Chalcatzingo. The fragments recovered represent rounded masks, ranging from 8 to 16 cm in diameter. Most examples have three suspension holes, two at the sides and one at the top. Open elliptical eyeholes are characteristic. The remainder of the face is depicted by appliqué strips and raised, horn-like tabs. The paste is generally an orange-brown (ca. 5 YR 6/6) and of local temper. One fragment shows traces of a white slip; another has traces of a red slip.

Among the mask fragments recovered in good context, one was from T-9A, two from the T-23 house excavations, three from T-27 excavations, two from S-39 excavations, and two from the subfloor area of Plaza Central Structure 1 (see Table 16.2). This distribution suggests that masks were not an item restricted only to elite areas of the site.

Similar circular masks have been recovered at Tlatilco (Piña Chan 1958: Pls. 26–27; Coe 1965a: Figs. 165–168), in "greatest quantities" in Zacatenco levels at Zohapilco (Niederberger 1976:233–234, Pl. 88), and in Vaillant's Middle period levels at Zacatenco (1930:156, Pl. 39). Vaillant labels his three illustrated fragments as "gorgets," raising the question of the actual function of these artifacts. An argument in favor of Vaillant's identification is that the slightly concave backs of these artifacts contain no room for a nose if worn on the upper face utilizing the eyeholes for seeing. Some Tlatilco figurines (Coe 1965a: Figs. 123–124; Covarrubias 1957: Fig. 6) illustrate that masks may have been worn in that manner. On the other hand, other Tlatilco figurines (e.g., Coe 1965a: Fig. 157) show circular masks being worn on the lower face area. Triple suspension holes would allow one supporting string to pass over the top of the head and two side strings to secure the mask at the back of the head.

Bars ***(7; Fig. 16.10)***

These enigmatic ceramic objects are long bars with rounded ends. Most of them resemble long, slightly curved handles, although we do not believe they served that function. In fact, it is possible that not all these objects served the same or similar functions. Unfortunately, six of the seven examples are broken. All but one have oval cross-sections, and four are decorated. Each of the specimens is briefly described below:

a. This bar (Fig. 16.10*a*) is unslipped and the surface is smoothed but not polished. It is decorated on both sides, whereas other decorated specimens have only one decorated side. The broken length of this artifact is 4.8 cm. It exhibits no wear pattern.

b. This example (Fig. 16.10*b*) has a smoothed but eroded rough-textured surface. One surface has an 8 mm diameter shallow hole. The broken length is 5.3 cm. No wear pattern was detected.

c. This example (Fig. 16.10*c*) is also undecorated with a smoothed but eroded and unslipped surface. It is the only unbroken specimen of the seven. Unlike the others, which have a slightly convex lower surface, the under surface of this artifact is slightly concave. Its complete length is 7.0 cm, and it lacks an apparent wear pattern.

d. This and the next two artifacts are decorated and white-slipped, setting them apart from the others. This example (Fig. 16.10*d*) is a long, slightly curved bar, slipped in Amatzinac White on all but the convex, curving underside. The upper surface has an incised design

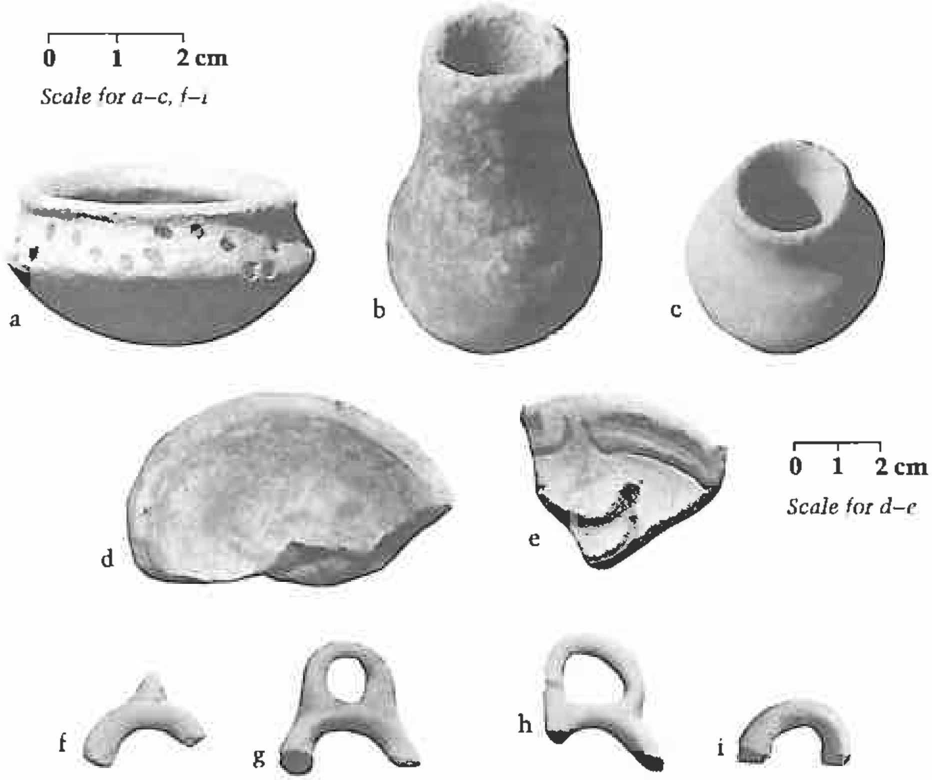

Figure 16.8. Miniature vessels: *a*, bowl; *b–c*, ollas; *d–e*, shallow dishes; *f–i*, double-loop handles from miniature censers.

Figure 16.9. Masks: *a*, T-23; *b*, PC Structure 2; *c*, T-9A.

which was executed after the white slip was applied. The undersurface is slightly roughened, but is smoothed in some areas, possibly representing use wear. The broken length is 10 cm.

e. This bar (Fig. 16.10*e*) is also slipped in Amatzinac White and has a design pattern identical to that of artifact *d*, although it is flat, not curved, and comes from a completely different site area. No basal wear is apparent. Broken length is 6.5 cm.

f. The decoration on this Amatzinac White slipped bar fragment (Fig. 16.10*f*) is unlike that of artifacts *d* and *e*, and the bar is more oval in cross-section. No visible wear pattern occurs. The broken length is 6.0 cm.

g. This specimen (not illustrated) was smooth, unslipped, and undecorated. Its broken length is 3.9 cm. No wear pattern is apparent.

Wear on most of these artifacts could be masked by the effects of erosion. Only *a*, an artifact decorated on two sides and far more pointed in shape than the others, comes from a Barranca phase context. All others are Cantera phase. As shown in Table 16.2, three of the bars, including two of the three white-slipped examples, come from excavation area S-39, an area which also yielded an abnormally large quantity of oval ground sherds (see below). Heavy co-occurrence of both types of artifacts at S-39 may indicate that they served similar functions, possibly related to ceramic manufacture.

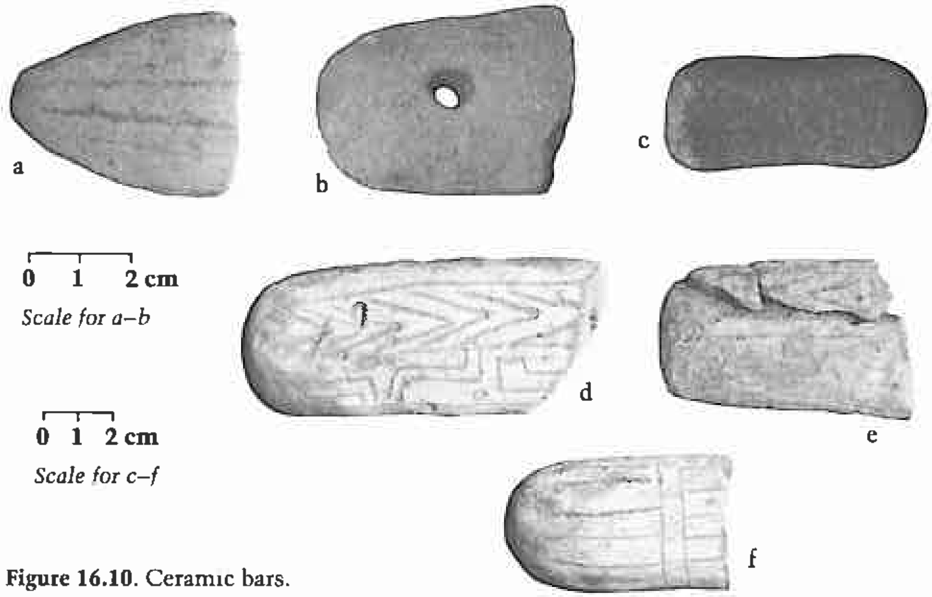

Figure 16.10. Ceramic bars.

Animal Figurines *(Fig. 16.11)*

A wide variety of animal figurines occur in Middle Formative contexts at Chalcatzingo, including birds, reptiles, and mammals. For some, the type of animal being portrayed is easily interpreted, while for others the identification is more difficult (e.g., were they depicting dogs or foxes?). As can be seen, the bird heads (Fig. 16.11*a–e*) include ducks, several possible turkeys, and numerous stylized and unidentifiable birds. Only a few reptilia are represented in the figurine sample: a turtle head and three snakes. Of these latter, two are relatively simple representations, while the third is a naturalistic depiction of a diamondback rattlesnake's head.

Among the many mammals depicted are dogs (Fig. 16.11*f–i*) both with and without fangs showing, animals with antlers which are probably deer (Fig. 16.11*j*), one squirrel (Fig. 16.11*l*; this figurine has a polished orange slip, a treatment usually reserved for C8 figurines), peccaries (Fig. 16.11*k*), numerous unidentifiable examples (a few of which may be opossums; e.g., Fig. 16.11*m*), a variety of monkeys (Fig. 16.11*n–p*), and a fish-shaped figurine fragment which has two breasts and thus may represent an aquatic mammal such as a manatee (Fig. 16.11*q*). Neither monkeys nor aquatic mammals are native to Mexico's central highlands.

As mentioned earlier, some of the animal figurine heads are probably broken-off clay whistles. It is important to note in this regard that animal figurine bodies (as compared to heads) are rare in the total figurine sample. This is in contrast to anthropomorphic figurines, for which bodies greatly outnumber heads recovered.

Only one figurine, relatively complete, combines both human and animal characteristics (Fig. 16.12). This unique figurine has an animal head (opossum?) and a woman's body. The animal's eyes are executed in the manner of Ch type figurines (see Chapter 14).

Utilitarian Artifacts

Spindle Whorls *(57)*

Twenty-five spindle whorls were recovered during excavations on the main site area and caves during the project's three field seasons, while thirty-two whorls were excavated at Tetla in 1974. All spindle whorls are analyzed and discussed in Chapter 25 and tabulated in Table 16.3.

Molds *(5; Fig. 16.13)*

Two types of molds occur in our sample, all apparently Late Classic and Middle Postclassic. The first type, represented by three examples, is a flat, shallow, stamp-like mold, apparently for use in mold-made vessel designs (*a–c*). The second type is a deeply concave figurine mold (*d–e*).

a. A nearly complete mold, this artifact is trapezoidal in shape, with the top wider than the base (Fig. 16.13*a*). A tapered or trapezoidal shape would seem logical for stamping designs onto vessels in order to avoid design overlap. The design is a human head wearing a plumed headdress. A speech scroll occurs in front of the person's mouth. This mold is from T-29.

b. This mold fragment has a design showing a seated human in profile (Fig. 16.13*b*). The person holds a plumed object or torch. The mold was found on the surface of T-29.

c. This is a flat-stemmed mold with a rabbit design (Fig. 16.13*c*), found on the surface of the T-15 ballcourt (T-15 Str. 2).

d. From a Classic period context on T-20, this figurine mold creates an eagle's head (Fig. 16.13*d*).

e. The second figurine mold (not illustrated) is from Tetla-11. Apparently Middle Postclassic in date, it is fragmentary, and the design is uncertain.

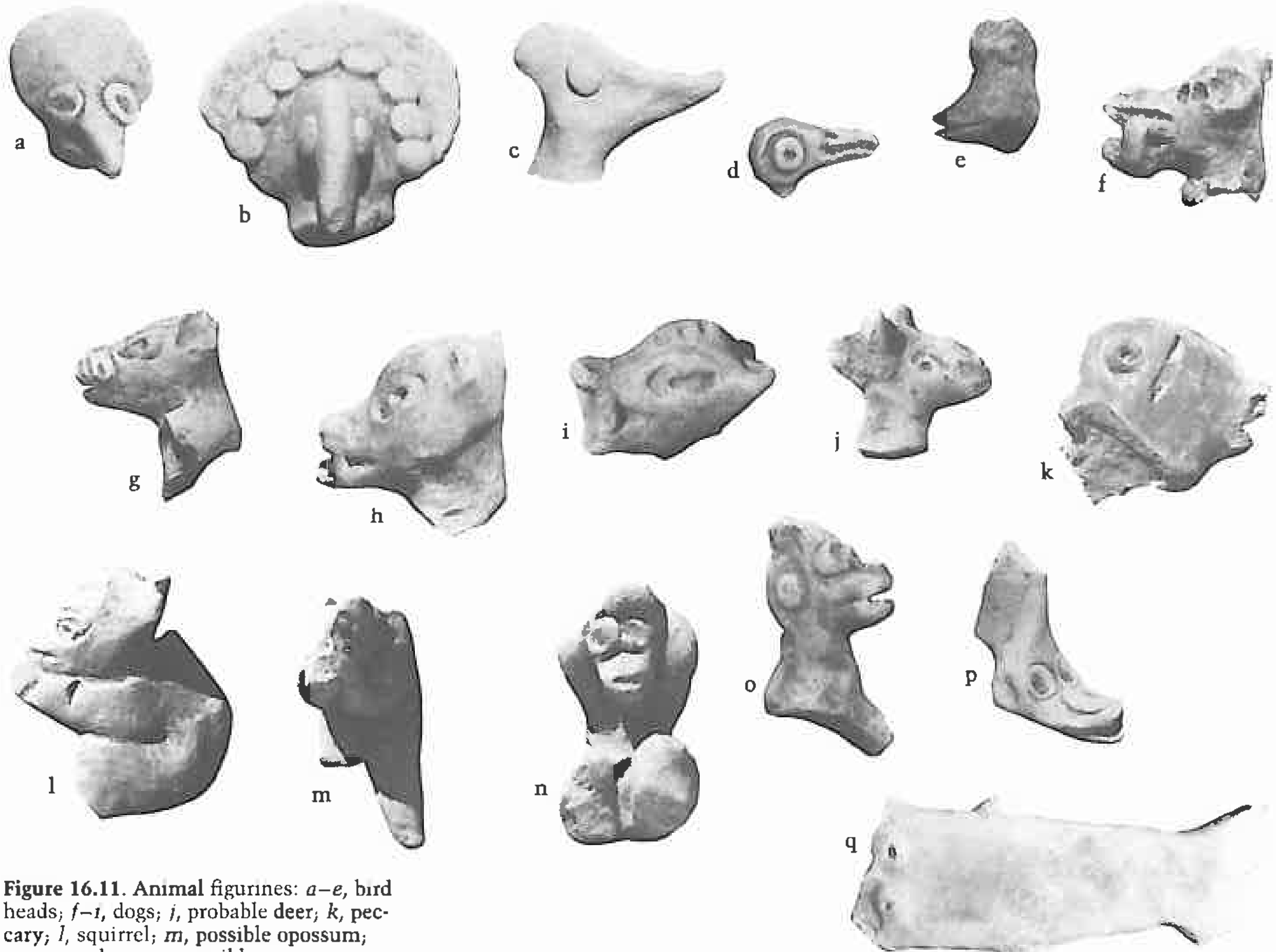

Figure 16.11. Animal figurines: *a–e*, bird heads; *f–i*, dogs; *j*, probable deer; *k*, peccary; *l*, squirrel; *m*, possible opossum; *n–p*, monkeys; *q*, possible manatee.

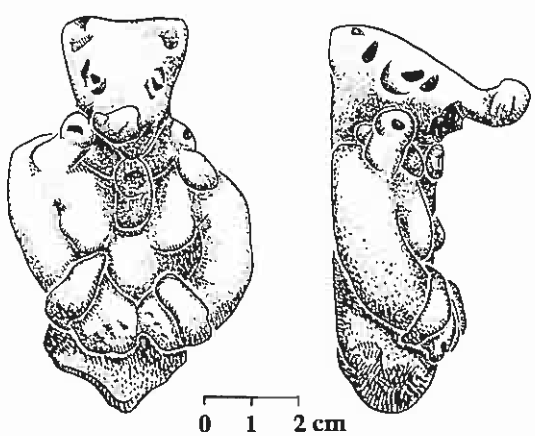

Figure 16.12. Animal figurine with opossum-like face and female human body.

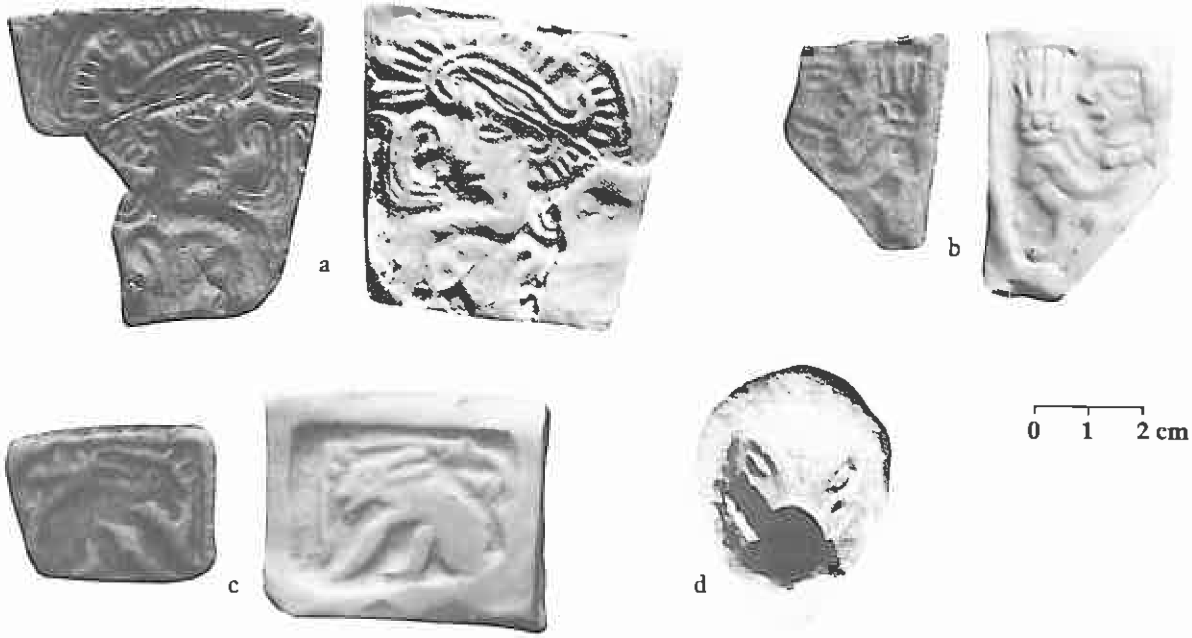

Figure 16.13. Ceramic molds: *a*, human head mold (*left*) and cast (*right*); *b*, seated human mold (*left*) and cast (*right*); *c*, rabbit mold (*left*) and cast (*right*); *d*, eagle head mold.

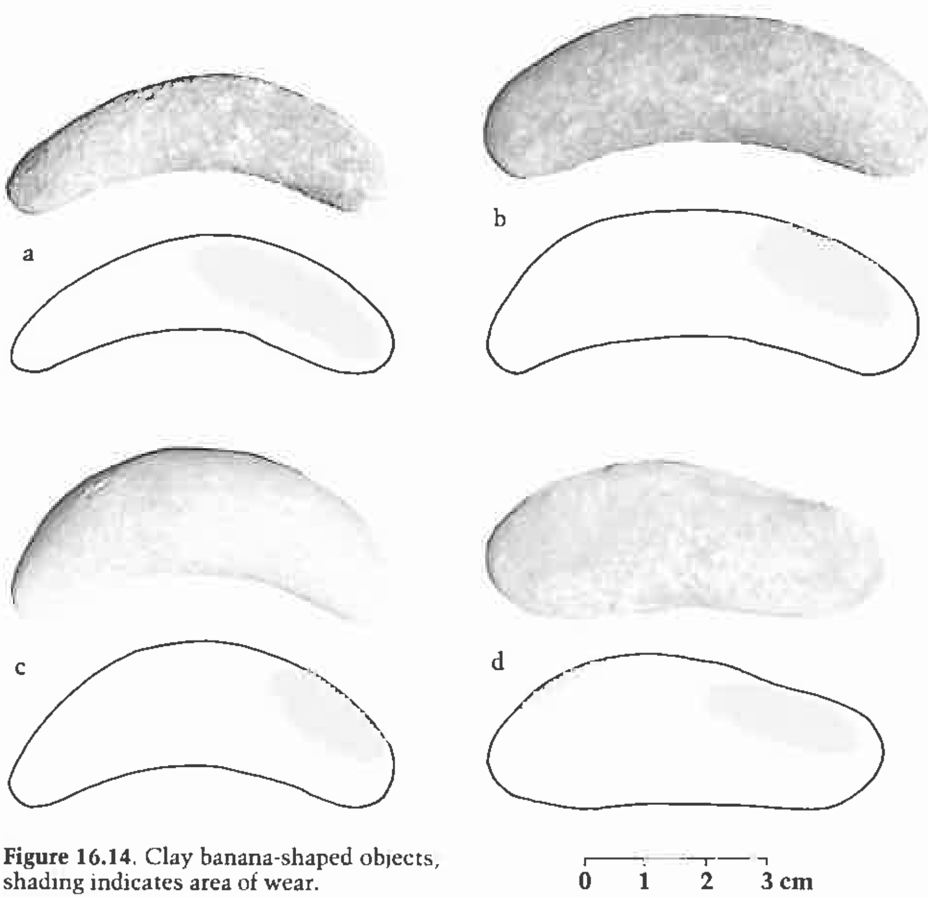

Figure 16.14. Clay banana-shaped objects, shading indicates area of wear.

"Bananas" ***(9; Fig. 16.14)***
These unusual crescent- or banana-shaped artifacts are rounded or oval in cross section. The surfaces of all nine examples are eroded, but several still show traces of polishing. All exhibit a specific wear pattern—a flattish worn area along one side, near one end of the crescent. Only two specimens have the wear pattern on both sides of the artifact. The largest of our specimens is 7.5 cm long; the smallest is 5.8 cm. Thus, the size range is relatively small. Maximum diameter is 3.6 cm and minimum is 1.5 cm. Surface color is variable, ranging from grey (ca. 10 YR 6/2–6/3–6/4) to brown (7.5 YR 5/2–4/2).

These artifacts were found only in Cantera phase contexts. Two come from the S-39 excavations, an area we believe may have been a ceramic workshop. The unusual wear pattern suggests that these crescent-shaped objects performed a smoothing or polishing function. Similar artifacts have been found at other Formative period sites in central Mexico but have drawn little attention. Harold McBride (1974:214–216) mentions those other occurrences, which include both Cuicuilco and Chupicuaro, and tends to favor the idea that these artifacts may have been potter's tools. Recent excavations at Loma Torremote in the Valley of Mexico (Santley 1977b:50; personal communication) recovered twenty-four such objects. Florencia Muller (personal communication to Robert Santley) notes that similar artifacts are used today in some areas of rural Mexico to support the base of pottery vessels during manufacture. However, an interesting similarity is seen with the limestone banana-shaped smoothers found in caches at Muna, Dzibilchaltun, and Mayapan in Yucatan (Andrews and Rovner 1973). In general the Yucatecan examples are nearly twice as large as those at Chalcatzingo but show the same general wear pattern. The Maya crescents were probably used in plaster working, and while we have no evidences of Cantera phase lime plaster, the S-39 excavations yielded both crescent-shaped artifacts and a Middle Formative lime deposit (Chapter 4).

Artifacts of Uncertain Function

Solid Balls *(27; Fig. 16.15)*

Solid ceramic balls occur at Chalcatzingo and other highland and lowland sites. Those from our sample are made from local clays. Their diameters range from 8 to 40 mm, with an average of ca. 20 mm.

Chronologically the solid ceramic balls from Chalcatzingo range from Early Formative to Middle Postclassic. Two balls (Fig. 16.15*d–e*) from Late Cantera subphase deposits (one from PC Str. 2, the other from T-24) have a light groove circling the circumference. Clay balls with an encircling groove have also been found at Tres Zapotes (Weiant 1943: 117–118, Pl. 65, bottom right). Clay balls of the same approximate size as our sample were found at San Lorenzo (Coe and Diehl 1980:287), at El Arbolillo, Zacatenco, and Ticoman (Vaillant 1930: 156, Pl. 39, middle row, Table I; 1931: 297, 396, Pl. 81, first two rows; 1935: 237, Table 18), and at Gualupita (Vaillant and Vaillant 1934:98, Fig. 29, no. 2).

Table 16.3. **Distribution of Ceramic Utilitarian Artifacts**

	Spindle Whorls						
	TYPE I			*TYPE II*			
Area	*Undecorated*	*Incised*	*Mold*	*Incised*	*Mold*	*Molds*	*"Bananas"*
PC Str. 1	1						1
PC Str. 2							
PC Str. 3							
PC Str. 4							2
PC Str. 6							
PC other							
ER Drainage							
T-4							
T-6							
T-9A							1
T-9B							
T-11	1						1
T-15	1	1				1	
T-17							1
T-20	1					1	
T-21	2						
T-23							
T-24							
T-25							
T-27		1					
T-29						2	
T-37							
S-39							2
N-2							
N-5							
N-7							
CT-1							1
CT-2							
Tetla	4	11	13	2	2	1	
Cave 1	3	5	6				
Cave 2							
Cave 3							
Cave 4	1						
Cave 8				1	1		
Other caves							
Surface							
Telixtac							
Huazulco							
Totals	14	18	19	3	3	5	9

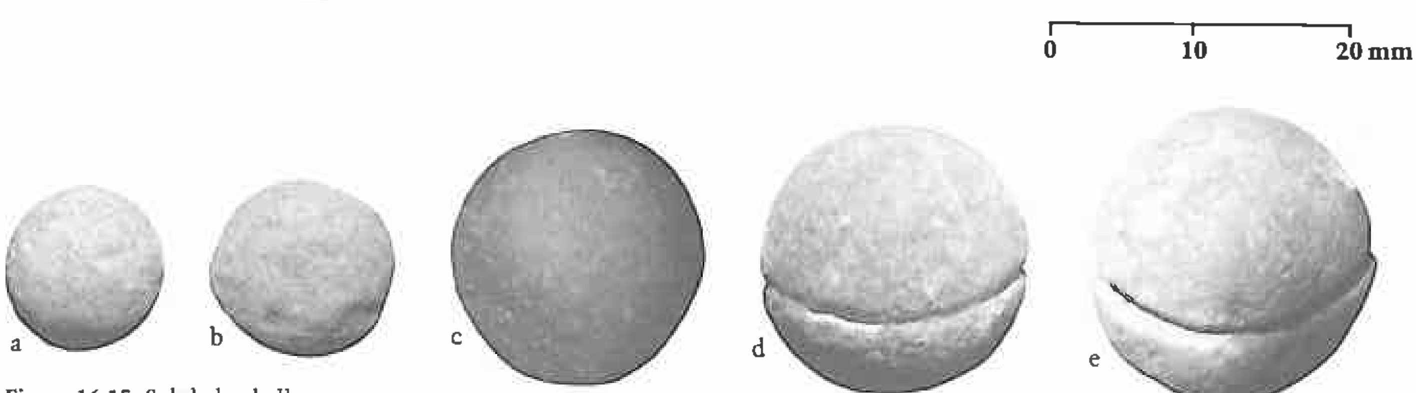

Figure 16.15. Solid clay balls.

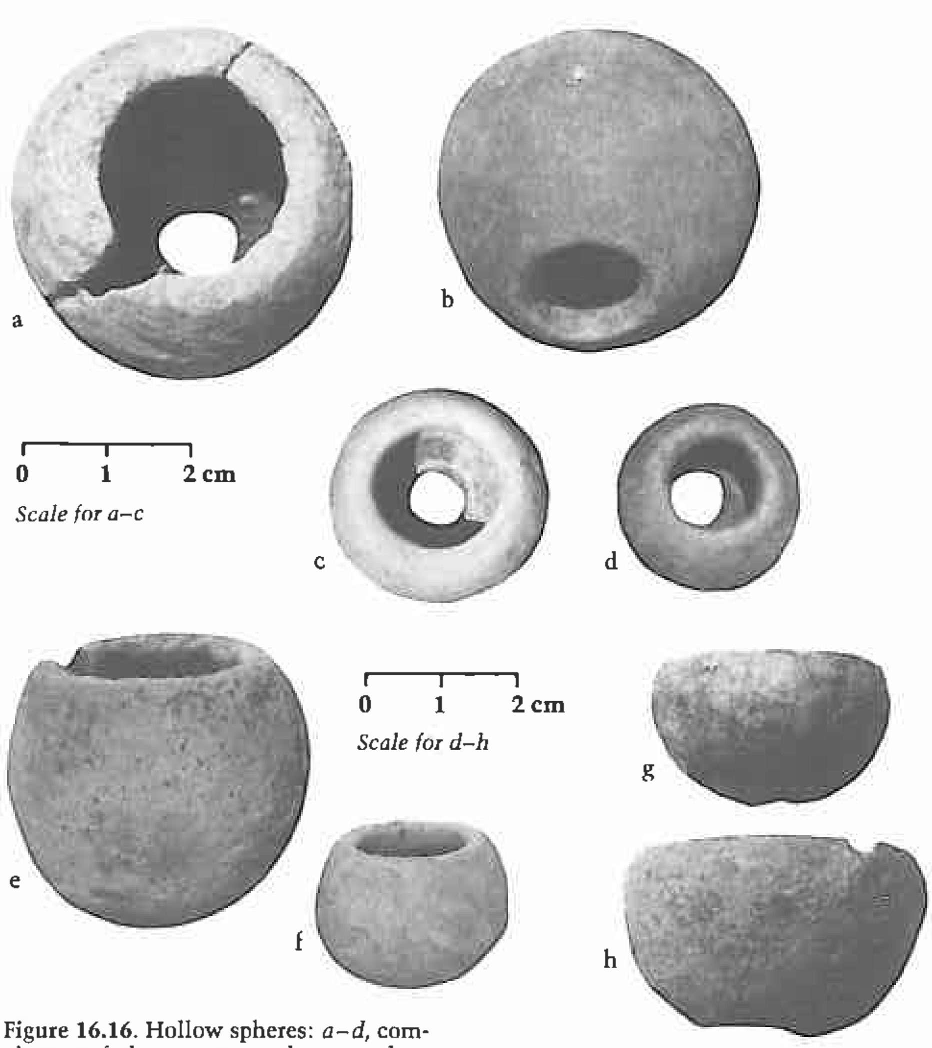

Figure 16.16. Hollow spheres: *a–d*, complete; *e–f*, three-quarter spheres; *g–h*, hemispheres.

Hollow Spheres *(433; Fig. 16.16)*
During the excavation of PC Structure 2, fragments of hollow clay spheres were uncovered, and soon thereafter three complete specimens were found. Sherds of similar hollow spheres were recognized in other excavation units, and the 1974 excavations at Telixtac produced further examples. Three basic sphere types can be distinguished based on the completeness of the sphere: complete spheres, three-quarter spheres, and hemispheres. All share certain attributes. One important feature is that all have well-made holes (finished as with vessel rims) at one end. By "end" I mean the portion of the sphere opposite the wide mouths of three-quarter and hemispherical examples. Complete spheres have a hole at each "end," with the holes unequal in size. The diameter of the smaller hole fairly consistently ranges from 0.8 to 1.2 cm.

In size, the majority of the spheres range between 3.8 and 5 cm in diameter. The smallest specimen has a diameter of 2.8 cm; the largest, 7.5 cm. Most of the artifacts are essentially true, round spheres, but elliptical and oval (along the axis between the holes) "spheroid" examples also occur. Elliptical spheroids are most common among the three-quarter sphere type.

In size, form, and quality of workmanship, sherds from spheres are easily distinguishable from miniature vessel fragments or sherds from the oval sound chambers of clay whistles. Hollow spheres have well-polished outer surfaces but rough interiors. Many show traces of either an orange or a fugitive white slip. Orange slip, which also occurs on some C8 figurines, appears to have been a treatment restricted to certain clay artifacts, perhaps marking them as "special." Red pigment traces are also found on some examples. Most of the spheres are undecorated, but a few have simple incised "rim" designs.

Complete Spheres (89; Fig. 16.16*a–d*): Among the complete spheres recovered were four whole specimens. Three were found in PC Structure 2, and the fourth came from excavations at the north end of T-25. The spheres, as mentioned above, generally vary between 3.8 and 5 cm in diameter. Ellipsoidal examples have a long-axis diameter about 10 percent greater than that of the short axis. The larger hole tends to vary in size proportionally with the sphere's size and ranges from 1.2 to 2.0 cm in diameter.

Three-quarter Spheres (85; Fig. 16.16*e–f*): This type has the same basic form as the complete sphere, with the exception that the sphere is only about three-quarters complete (this actually varies from 60 to 80 percent of the short-axis diameter). Essentially this is a truncated sphere which resembles a miniature *tecomate* with a well-made hole in the bottom. The larger opening is approximately 50 percent of the sphere's diameter.

From our sherd sample we know that most of these three-quarter spheres were manufactured originally in this form, with rounded or tapered rims on the larger opening. However, in about 10 percent of the sherds, the large opening has a flat, ground rim edge, suggesting that these artifacts may originally have been complete spheres which were then ground down to three-quarters form. Such grinding not only produces a flat rim, but also leaves grinding marks and exposes the carbon streak in the interior of the thin clay wall.

Hemispheres (67; Fig. 16.16*g–h*): These are simply half spheres, but with the characteristic small hole at the bottom. The exterior rim diameter of the "mouth" or large hole essentially equals the diameter of the sphere. Rims are usually rounded or slightly tapered, and interiors are often smoothed and polished along the interior rim area. Seven sherds of this sample have flat ground rims, indicating, as with three-quarter spheres, possible modification of a larger sphere.

Unclassifiable (192): These artifacts are so fragmentary that they cannot be classed into one of the three types above.

Comments: All three sphere types occur

Table 16.4. Distribution of Ceramic Artifacts of Uncertain Function

		Hollow Spheres					Ground Sherds						
							Discs			Rectilinear			
Area	Solid Balls	Complete	Three-quarter	Hemispheres	Not Classified	Plain	Partly Perforated	Perforated	Rectangular	Trapezoidal	Triangular	Oval	Cut and Shaped Sherds
PC Str. 1	4	4	10	3	8	13	5	5					
PC Str. 2	2	13	15	10	8	9	1	2					1
PC Str. 3													
PC Str. 4													
PC Str. 6												1	
PC other	3	5	5	2	7	20	3	3		1		3	
ER Drainage													
T-4	4	1	2	2	7	2		2					
T-6	2					7		1					
T-9A	1		3		4	6		1					
T-9B		2	2		1								
T-11		4	5	1	13	10	2	2	2			1	
T-15	1	3	1		2	5	1	2					
T-17													
T-20		3	5	3	16	2						1	
T-21		4		2	7	9						1	1
T-23	2	10	9	6	20	23		1				1	
T-24	1	11	5	3	25	16	1	1				1	
T-25		12	3	2	13	28	1		3				
T-27		6	4	2	28	2	2	1				1	1
T-29		1				2							
T-37		1	3	5	6	3	1		1				
S-39	1	3	4	10	17	28		1	3			17	
N-2		2	3	1	3	5	2		1	1			
N-5			1		2	2							
N-7			1		1	1							
CT-1	2					1							
CT-2						1							
Tetla	4					5		2					
Cave 1						1							
Cave 2													
Cave 3							1						
Cave 4									1		1	1	
Cave 8													
Other caves													
Surface													
Telixtac		4	4	15	4	6	1	2	1			1	
Huazulco													
Totals	27	89	85	67	192	207	21	26	12	2	1	29	3

in both Barranca and Cantera phase deposits. They are fairly generally distributed around the site, with only three major units actually lacking sphere sherds. Interestingly, the areas lacking spheres are the major platform structures: the two Cantera phase stone-faced platform mounds with stelae (T-6 Str. 1 and T-15 Str. 5), and the 70 m long earthen platform mound on the Plaza Central (PC Str. 4).

Current data do not elucidate the function of these artifacts. While the complete spheres could have functioned as clay rattles, no pebbles or clay balls occur within the four complete examples, and sherds from complete spheres show no unusual interior wear (if such wear would indeed be visible in a rattle). Further, I am assuming that all three types had a similar function, and a rattle function does not explain three-quarter spheres and hemispheres.

Only 6 of the 218 classifiable sphere sherds from Chalcatzingo (less than 3 percent) showed incised or engraved rim designs (unclassifiable sherds do not have rim areas and thus are not included in this tally). On the other hand, 3 of the 23 identifiable sherds (13 percent, including one complete hemisphere) from the smaller site of Telixtac had decorated rims. Interestingly, too, 65 percent of the Telixtac sample, as opposed to only 24 percent of the Chalcatzingo sample, are hemispheres. At both sites, complete and three-quarter spheres occur in almost equal proportions (see Table 16.4).

I have found only one similar artifact in the literature on the Formative period. Vaillant (1930: Pl. 40, bottom row, no. 4) illustrates a "hollow hemisphere, light brown pottery, perforated for suspension" from Late period deposits at Zacatenco.

Ground Sherd Discs _(248; Fig. 16.17)_ These artifacts occur as part of the cultural assemblage at many Mesoamerican sites and have been identified in the

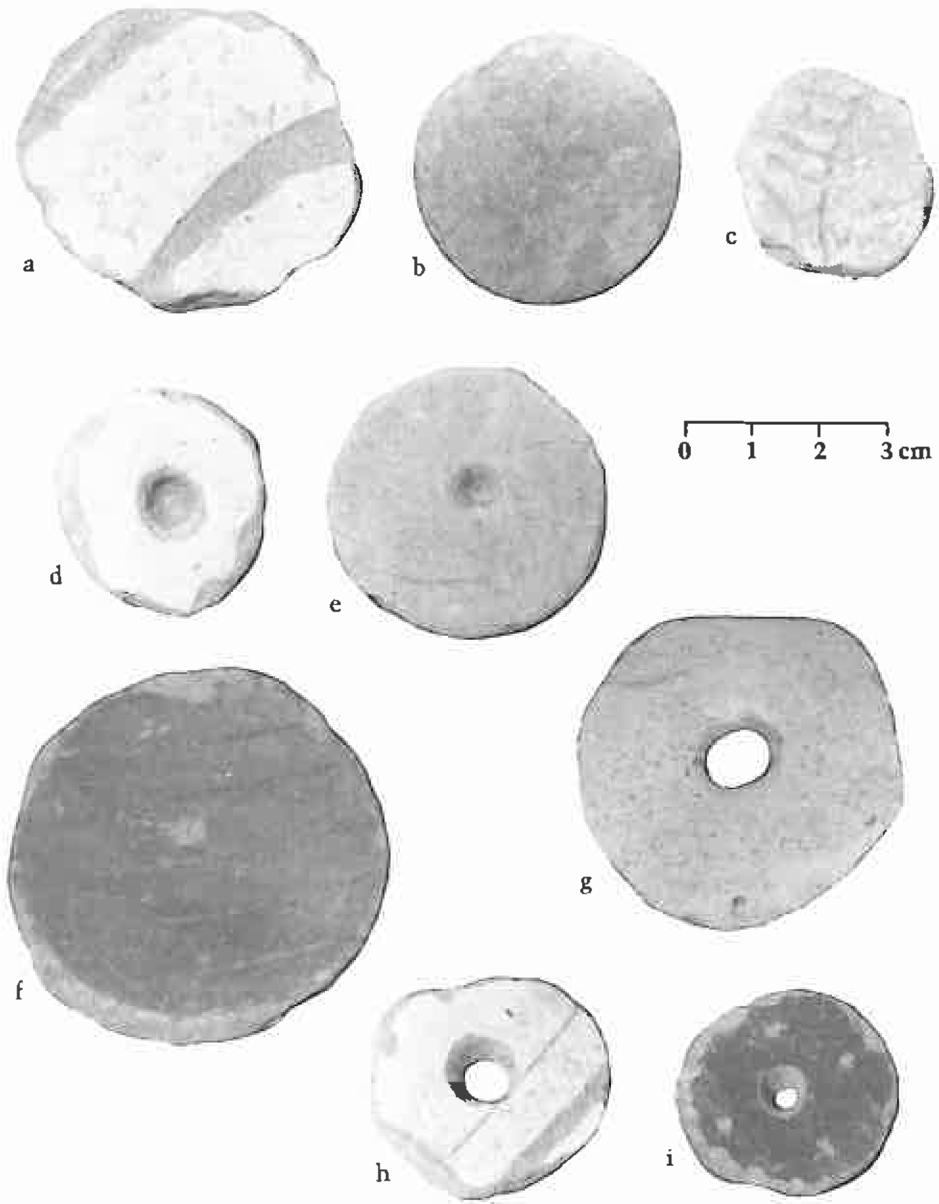

Figure 16.17. Ground sherd discs: *a–c,* plain; *d–f,* partially perforated; *g–i,* perforated.

literature as everything from gaming pieces to spindle whorls. Lee (1969: 99–103) provides a good discussion and bibliographic coverage of sherd discs, and there is no need to repeat his comments here. The discs are reworked fragments of broken pots, and it would be, as Lee (1969:97) notes, a valueless exercise to describe the pottery types from which these were manufactured.

In analyzing these artifacts a few simple tests were made to look for patterning in various attributes ("type," color, surface wear, etc.). No statistically significant pattern was detected. About 50 percent of the discs show surface erosion (as compared to abrasion), suggesting that any sherd on the site could be chosen at random to be made into a disc (or into other geometric forms described below). Many discs found in Barranca and Cantera phase contexts have been manufactured from Amate phase sherds, again suggesting that older surface sherds were collected and reworked. Most of the discs in our sample are made from plainwares, a fact to be expected if the original selection was random. Some sherd discs were made from decorated pot fragments, but in only two instances in our sample does the old design element appear to have been important to the disc's function. In these two instances the design was centered on the disc.

Smaller discs are generally better made than larger examples. The edges on small discs are generally ground smooth, while larger discs have most often been chipped rather than ground into a circular form (Lee 1969:99). Chiapa de Corzo discs include various examples with notched sides (Lee 1969:97–98, Fig. 52*q–u*). While those of the Chalcatzingo sample are not directly similar, nearly one-third of our whole discs (partial discs cannot be included in this observation) have one chipped area on the edge. Such "chip-notching" occurs not only on Middle Formative discs, but also on three Middle Postclassic discs from the Tetla area of the site. It is, however, difficult to tell at this time whether the chip-notched edges are functional or simply the result of natural actions over time.

Sherd discs vary in size from less than 2 cm to slightly over 8 cm in diameter. Three types of discs occur in our sample: plain, partially perforated, and perforated. Those with partial or complete perforations usually range in size from 2 to 5 cm. Of the six sherds with diameters of slightly over 8 cm, three were from Amate phase levels.

Plain Discs (201; Fig. 16.17*a–c*): These artifacts are circular to slightly oval in shape. Smaller specimens often have the edges well ground. The quality of edge grinding generally decreases as disc diameter increases.

Partially Perforated Discs (21; Fig. 16.17*d–f*): These are like plain discs except that on one side (normally the sherd's original interior side) there is a drilled hole at the disc's center. Holes vary from quite small and shallow (ca. 3 mm depth) to wide holes (ca. 10 mm diameter) which nearly penetrate the thickness of the disc. Most drilled perforations are conical, but several are more spherical and may have been reamed out.

Perforated Discs (26; Fig. 16.17*g–i*): These are identical to the partially perforated discs except that all have the center hole drilled completely through the disc. In the majority of our sample a conical hole was drilled through to the other side, and the disc was then turned over and the hole enlarged. The result is an asymmetrical hourglass-shaped perforation. There are a few instances when the perforation was drilled from both sides, with the intention for the holes to meet. In some of these latter cases the holes did not meet exactly, resulting in a lopsided perforation.

Perforations vary in diameter (at their narrowest point) from 3 to 10 mm. Perforation diameter does not relate to disc diameter. Some of the largest discs have both the largest and smallest holes.

Comments: Many investigators have speculated upon the use of ground sherd discs, but their actual function remains unclear. Although discs may have served a variety of functions, no single hypothesized use accounts for the three different types.

It is possible that some of the perforated discs functioned as spindle whorls, although we have no firm data on textiles or cotton from the Formative period in Morelos. Perforated discs comprise only a little over 10 percent of the total sample, and it should be noted that many perforated discs have holes too small to accommodate spindles and that many of the perforated holes are off-center. Partially perforated discs could also have served a function related to the spinning of fiber, for they could have been held in the palm of the hand to act as a bearing or resting place for the base of the spindle. Gourd pieces often serve that function today in areas of Mesoamerica where cotton is still spun on hand spindles. Such a "bearing" function might explain the "reamed" appearance of some of the partially perforated holes. Although I believe that evidence for a spinning function is very tenuous for perforated and partially perforated sherds, they both occur in approximately the same low percentages on the site. They co-occur in the same excavation units about 50 percent of the time, which statistically suggests that the co-occurrence could be random.

Unperforated ground discs have often been called "gaming pieces," the implication being that they were used in a prehispanic game such as *patolli*. Apparently stacks of ceramic *patolli* markers were found at Teotihuacan, and according to Robert Santley (personal communication), they exhibit the same size range as the Late Formative sherd discs which he recovered at Loma Torremote. If sherd discs did function as gaming pieces at Chalcatzingo, and if differentiation between discs was an important aspect of the game, then disc size, surface color, or even chip-notched edges may have served as differentiating attributes. However, our analysis of eighty-eight discs from our sample indicates that diameter, surface color, and edge chipping are not correlated with each other but appear to be random in occurrence.

Santley (personal communication) has also suggested that some discs may have served as scrapers or polishers for pottery manufacturing. Our studies show that edge grinding is uniform around the circumference of the disc, suggesting that our specimens were not used for scraping. Similarly, they lack surface wear which is indicative of use as polishers.

Finally there is the remote possibility that discs were used for record-keeping and differentiated into three types for use perhaps as tally or counting markers, each disc having a specific numerical value. This might account for the stacks of discs ("*patolli* markers") found at Teotihuacan. If Chalcatzingo's houses served storage functions (Chapter 6), the use of discs as record-keeping devices might explain their abundance in some house contexts. However, there currently is no good evidence for this hypothesis.

One Middle Postclassic disc from the Tetla area of the site has two small biconical suspension holes on the edges of the disc, indicating that it was worn or more probably sewn onto a garment. The design was also carefully incorporated into the sherd. This is the only example with small suspension holes near the circumference of the disc.

The distribution of sherd discs at Chalcatzingo appears to correlate strongly to house areas (see Table 16.4). Within the T-23 Cantera phase house remains, plain sherd discs and hollow clay spheres (see above) cluster in one area of the house. Of the twenty-five discs recovered from the T-25 altar area, twenty-four are plain.

Our present data do not provide information on finer temporal distinctions among the types. The discs begin with the Early Formative Amate phase and continue through the Cantera phase. Few were recovered from clear Late Formative or Classic contexts, and thus information on discs from those periods is tenuous. Seven Middle Postclassic discs from Tetla, ground from Middle Postclassic sherds, indicate their continued importance in that period.

Finer chronological distinctions may be possible in the future based on an observation made by Sheets (1978: Fig. 20) on discs from Chalchuapa, El Salvador. There, perforated discs begin in the Early Formative and continue into the Postclassic. Partially perforated discs also begin during the Early Formative but end sometime in the Late Formative. Plain discs do not begin until well into the Middle Formative but continue into the Postclassic. At Chalcatzingo, plain discs appear as early as the other two types.

Lee (1969:97–103) and Sheets (1978: 66–68) have provided detailed distribution studies of ground sherd discs in Mesoamerica. Here I will only make some comparisons to the Formative Valley of Mexico and the Gulf Coast. Philip Drucker illustrates and discusses sherd discs from La Venta (1952:143–144, Pl. 42, right, *a–d, g, j, k*). Notched examples (unlike the chip-notching from Chalcatzingo) he classifies as "weights" (ibid.: 144, Pl. 45). Tres Zapotes sherd discs are also shown by Drucker (1943a: 130–131, Pl. 30*l–m*; 32*t–u*). At San Lorenzo discs begin in the Ojochi phase and continue into the Villa Alta phase (Coe and Diehl 1980:283). Central Mexican discs are found at El Arbolillo (Vaillant 1935:237), where plain discs appear less frequent in the earliest deposits; Zacatenco (Vaillant 1930:155, Pl. 38, middle row, nos. 3–7; bottom row, nos. 1–5); and Ticoman (Vaillant 1931:396, Pl. 81, fourth row, nos. 1–2, 4–6; bottom row, nos. 1–3, 8–9).

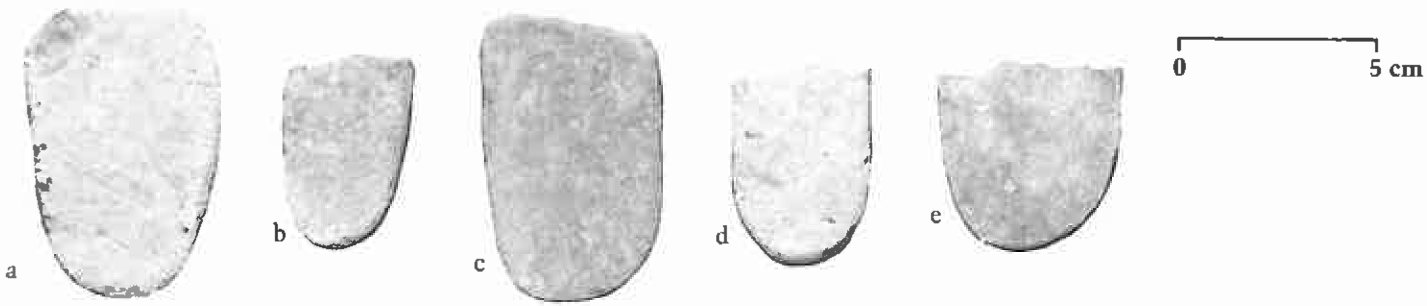

Figure 16.18. Oval ground sherds.

Oval Ground Sherds ***(29; Fig. 16.18)***
These artifacts are generally rectangular sherd pieces with rounded ends. They range from 2.8 to 5 cm in width and up to 7 cm long. Most of our specimens are broken, and thus actual length is difficult to establish. They occur from Early Barranca through the Late Cantera subphase.

Lee (1969:97) suggests that ground sherds of this shape functioned as scrapers in pottery manufacturing. This function was independently suggested to us by the distribution of these sherds at Chalcatzingo (see Table 16.4). Over 60 percent of the Chalcatzingo examples (seventeen sherds) come from one small site area, S-39. This area is enigmatic, with a large lime deposit and other unusual artifacts, such as ceramic bars. Although no kilns were located, S-39 may have been a ceramic workshop. However, even if these sherds functioned as ceramic manufacturing tools, their presence in Cave 4 and other site areas in minor numbers suggests that they could have had other functions as well.

Lee's Chiapa de Corzo examples (1969: Fig. 52*a–e*) are similar to those from Chalcatzingo. The one sherd illustrated from Chalchuapa and noted by Sheets as similar to the Chiapa de Corzo sample (Sheets 1978:66–67, Fig. 10*c*4) appears in the photograph to be closer to our rectilinear category, but his Figure 10*c*3, an "unperforated potsherd disc," looks similar to our sherd ovals. Two Ocós phase sherds from La Victoria (Coe 1961: Fig. 51*a*, *d*) also appear similar.

Ground Sherd Rectilinear Shapes ***(15; Fig. 16.19)***
Other ground sherds from our sample occur as rectangles (twelve), trapezoids (two), and one triangle. In most cases the sides of these are slightly curved rather than absolutely straight. The largest rectangular sherd is almost 9 × 8 cm, and the smallest 5 × 3.5 cm. All other examples regardless of shape fall within that range.

Ground rectilinear sherds are not commonly mentioned in the literature but do appear to occur in minor numbers at sites over a large area. Lee illustrates one from Chiapa de Corzo (1969: Fig. 52, no. 1), and five from Chalchuapa are discussed by Sheets (1978:66–67, Fig. 10*c*4). Two Conchas phase rectangles from La Victoria are illustrated by Coe (1961: Fig. 59*h*), and two trapezoids from the Jocotal phase at Salinas La Blanca are shown by Coe and Flannery (1967: Pl. 21*m*, *o*, *n*?). A notched rectangular sherd, possibly a net weight, is illustrated from San Lorenzo (Coe and Diehl 1980: Fig. 398*h*). Vaillant illustrates a rectangle and trapezoid from Ticoman (1931:396, Pl. 81, bottom row, nos. 4–5) and an unusual example from Gualupita (Vaillant and Vaillant 1934: 100, Fig. 30, no. 9).

Most of the Chalcatzingo specimens occur in Barranca and Cantera phase contexts.

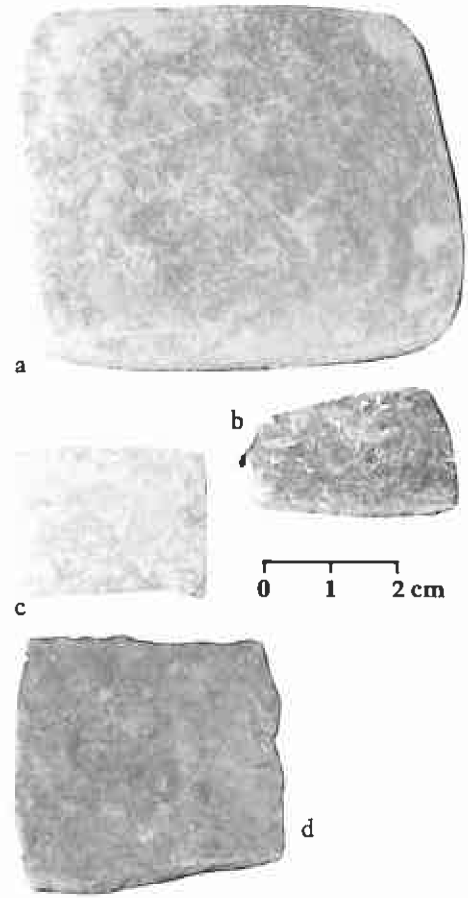

Figure 16.19. Rectangular ground sherds.

Cut and Shaped Sherds ***(3; Fig. 16.20)***
Three sherds were unusually cut and shaped, and they are described individually as follows:

a. This is a sherd shaped and ground to a rounded, awl-like point (Fig. 16.20*a*). The point is smoothed and evenly rounded, suggesting it was used in a rotary motion. The broken length is 4.3 cm, and the width is 2 cm. This specimen dates to the Cantera phase.

b. Trapezoidal shaped, this sherd has notches on the sides near the small end (Fig. 16.20*b*). No wear marks were present aside from those of shaping this

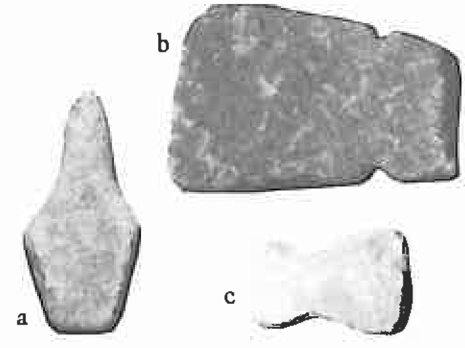

Figure 16.20. Cut and shaped sherds. (Scale varies; see text for dimensions.)

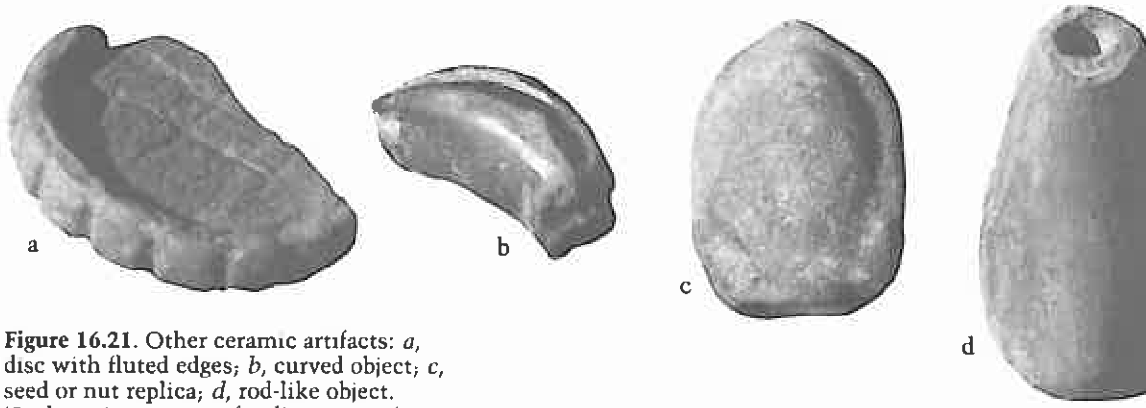

Figure 16.21. Other ceramic artifacts: *a*, disc with fluted edges; *b*, curved object; *c*, seed or nut replica; *d*, rod-like object. (Scale varies; see text for dimensions.)

object. Its length is 4.5 cm; maximum width is 3 cm. It has a plow zone context but was in an area of purely Cantera phase deposits.

c. This is a small bottle-shaped sherd (Fig. 16.20*c*). It is 2.8 cm long and 1.7 cm maximum width. Its context suggests a Late Cantera subphase date.

Other Ceramic Artifacts *(6; Fig. 16.21)*

a. Ceramic disc with raised fluted edges (Fig. 16.21*a*). The diameter is 3.7 cm and thickness at the edge is 5.5 mm. It probably dates from the Cantera phase.

b. A fragment of a black, curved object, oval in cross section (Fig. 16.21*b*). It has one suspension hole. The broken length is 2.7 cm, the maximum width is 1.2 cm, and the thickness is 10.5 mm. The outer edge has a 4 mm deep, V-shaped groove in which hematite stains occur. It dates to the Cantera phase.

c. A seed or nut replica (Fig. 16.21*c*). This unusually shaped object may replicate a fruit, seed, or nut. Its surface is smoothed but not polished. The color is brown. Its length is 6 cm, the width 4.5 cm, and it is 2.8 cm in maximum thickness. The bottom is slightly concave. It dates to the Late Barranca subphase.

d. A rod-like object (Fig. 16.21*d*), 6.5 cm long and 3.6 cm in diameter at the base, tapering upward to 1.6 cm. The small end has a hole in the center which is 8 mm in diameter and about 7 mm deep. It was found in Cave 4.

e. A circular clay ball, 45 mm in diameter (not illustrated). The ball has a cylindrical hole 15 mm in diameter and ca. 25 mm deep on one side. It may be significant that this object is unfired. It dates to the Cantera phase.

f. A clay pipe (Fig. 24.19) 34 cm long with an outside diameter of 10 cm. Clay pipes have been found at Tula (Healan 1974:22; Richard A. Diehl, personal communication) and at Tehuacan (MacNeish, Peterson, and Flannery 1970: Fig. 109). This pipe was found adjacent to a looter's pit at Tetla. It is apparently Middle Postclassic in date, as are the drain pipes at Tula and the one at Tehuacan.

MISCELLANEOUS ARTIFACTS

Iron Ore Artifacts

The thirteen iron ore mirrors and artifacts are almost all fragmentary. Seven of them were subjected to source analysis tests, the results of which are presented in Chapter 23. Although the total sample is small, the artifacts fall into tentative categories based primarily on shape: concave mirrors, mosaic segments, rectangle and disc mirrors, and miscellaneous. This last category is composed mainly of irregularly shaped fragments with one polished side, possibly from broken mirrors. All the mirrors date to the Cantera phase unless noted otherwise in the descriptions below.

Concave Mirror *(1)*

Burial 40, presumed to be one of the highest-ranking burials excavated (Chapter 8), was found with a concave mirror lying on the mandible (Fig. 8.4*f*). Two conical suspension holes in the mirror and its position on the skeleton suggest it had been worn as a pendant at the time of interment and had fallen onto the jaw area when the person was placed in the grave.

The mirror (M-1; Fig. 16.22*a*) was manufactured from high-purity magnetite. It is slightly trapezoidal in form, with tapered side and basal edges. The longest side (top) is 4.5 cm, the maximum width 3.3 cm. The thickness varies from 3.5 to 5 mm. Only one side of the mirror is polished. The concavity ground into the polished face is elliptical, 2.1 cm long and 1.6 cm wide, with a depth of about 1 mm. The axis of the ellipse is at an angle rather than perpendicular to any of the mirror's sides, a common trait in such mirrors (Carlson 1981).

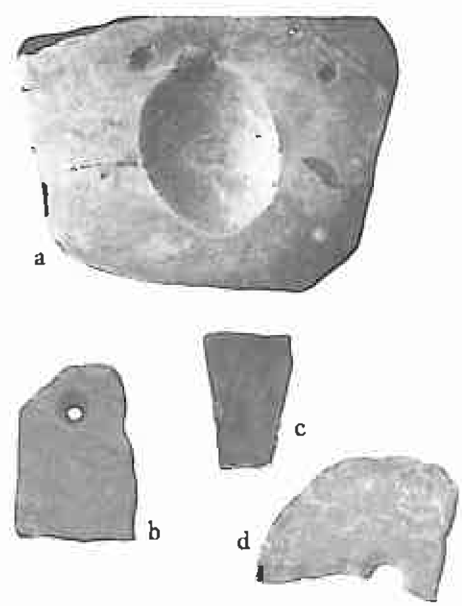

Figure 16.22. Iron ore mirrors: *a*, concave mirror (M-1) found with Burial 40; *b*, pendant (M-4); *c*, mosaic wedge (M-6); *d*, perforated disc (M-10). (Scale varies; see text for dimensions.)

Mosaic Segment *(1)*

A second polished mirror piece was found near the eye sockets of the skull of Burial 40. The mirror (M-2) is wedge-shaped and while nearly complete, the slight curvature of the top and bottom indicate it may have been part of a circular mosaic disc or ring. If this surmise is correct, and assuming the other pieces of the mosaic were of the same approximate form and size, the disc or ring would have been composed of ten segments, with an estimated outside diameter of 4.7 cm and inside diameter of 2.5 cm. Obviously the entire mosaic was not included in the burial. An alternative suggestion by the excavator (William Fash, personal communication) is that this mirror segment was part of a perishable object which included over ninety tiny turquoise mosaic squares (see Chapters 8, 17, Appendix F) also found around the skull.

The mirror segment is of ilmenite, with a thickness of 1.7–2.0 mm, sides 11.5 mm in length, and a taper from 12 mm at the top to 6.5 mm at the base.

Rectangles *(3)*

Three small, thin, and essentially rectangular mirrors comprise this category. Two are whole and one is a fragment. All are characterized by having one polished side and beveled edges.

a. Measuring 19 × 12 mm, with a thickness of 1.2–1.5 mm, this rectangle (M-4; Fig. 16.22*b*) has a conical suspension hole drilled from the back (unpolished side). The polished face is also the beveled face. The provenience is PC Structure 1d. The ore type is unidentified.

b. This trapezoidal specimen (M-6; Fig. 16.22*c*) lacks a suspension hole, and, unlike specimen *a*, has the polished face on the unbeveled side. The piece is 10 mm wide at one end and 5.5 mm at the other. The sides are 14 mm long, and the thickness is 1.8–2.0 mm. The material from which this was manufactured has not been identified. The piece was found in the plow zone level of PC Structure 6 excavations.

c. This specimen is a broken fragment (M-13) of unidentified iron ore. It is ca. 15 mm in length, with the edge beveled to the unpolished side. The broken width is ca. 9 mm, and these edges bevel to the polished face. The provenience is Cave 1.

Discs *(3)*

All one-piece circular mirrors have been placed within the category of discs. Only one unbroken disc occurs in our sample.

a. This specimen, associated with Barranca phase Burial 150, is a fragment of a perforated iron ore disc (M-10; Fig. 16.22*d*). The original diameter was ca. 26 mm, and the thickness ca. 4 mm. The conical perforation in the center of the disc, drilled from one side only, left a hole of ca. 3.5 mm diameter. The disc, manufactured from an unidentified iron ore, has a slightly rough surface and roughly rounded edges. It is unpolished.

b. Both sides of this broken magnetite disc (M-8) are polished. The specimen's diameter is 18 mm, and it is 2 mm thick. The edges are rounded. Found during the excavation of T-27 Structure 1, this artifact probably dates to the Cantera phase.

c. The ore from which this complete 13 mm disc (M-11) was manufactured has not been identified. The disc's thickness is ca. 2 mm. It is polished only on one side. It was found in the mixed uppermost 12 cm of Cave 1, a cave with both Middle Postclassic and Cantera phase deposits. Dating of this artifact is therefore uncertain.

Miscellaneous *(5)*

Three small irregular iron ore fragments, each with one polished surface, one irregular fragment with two polished surfaces, and a wafer-thin fragment with a rounded corner and one polished surface make up the specimens of this catch-all category. The irregular fragments include both hematite and magnetite specimens, and come from PC Structure 2 (M-5), PC Structure 6 (M-3), the surface of S-39 (M-9), and near Late Formative Burial 123 on T-27 (M-7). The wafer-thin specimen (M-12) comes from Cave 1, and its age is uncertain.

Shell Artifacts

Thirteen worked and six unworked shell fragments were recovered by our excavations. Importantly, twelve of these come from excavations of Caves 1 and 8. This may reflect better preservation within the caves, but may as likely be due to specific manufacturing or use loci. Only the shell earspool inset (artifact *a*) comes from a context which is currently clearly datable to the Middle Formative (Cantera phase). The shell fragments from the caves are from stratigraphic contexts which are still under analysis, and while probably Middle Postclassic, their exact dating is uncertain at this moment. Only the thirteen worked fragments are discussed here.

a. This piece of worked shell is a square, 1.5 cm on a side, with cruciform extensions and a diamond-shaped cutout in the center (Fig. 16.23*a*). It apparently functioned as an inset to one of the earspools associated with Burial 40, one of the highest-ranked Cantera phase burials uncovered at Chalcatzingo (Chapter 8). No matching inset was found with the burial's second earspool.

b. Excavations on the Barranca phase water-control construction at the northeast corner of T-15 (Str. 1) recovered one piece of a partially worked bivalve (genus unidentified) ca. 3 cm long and 1.8 cm wide. Its worked areas suggest it may be a section of a simple shell pendant (Fig. 16.23*b*). The shell's hinge has been drilled, as if for suspension. Because the drilling occurs on the interior of the hinge area, it is without question human-made and not the work of a predator gastropod. Further working on the shell includes a cut groove at the base of the hinge and the removal by cutting of an area of the right side of the valve. The context of this piece is mixed Barranca and Amate phase fill dirt.

c. This piece (Fig. 16.23*c*), 10 mm in length and 6 mm in width, may also be a pendant fragment. It is notched along one side, while the opposite side (broken) has the partial remains of a drilled hole. The provenience of this artifact is Cave 1.

d. It is unfortunate that this piece is fragmentary because it is the only one of our sample with an engraved design (Fig. 16.23*d*). The fragment is ca. 14 × 13 mm in size and has two drilled holes. One hole is partially outlined by an engraved arc, and is positioned in such a way as to suggest that it was a suspension hole. The engraved design cannot be determined. This artifact is from Cave 1.

e. This long triangular-like pendant, 25 × 11 mm, has the suspension hole drilled somewhat off center (Fig. 16.23*e*). It was found in the Cave 8 excavations.

f. Also found in Cave 8, this small rectangular artifact, 12 × 14 mm, has tiny "suspension" holes at two corners, and a crude central hole which may have broken the piece during drilling (Fig. 16.23*f*).

g. This worked Cave 1 shell is a small gastropod, 11 mm in length. It has been ground flat on each side to expose the shell's interior column.

h. This 10 × 6 mm fragment has one drilled hole. It was recovered during Cave 8 excavations.

i. These are five triangular shell pieces recovered from cremation Burial 161 at Tetla. Each triangular section is about 3 cm in length and has a transverse suspension hole drilled at the apex, indicating that these are neckline pieces.

Bone Artifacts

A variety of worked bone fragments were recovered, the majority of them awls. Other distinguishable categories are needles, bird bone tubes, and cut sections. Their proveniences are given in Table 16.5. Several notched bone fragments (listed as one item in Table 16.5; Fig. 16.24*a*) are reminiscent of musical instruments, although this function is hypothetical. Among the cut or "sawed" bone pieces of unknown function is one from T-20, which is a long bone with the end cut and the edges rounded (Fig. 16.24*b*). An awl fragment from T-27 exhibits several long straight cuts, almost as if they were thread cuts.

Sinew

During the excavation of Burial 40, a piece of sinew thread was recovered from beneath the skull. This thread, over 40 cm in length, is knotted near the center with a double loop knot. The jadeite beads found around the skull had probably been strung on this sinew thread. Whether this strand of beads was intentionally broken at the time of the interment or broke later is a matter for speculation. The orderly arrangement of most of the beads suggests the latter event.

Obsidian Bloodletters

Chapters 18 and 19 discuss Chalcatzingo's lithics in general terms rather than separating out certain specific artifacts. One small group of artifacts warrants special mention, thin, finely worked obsidian objects which most probably served for ritual drawing of blood. The majority of the objects are needle-like and retouched around their entire circumference, giving them a round or oval cross-section (Fig. 16.25*a–e*). Several specimens however are manufactured from blades and include the needle-like section, which then expands to a section of blade. On at least two examples the blade edge has been intentionally serrated (e.g., Fig. 16.25*h*); in others it has been reshaped by retouching (Fig. 16.25*f–g*). If these latter bloodletters were pulled entirely through the tongue or earlobe, they would have lacerated the area, an act similar to types of Maya bloodletting in which a cord with attached spines was pulled through the tongue. Obsidian bloodletters are found across the site and do not appear to have

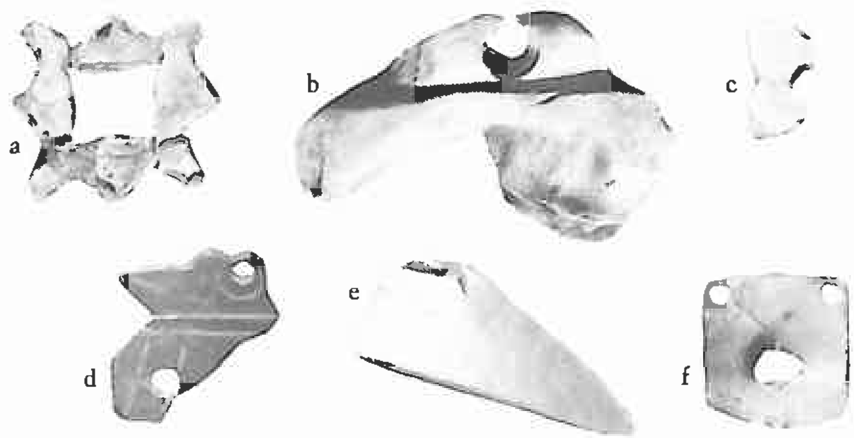

Figure 16.23. Worked shell artifacts. (Scale varies; see text for dimensions.)

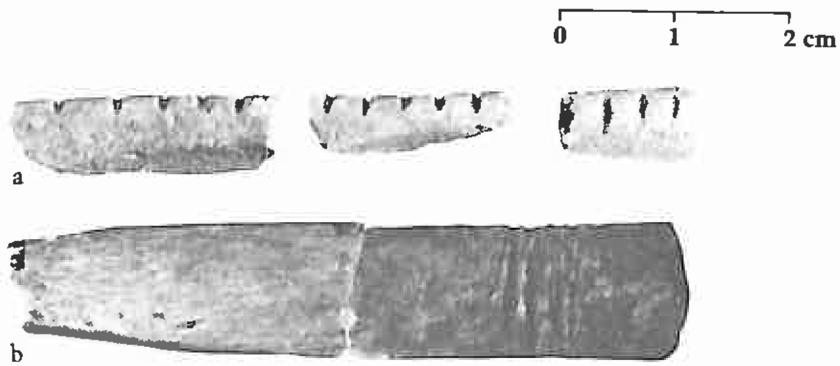

Figure 16.24. Notched (*a*) and cut (*b*) bone artifacts.

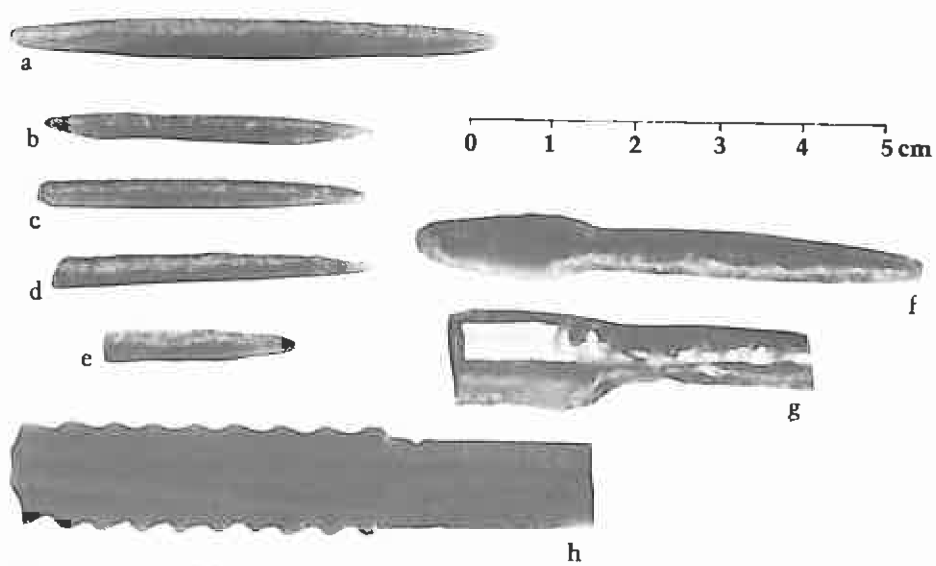

Figure 16.25. Obsidian bloodletters: *a–e*, needles; *f–h*, reworked blades (in *h* the blade area is serrated).

any special restricted distribution. The only other instance of the needle-serrated blade type bloodletter (Fig. 16.25*h*) of which I am aware is from San José Mogote, Oaxaca (Kent Flannery, personal communication).

ARTIFACTS FROM CAVE 2

Cave 2, on the eastern side of the Cerro Delgado (Fig. 12.37), had already been disturbed by looters at the time our project visited it in 1973. However, the looters' backdirt was screened, and a small remaining section of unlooted cave floor deposits was excavated and screened as well.

A large quantity of plant remains was recovered from both contexts as were a number of wooden artifacts, fiber, threads, etc. The plant macro-fossils are discussed in Chapter 3 and listed in Appendix A. The other major artifacts are described below. These are all presumed to date to the Middle Postclassic (through associated ceramics), although since the looters destroyed any significant stratigraphic data some might be more recent.

a. Wooden lath strip, 13.7 cm long, 2.7 cm wide, 0.5 cm thick, well smoothed and worked. This rectangular strip (Fig. 16.26*a*) and its counterpart (artifact *b*) have slightly beveled ends, and may be shuttles or other pieces of a back-strap loom.

b. Wooden lath strip, 11.8 cm long (broken), 2.7 cm wide, 0.3 cm thick, well smoothed and worked (Fig. 16.26*b*). This is presumed to be part of the loom described above.

c. Wooden tool tip, 4 cm long, 1.5 cm wide, and 1 cm thick. This piece (Fig. 16.26*e*) has a triangular shape and cross-section. The sides appear to have a light coating of some sort of pitch or resin, while the tip is polished.

d. Wooden tool, 19 cm long, 1.2 cm wide, with a triangular cross section (Fig. 16.26*c*). The rounded tip and edges are polished.

e. Wooden tool fragment, 18.5 cm long, 1.2 cm wide (Fig. 16.26*d*). This rectangular piece has a tapered, wedge-shaped tip. The tip and upper side are polished from wear.

f. Wooden lath piece, 16.5 cm long, 0.8 cm wide, 0.2 cm thick, with cut ends (not illustrated). This piece lacks the finishing of artifacts *a* and *b* above.

g. Wood chip, shaped, both ends burnt (Fig. 16.26*f*). Dimensions are 3.0 × 1.5 × 0.4 cm.

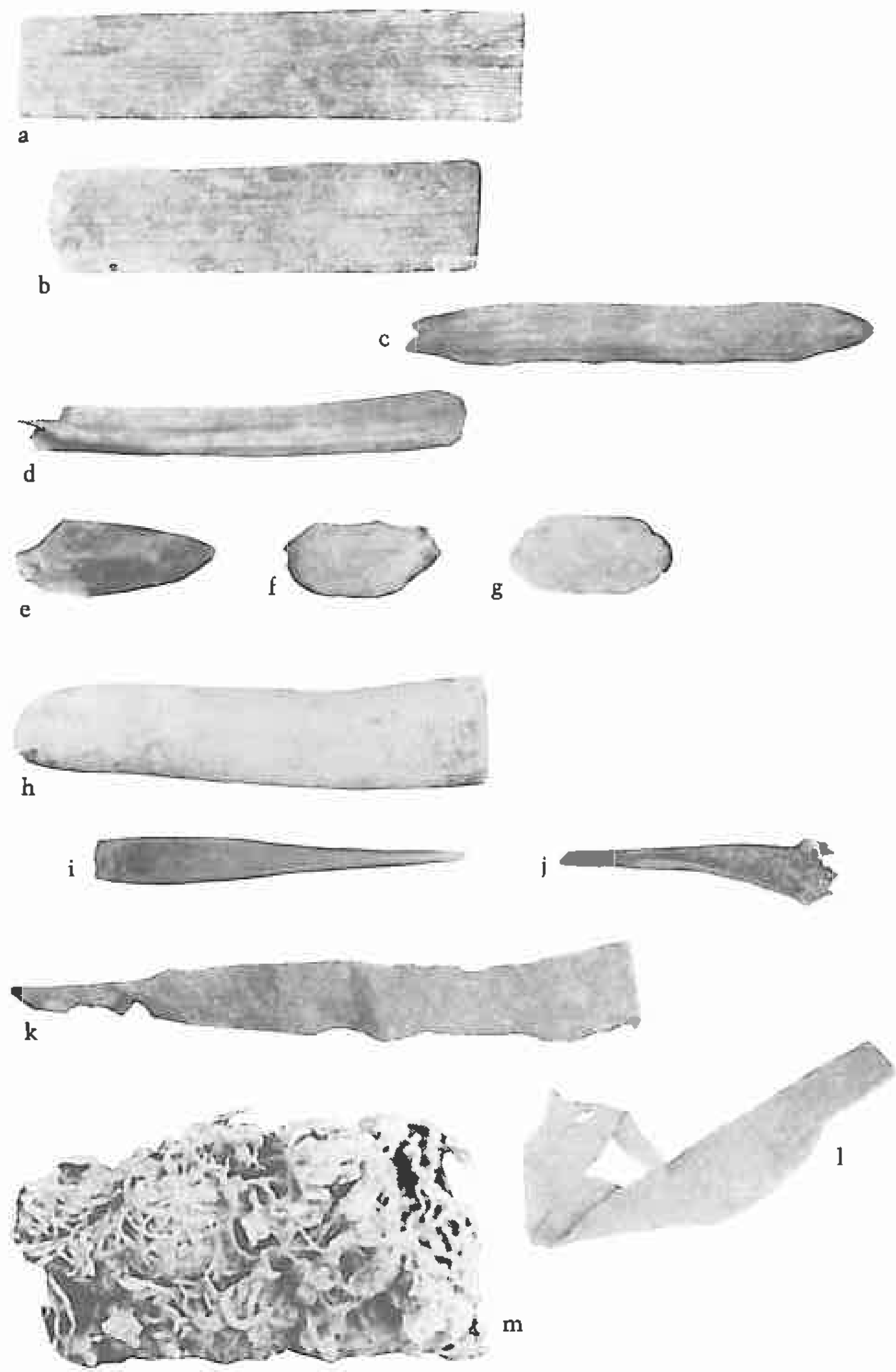

Figure 16.26. Artifacts recovered from Cave 2: *a–g*, wood; *h–i*, bone; *j*, maguey spine; *k–l*, leather; *m*, cotton. (Scale varies; see text for dimensions.)

h. Wood chip, shaped, burnt, 2.1 × 1.5 × 0.9 cm (not illustrated).

i. Wood chip, shaped, 3.3 × 1.5 × 0.3 cm (Fig. 16.26*g*).

j. Wooden spindle, 20 cm long, with a maximum diameter of 0.6 cm (Fig. 16.27*a*). This piece is tapered and worn at one end, suggesting that a clay spindle whorl had been wedged onto that section. The pointed tip is worn and rounded, also indicating that this piece was a spindle.

k. Polished bone section, 8.7 cm long, 2.0 cm wide (Fig. 16.26*h*). One end is rounded and the other is cut flat. The piece is well polished, and numerous cuts occur near the blunt end.

l. Bone awl, 17.2 cm long, with the tip highly polished (Fig. 16.26*i*).

m. Two leather strips, ca. 12 cm long, 1.5 cm wide, each with a short longitudinal slit near one end (Fig. 16.26*k–l*).

n. Wadded textile fragment, cotton, 5 × 4 cm. It has a double-warp, twined weave (Fig. 16.26*m*).

o. Twisted ixtli fiber cord and twisting stick (Fig. 16.27*b*), three twisted strands. This was apparently the end of a longer cord, with this section cut off after the cord was twisted and finished.

p. Two corn leaves, knotted (Fig. 16.27*c–d*).

q. Cotton thread wound onto a stick (not illustrated).

r. Ixtli fiber net fragments (?) (2) (Fig. 16.27*e*).

s. Maguey spine with attached but cut fibers (Fig. 16.26*j*).

t. Small hemispherical cut gourd section (broken), 7 cm in diameter (Fig. 16.27*f*). It was probably used as a small bowl.

In addition to the artifacts listed above, there were a number of pieces of twisted ixtli fiber cord and cotton thread. This assemblage, with few exceptions, is unquestionably part of a spinning–weaving–cord-manufacturing tool kit. Even the small gourd bowl may have been used to hold cotton (?) fiber as it was being spun.

The cotton recovered was studied by Juan DuBernard, a textile manufacturer with an extensive interest and knowledge of prehispanic textiles and fibers. The analysis indicated that this short-fibered cotton, similar to Egyptian cotton, was a "wild" cotton that had once been domesticated (DuBernard, personal communication). This identification suggests at least two possible explanations. If this is Middle Postclassic cotton, it may have been collected from

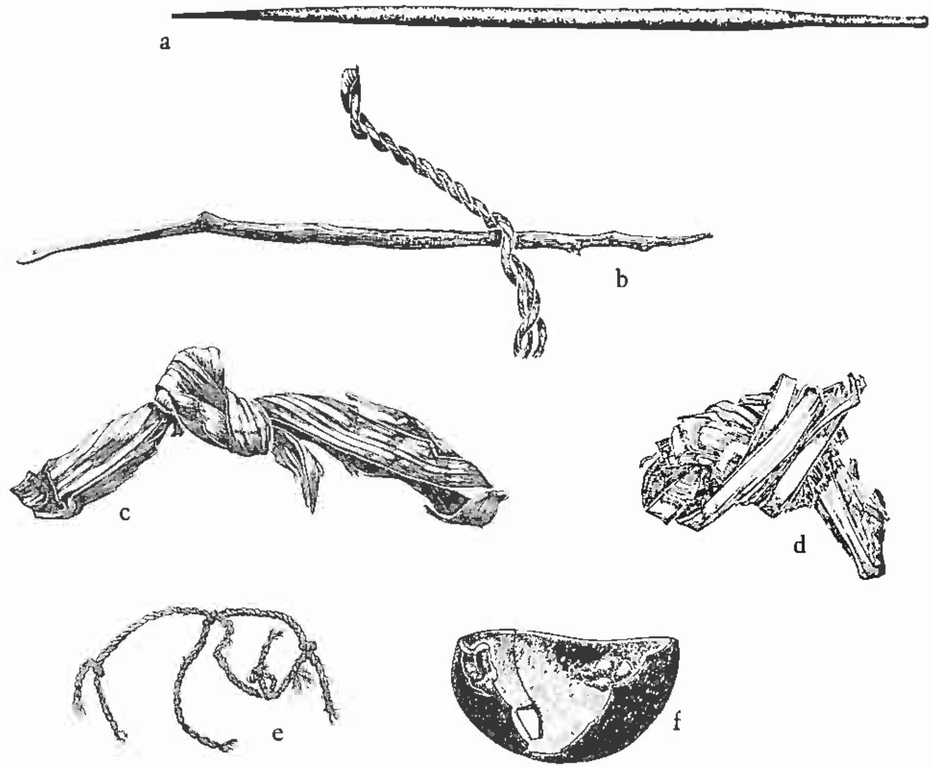

Figure 16.27. Artifacts recovered from Cave 2: *a*, spindle; *b*, twisted ixtli fiber and stick; *c–d*, knotted corn leaves; *e*, ixtli fiber net fragment; *f*, cut gourd. (Scale varies; see text for dimensions.)

Table 16.5. **Distribution of Worked Bone Artifacts**

Area	Cut Sections	Awls	Needles	Bird Bone Tubes	Other
PC Str. 1					Notched fragments
PC Str. 2	1				
PC Str. 6			1	1	Engraved fragment
PC other	1				
T-11					Bone "spindle"
T-15W	1				
T-20	1 (femur, end cut and rounded)				Notched human tooth
T-21	1		1		
T-23		1			
T-27 Level 1	2	1 (with cuts)			
T-25		2			Animal incisor pendant
T-37		1	1		Reworked femur head
N-2		1			
Tetla Exc. 1-A		1			
Tetla-11		7		1	
Cave 1		3	1	1	
Cave 2		1			
Cave 4		1			
Totals	7	19	4	3	6

relict "wild" plants in the area, remnants of domesticated cotton grown in the southern valley during the Classic period. Such an explanation would imply that access to domesticated cotton during the Middle Postclassic here was difficult. However, although the artifacts associated with the cotton in the disturbed deposit suggest that it is Middle Postclassic, it may instead be colonial and in fact an actual imported Egyptian cotton variety.

RESUMEN DEL CAPÍTULO 16

Además de los tepalcates y las figurillas, se recobraron muchos otros objetos de cerámica en Chalcatzingo. Estos han sido clasificados en tres categorías: de adorno personal, rituales, y utilitarios. Los objetos de adorno personal son cuentas de barro, orejeras, pendientes, y sellos. Las cuentas y los pendientes son bastante raros, en tanto que las orejeras sólidas o huecas son más comunes. Tanto los sellos huecos como sólidos, de rollo, así como los planos, aparecen en el muestrario.

Los artefactos de la categoría ritual consisten en pitos y ocarinas, flautas, máscaras, vasijas en miniatura, figurillas de animales, y barras de cerámica. El muestrario de pitos y ocarinas es grande y éstos ocurren en variedad de formas. Las "flautas" encontradas en Chalcatzingo bien pudieron haber sido parte de los pitos. Las vasijas en miniatura incluyen los tazones de boca ancha, ollas de cuello restringido, platos, y los incensarios de doble asa. Los fragmentos de "máscaras" con perforaciones para suspensión, se encontraban en los contextos de la fase Cantera, y del mismo modo que otros artefactos, que caen en la categoría ritual, no parecen ocurrir de modo restringido al sitio. Las barras de cerámica, por otra parte, se encontraron fundamentalmente en S-39, un área posible de manufactura de cerámica, y bien pudieron haber sido artefactos utilitarios asociados a la manufactura de vasijas, pero deben haber sido incluidos como objetos rituales dado que la mayoría aparecen con decoraciones y parecen no haber sufrido desgaste. Las figurillas zoomórficas ocurren con una gran variedad en su representación de animales, la cual incluye pájaros, reptiles, mamíferos, y peces. Algunas bien pueden ser partes desprendidas de los pitos zoomórficos.

Los artefactos utilitarios fácilmente identificables son las malacates y los moldes de cerámica. Además se incluyen en esta categoría los "plátanos" de cerámica porque presentan patrones de desgaste interesantes. Los plátanos aparecen solamente en los contextos de la fase Cantera, y es probable que sirvieran para pulir o refinar. Las malacates y los moldes presentan fechamientos del Clásico y Postclásico.

También hay artefactos de cerámica enigmáticos porque no caen en ninguna de las tres categorías dadas arriba. Éstos incluyen bolas sólidas, más de 400 esferas huecas, y más de 250 discos y óvalos de tepalcate molido, algunos de los cuales presentan perforación completa o parcial. No se ha podido determinar cuáles son las funciones de estos artefactos.

Además, hay artefactos entre los cuales se incluyen aquellos hechos de mineral de hierro, concha, hueso, y tendón. Se encontraron varios espejos de mineral de hierro y segmentos de mosaico, así como fragmentos de forma irregular. La mayoría se fecha en la fase Cantera. Los pocos artefactos de concha consiguen fundamentalmente fechamiento en el Postclásico Medio, y provienen de las excavaciones de las Cuevas 1 y 8. La mayoría de los artefactos de hueso son leznas, y ocurren en los contextos Formativo y Postclásico. Una pieza de tendón, el cordón para un collar para cuentas de jade, se recobró del Entierro 40 de la fase Cantera.

Finalmente, se encontraron bien conservados en la Cueva 2 un número de artefactos de madera, hueso, y fibra, debido a que es ésta una cueva seca ubicada en la parte oriente del Cerro Delgado. Estas herramientas y las fibras de agave y algodón son parte de un juego de herramientas para la manufactura del hilado y tejido de cordel.

17. Chalcatzingo Jade and Fine Stone Objects

CHARLOTTE W. THOMSON

Beginning in the thirteenth century BC, the Olmec of southern Veracruz and Tabasco created sculptural forms that were revolutionary in the New World. They not only carved multi-ton public monuments of basalt; they also made jade objects, the first well-documented occasion in the Americas of the working of this refractory stone. The art of the Olmec is profoundly serious, rational, "great" art, and it is in no way derivative.

To anyone who has seen and held Olmec jades, their strange artistic excellence is immediately apparent: in the grace, restraint, decorum of their lines, in their logarithmic curves and smooth, closed forms. Olmec jades are tactile as well as visual objects because of the extreme high polish with which they were finished. (The ancient Chinese had a term for this quality of jade: *pa wan*; literally, "hold and enjoy.")

The word *jade* derives from the Spanish *piedra de ijada* ("stone of the side"), for the stone was believed to have curative powers for liver ailments and side pains. Today the word *jade* is a general term and encompasses two varieties of the stone: nephrite and jadeite. This chapter uses *jade* and *jadeite* interchangeably.

While Olmec monumental art occurs in quantity outside of the Gulf Coast only at Chalcatzingo, Olmec style jade objects, being small, portable, and apparently of extremely high status value, occur over a wide area of Mesoamerica. Such jade objects range from Guerrero in the north to Yucatán and Costa Rica in the south. Unfortunately, most of these artifacts were not excavated by archaeologists, and therefore their contexts are undocumented. In all likelihood there were multiple centers of jade manufacture and, in some instances, attempts in other areas to copy the Olmec jade-working style.

The sites of La Venta, San Lorenzo, and Cerro de las Mesas are the only locations within the so-called Olmec heartland where Olmec jades have been excavated by archaeologists. Only one piece of jade was recovered at San Lorenzo, although a number of serpentine artifacts occur there (Coe 1970; Coe and Diehl 1980: 241–245). The one San Lorenzo jade is a blue jade axe, sawed in half lengthwise, reported by Matthew Stirling (1946) as found in the ravine between the southwest and south-central ridges at the site. At Cerro de las Mesas two Olmec jade figures of fine-quality stone and another twenty to fifty small objects of apparent Olmec manufacture were buried in a dedicatory cache of the Classic period (P. Drucker 1955).

At forty-one locations within Complex A at La Venta, buried offerings of jade and serpentine were encountered by the excavators. The C-14 dates for building activity in Complex A, 1000–600 BC, are the frame of reference for the burial dates of the jades (Berger, Graham, and Heizer 1967). The kinds of offerings made at La Venta include shaped blocks buried in quadrilateral pits intruded into court and platform construction, groups of celts, celts and mirrors, burials with jade regalia, and groups of stone figurines (P. Drucker 1952; P. Drucker, Heizer, and Squier 1959).

That La Venta artisans had ready access to supplies of stone is apparent in the sheer quantity brought into the site. In one feature in the southwest platform, 443 blocks of dressed serpentine were laid in twenty-eight courses with blue and olive clay. The excavators estimated that a thousand tons of stone were present in this one feature alone (P. Drucker, Heizer, and Squier 1959:95–97). The nearest known serpentine sources occur on the Pacific Coast side of the isthmus (Williams and Heizer 1965:12). Sources of the jade utilized are still unknown. Michael Coe (1968a:94) has suggested that sources might be present in Guerrero, and Grove (personal communication) has informed me of rumors that raw jade boulders have been found in Oaxaca along the upper course of the Río Papaloapan. The variety of jades at La Venta strongly suggests multiple sources for this stone.

The sculptured pieces from La Venta present a puzzling case: massive amounts of serpentine and jade were traded into the site or received as tribute, yet of twenty-eight stone figurines at the site, only eight were jade. This suggests that the trade of blocks and celts of precious stone was independent of their working into figurines and ornaments. The jade figurines at La Venta are in a number of different styles and, other than the consistent style of the group of sixteen in Offering 4, bear only a vague similarity to each other. This too suggests that stone working was independent of the stone trade, and that La Venta jades might have been made at a center or centers removed from La Venta.

THE FINDS AT CHALCATZINGO

In the excavations at Chalcatzingo, 365 artifacts and worked pieces of jade and greenstone were found. Of these, 145 objects, or 40 percent of the fine stone artifacts, were jadeite (Table 17.1). Approximately one-quarter were made of a distinctive jadeite dubbed "Chalcatzingo mottled." This material has a jadeitic matrix varying in color from nearly white to spruce green, and pebbly small inclusions of feldspar ranging in color from spinach green through spruce green to dark grey green (see Appendix F for a detailed discussion of color terms). Chalcatzingo mottled jadeite is the most characteristic stone in the inventory of fine stone materials. Fifty-five objects (15 percent), mostly earspools, were made of serpentine. Over half of the thin earspools found were made from fuchsite, a chromium or green mica. Chrysoprase and chalcedony were also prominent among the fine stone artifacts.

Jadeite and lesser-quality stones are treated together in this chapter because, as can be seen in Table 17.1, jadeite and other greenstones were interchangeable materials. The lapidary worker fashioned tools and ornaments alike out of fine greenstone, whether the stone was jade or not. Nearly all of the ornaments excavated at Chalcatzingo were green or greenish stone.

The lapidary and the wearer of the stone undoubtedly had notions and terms for quality, like the descriptive terms for different gems that come down to us from the sixteenth-century Aztecs. For the lapidary, jadeite would have been much more difficult to work than the other greenstones, requiring different abrasives, greater pressure for drilling, and incrementally longer time for the work process. The final result of this effort was a fine, high, even, durable polish that could not be achieved using the lesser stones.

***Table 17.1.* Chalcatzingo Fine Stone Artifacts by Material**[a]

	Material					
Type of Artifact	*Jadeite*	*Chalcatzingo Mottled Jadeite*	*Serpentine*	*Fuchsite*	*Other or n.d.*[b]	*Total*
Stone figures			2		1	3
Pendants	3	1	5		18	27
Earspools						
Standard	4	8	3		9	24
Thin			29	44		73
Beads						
Spherical and subspherical	88	1	1		9	99
Bag-shaped		10			5	15
Tubular	4	6	1		4	15
Other	4	3	1		8	16
Tools						
Adzes/celts	1		3		9	13
Awl points	1		2		2	5
Other					7	7
Drill cores			4		2	6
Pulidores					5	5
Discs	2	2	1		4	9
Miscellaneous			1		6	7
Worked stone		7	2		32	41
Total	107	38	55	44	121	365

[a]Tetla artifacts are not included in this table.
[b]Includes other types of stone as well as unanalyzed and unidentified materials.

***Table 17.2.* Distribution of Greenstone Artifacts at Chalcatzingo**[a]

	Area																						
Type of Artifact	*PC1*	*PC2*	*PC4*	*PC Other*	*T-4*	*T-6*	*T-9A*	*T-9B*	*T-11*	*T-15*	*T-17*	*T-20*	*T-21*	*T-23*	*T-24*	*T-25 1*	*T-25 2*	*T-27 1*	*T-29*	*T-37*	*S-39*	*Other*	*Total*
Stone figures	1																				1	1	3
Pendants	3	4		4	1			1	3						3		1	1	1	1	2	2	27
Earspools																							
Standard	4	2	5	1	1	1			1				1	2			1		1	2		2	24
Thin	20	10		7	12	1	1	1	2	2		1		3	1	2	3		4		1	2	73
Beads																							
Spherical and subspherical	3	2	86							2		1					1					4	99
Bag-shaped						1						1			1							12	15
Tubular	1	1	3		1					1						5	1	1				1	15
Other	3	1		1	1	2				1		1				1	1	1				3	16
Tools																							
Adzes/celt			1	2					2							2				1		5	13
Awl points	2						1	1														1	5
Other	1	1		1								1										3	7
Drill cores		3		1		1	1																6
Pulidores	2		1											1								1	5
Discs	1		1	2						1					1					1		2	9
Miscellaneous		1		1					1	1				1	1			1					7
Worked stone	4	4	2	1	1	4	1			1				4	4	4	1				2	8	41
Total	45	29	99	21	17	10	4	3	9	9	0	5	1	11	11	14	9	4	6	5	6	47	365

[a]Tetla artifacts are not included.

Most greenstone artifacts came from nonburial contexts. Nevertheless, the finest-quality jade and the stone objects of greatest aesthetic interest were encountered, almost without exception, in graves of the Cantera phase. Fine emerald green jade beads with a cracked surface and red pigment adhering, a type of jade also excavated at La Venta, were found with burials. Blue-green tubular jade beads of "Costa Rican" jade were also found in graves, as were emerald green ear flares. Table 17.2 provides proveniences (by terrace) for all these artifacts (excluding those from Tetla).

The fine stone artifacts excavated at Chalcatzingo were classified into the following categories: stone figures, pendants, earspools, beads, tools, drill cores, *pulidores* (polishing stones), miscellaneous pieces (including discs), and worked stone.

Stone Figures **(3 specimens)**

Olmec Standing Figure *(Fig. 17.1)*

An Olmec standing figure, made of grey serpentine, was encountered in a Cantera phase crypt (Burial 33) in PC Structure 1. This figure, 11 cm tall, is a frontal, immobile, jarringly direct composition, standing assertively with legs apart. The arms are foreshortened, held out in front of the body. The physiognomy of the face is typically Olmec, especially in the gaping, triangular, down-turned mouth. The figure is marked with arcs that indicate breasts, a scratched-away area indicating the navel, and saw cuts forming the pubic triangle. The figure's red pigment incrustations appear in some photographs of the piece to show a bearded face. Whether such a face was intended is conjectural; it is not a known feature of any other such Olmec figures.

Although clearly recognizable as Olmec in style, the figure diverges in several important respects from the canon for such figures established by the group of sixteen excavated in Offering 4 at La Venta (P. Drucker, Heizer, and Squier 1959: 152, 158–162, Pls. 33–36). The head tilts backward on the body axis and is rectangular rather than pear-shaped. The shoulders are missing, as the line of the upper arm sweeps from the neck to the elbow. The holes drilled in the ears and nostrils are over large, and a raised, squared area is left around each eye.

The La Venta figurines, sixteen from Offering 4 and eleven from other parts of the site, themselves exhibit a wide range of stylistic variation. The group cached in Offering 4 is nearly homogeneous, while the others represent the works of different artisans, schools, or styles of Olmec stone carvings. Since the range of sculptural style is so wide at La Venta, which is the type site for Olmec jade and stone carvings, it is impossible to state with certainty the degree of artistic relationship of the Chalcatzingo figure to the ones from La Venta.

In a prior study (Thomson 1975) I pointed out that the subject matter of Olmec jade and stone carvings is not were-jaguars, as so often has been assumed. Rather, the range of figure carvings of the type excavated at La Venta encompasses developmental stages, perhaps in the life of a single individual, i.e., baby, adolescent, and adult. The Olmec jade figure with forward-reaching, foreshortened arms excavated in a Classic period cache at Cerro de las Mesas (P. Drucker 1955: Pl. 27) is a superb example of the infantile character. A good example of the progressive transformation from baby to adolescent is illustrated in three figures recovered in the 1943 excavations at La Venta (P. Drucker 1952: Pl. 50). The figures of La Venta Offering 4 are representative of the adult male stage, all having incised loin cloths or codpieces, and thus the ceremony or event depicted by this offering was one in which adult males participated.

The Chalcatzingo figure is similar to the Cerro de las Mesas figure and the 1943 La Venta figures in the forward projection of the arms and the absence of a codpiece. It differs in these same attributes from the Offering 4 figures. It is also at variance with all the Gulf Coast examples in its physical proportions. By comparison with the Olmec figures excavated at La Venta and the other Olmec figures discussed, it is apparent that the standing Olmec figure at Chalcatzingo represents an adolescent male.

Torso of a Seated Man *(Fig. 17.2)*

The second Olmec style sculpture excavated at Chalcatzingo is a superb but broken torso of a seated man. The figure is 5 cm high and is made of a soft, dark spruce green serpentine that takes a high polish. It was excavated in S-39 in a Cantera phase context.

The importance of this sculpture lies not just in its aesthetic superiority. It is one of only two known small-scale pieces from excavated sites that bear direct stylistic relationship to the monumental sculpture of the Olmec heartland. The other is a fragmentary serpen-

Figure 17.1. Anthropomorphic "were-jaguar" figurine, PC Structure 1, Burial 33.

Figure 17.2. Seated anthropomorphic figurine fragment, S-39.

tine torso, also with head, arms, and legs missing, which was excavated at La Venta (P. Drucker 1952: 148, Fig. 45). It is reconstructed as a figure seated cross-legged, with the arms resting on the thighs.

From illustrations of the major Olmec monuments depicting seated persons (e.g., La Venta Mons. 10, 23; San Lorenzo Mons. 11, 12, and 47; de la Fuente 1973: 67–68, 81–83, 192–196, 226–227), it is apparent that the ceremonial representation of a seated figure is the same in the great monuments as in the small-scale torso from Chalcatzingo. In all cases, a stocky, rounded body is indicated, with a corpulent torso mounded above the crossed legs. The figures in the monumental sculpture have badges of rank such as capes, ceremonial bars, and bracelets, while the Chalcatzingo fragment appears to be devoid of such trappings.

The Chalcatzingo figure is made of a spruce-green serpentine that is worked into half a dozen different kinds of artifacts at the site. "Paper-thin" earspools of this type of stone abound, while beads, pendants, tools, and drill cores are also found in this material. For this reason it is possible that the torso could have been made at or near Chalcatzingo. Abrader saws and jade adzes found at the site could conceivably have been part of the kind of tool kit necessary to manufacture such a figure.

The most puzzling aspect of the torso is its similarity in design to the monumental figures of the Gulf Coast Olmec. Did sculptors move back and forth between sites, or did designs travel on paper or in the mind? Could the Chalcatzingo figure have been a sculptor's copy or model of a large-scale monument such as Chalcatzingo Monument 16 (Fig. 9.18)? Resolution of questions such as these would also shed light on the major problem of the artistic genesis of the Chalcatzingo relief sculpture.

Teotihuacan-like Figurine Head *(Fig. 17.3)*

A characteristic Classic period Teotihuacan-like stone head, made of light brown material and 2.4 cm high, was found in Cave 10, high on the Cerro Delgado.

Figure 17.3. Teotihuacan-like figurine head, Cave 10.

***Pendants* (27 specimens)**

A variety of artifacts classified as pendants were found during the excavations. The majority come from Cantera phase contexts. It is important to note that some of these pendants are directly similar to minor materials excavated at La Venta, e.g., fang or tooth pendants (Fig. 17.4*a–c*), a duck-billed pendant (Fig. 17.4*d*), and two tiny T-shaped "spoon" pendants (Fig. 17.5). Similar materials have been found at La Venta (P. Drucker 1952: Pl. 58; P. Drucker, Heizer, and Squier 1959: Pl. 37). These Olmec pendants at Chalcatzingo are small in scale, as they are at La Venta. One of the fang or tooth pendants (Fig. 17.4*c*), of brown serpentine, has the earliest context of any of the jade and stone pieces at Chalcatzingo, coming from the Barranca phase. George C. Vaillant's Zacatenco excavations recovered a jade "jaguar tooth" pendant (1930: Pl. 60) similar to the three from Chalcatzingo.

A fine blue-green chalcedony pendant of a monkey with the suspension hole in its tail (Fig. 17.6) was excavated in the Plaza Central. It can be compared to a jade monkey from Guerrero in the American Museum of Natural History in New York (Easby and Scott 1970: No. 47). The Chalcatzingo monkey bears no stylistic relationship to other pieces excavated at the site, but blue-green chalcedony is not uncommon there. Fourteen other objects of chalcedony, including a few beads and a fragment of an earspool, were recovered. The fine straight bore of the holes in the monkey pendant is noteworthy, for they were probably made with a tubular drill.

Six "axe" pendants were found at Chalcatzingo (Fig. 17.7). One of these (Fig. 17.7*c*) was associated with a Classic period infant burial on T-25. These pendants are axe-shaped anthropomorphic figures pierced for suspension at the sides or at the top of the head. They are made of greenish stones, none of which are very hard. A tubular drill was held obliquely to the stone to cut arcs indicating facial features. This is a Classic period drilling technique not so far found among pieces of the Formative period.

The other pendants found at Chalcatzingo are a miscellaneous assortment of small circular jade pieces cut from a sphere, pendants shaped like miniature bowls, and other broken and irregular pieces pierced for suspension (Fig. 17.4*e–k*).

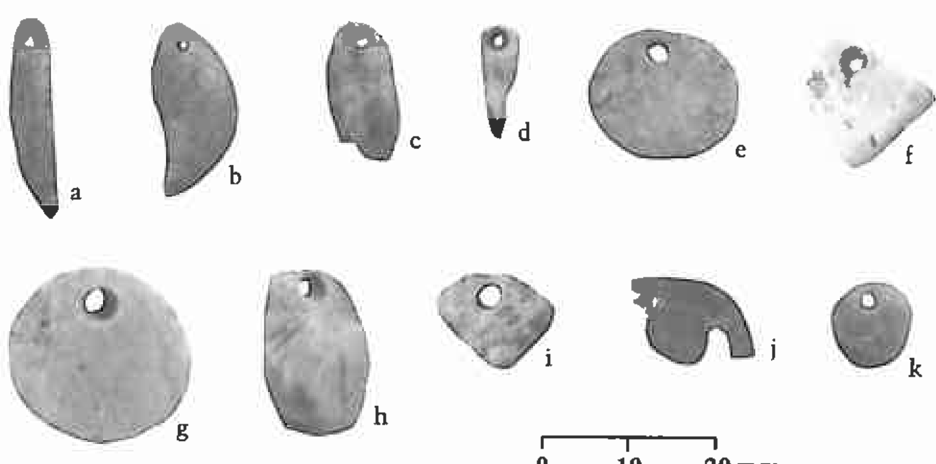

Figure 17.4. Pendants: *a*, PC Structure 1, Burial 32; *b*, T-27 Structure 1; *c*, T-9B; *d*, PC Structure 2; *e–f*, T-11; *g*, PC Structure 1, Burial 16; *h*, S-39; *i*, T-37; Burial 140; *j*, T-24; *k*, T-24, Burial 92.

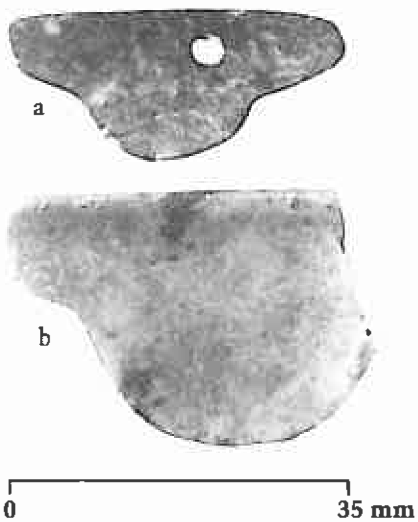

Figure 17.5. T-shaped pendants: *a*, T-24; *b*, PC Structure 1.

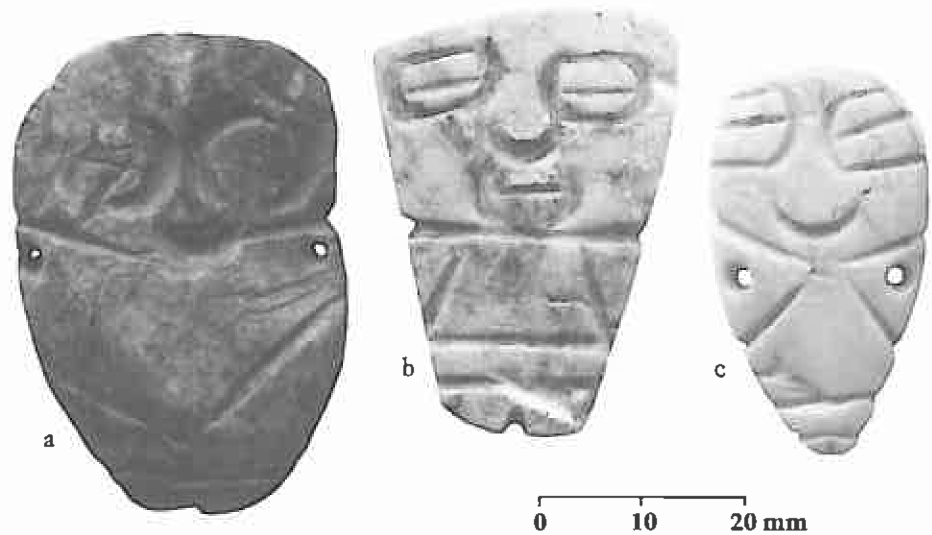

Figure 17.7. Axe pendants: *a*, T-4; *b*, PC Structure 1, plow zone; *c*, T-25, Burial 115.

Figure 17.6. Monkey pendant, PC excavations.

***Earspools* (97 specimens, mostly fragmentary)**

The earspools excavated at Chalcatzingo were classified into two groups—standard jade earspools with broad perpendicular flares (twenty-four specimens) and more cylindrical, "paper-thin" earspools made of highly polished chromium mica (fuchsite) and serpentine (seventy-three specimens). The former are found mostly in Cantera phase contexts and are believed to be a status-associated artifact. The latter are present in both Barranca and Cantera phase associations, and they are not as clearly an elite item.

The thin earspools (Fig. 17.8) are remarkable artifacts, ground down to a thickness of 0.5–1.3 mm. They are basically parallel-sided, exhibiting less flare than the other class of ear ornaments. The heights of the thin flares range from 11 to 21 mm. The outer diameter of the forward or flaring edge lies between 20 and 35 mm. The base diameter, the size of the hole in the earlobe, is similar to the base diameter of the standard flares, varying between 20 and 35 mm. From the point of view of manufacture, they represent a consistent series. The part of the thin earspools that was observed from the front (the inside of the flare) was always more highly polished than the rest of the piece. In addition, some of the earspools had minute double ridges at the base on the outside. These probably served to keep the spool in place in the earlobe (Fig. 17.8*e*).

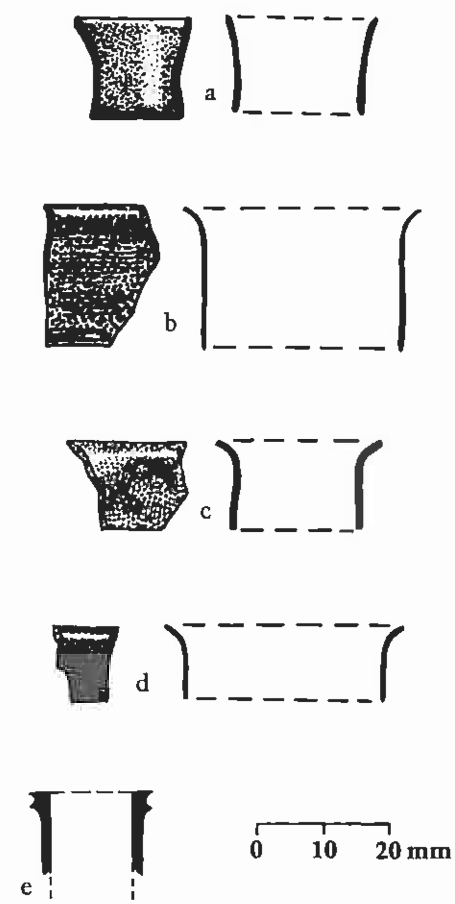

Figure 17.8. Thin earspools: *a*, PC Structure 2; *b*, T-20; *c*, T-11; *d*, T-25; *e*, T-4.

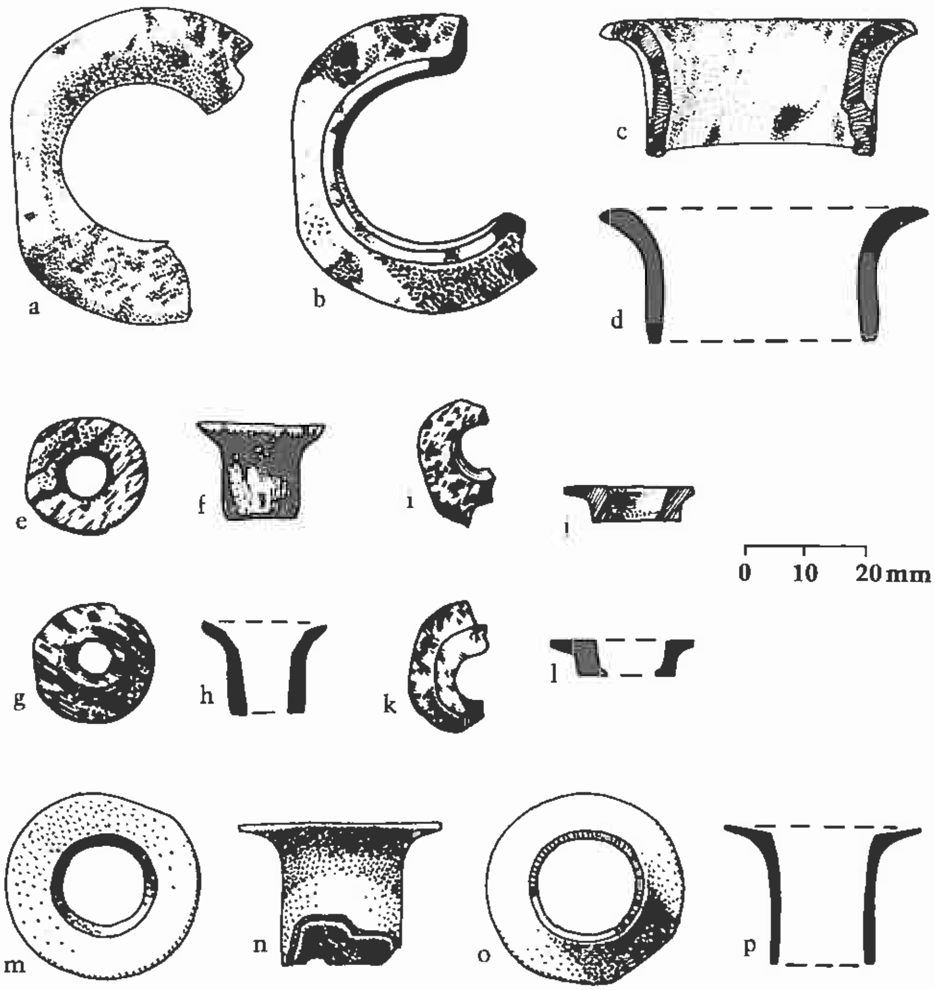

Figure 17.9. Standard earspools (four views each): *a–d*, PC Structure 1, Burial 28; *e–h*, from excavations in front of PC Structure 2; *i–l*, Cave 1; *m–p*, PC Structure 4, Burial 40.

The materials used in the thin earspools were fuchsite and serpentine. Fuchsite, or green mica, was the material used in forty-four specimens. It is a dark spruce (blued) greenstone that is translucent to transparent spinach (yellowed) green when held to the light. Black seams and inclusions are found when the material is held to a strong light source. A few examples were translucent bottle green in ambient light. The serpentine employed in twenty-nine examples is an opaque light spruce green stone, often dull-surfaced. Rarely the thin serpentine earspools have a high, vitreous polish.

Thin earspools were found primarily in the excavations of PC Structures 1 and 2 and T-4 (see Table 17.2), although they were also recovered in minor numbers from most Middle Formative structures. They were found only as broken fragments. Thin-walled clay earspools (Chapter 16) also occur on the site but are rarer and have somewhat different distributional contexts (Table 16.1).

Standard earflares survived relatively intact, since they are thicker (thickness ranges from 1.9 to 3.5 mm) and were usually associated with burials. They are not a consistent series (e.g., Fig. 17.9). The variety of their forms, dimensions, and materials suggests that they may have derived from a number of different centers of manufacture. Their height from base to throat varies from 6 to 25 mm. They are 20–61 mm across, and the base penetrating the earlobe varies from 19 to 39 mm. They are made of imperial green jadeite, Chalcatzingo mottled jadeite, serpentine, and other materials now badly weathered. A weathered pair in Burial 40 was found with minute, finely-worked fragments of shell and turquoise mosaic.

Jade earspools are not restricted to Chalcatzingo during the Middle Formative. Vaillant's Zacatenco excavations found an earspool fragment (1930: Pl. 60, top row, no. 2), while his work at El Arbolillo uncovered an infant burial associated with a pair of earspools (1935: 244–245, Fig. 25). Turquoise mosaic pieces were also excavated at El Arbolillo in association with a burial (1935: Fig. 25, no. 10).

Beads **(145 specimens)**

The beads excavated at Chalcatzingo were of four main types—subspherical, bag-shaped, tubular, and discoidal—as well as some irregular forms. The subspherical beads were by far the most numerous, comprising 67 percent of all beads (Fig. 17.10*a–d*). Most of the subspherical beads were made of jadeite and were biconically drilled. Many of these are of fine imperial green jadeite. Beads account for the majority of jadeite artifacts found at Chalcatzingo, and almost all of them occurred in the two high-status burials on PC Structure 4 (Burials 39 and 40), where they were strung and presumably worn by the individuals. Beads were also found in the mouths of several Cantera phase burials (a practice also known for the Aztecs).

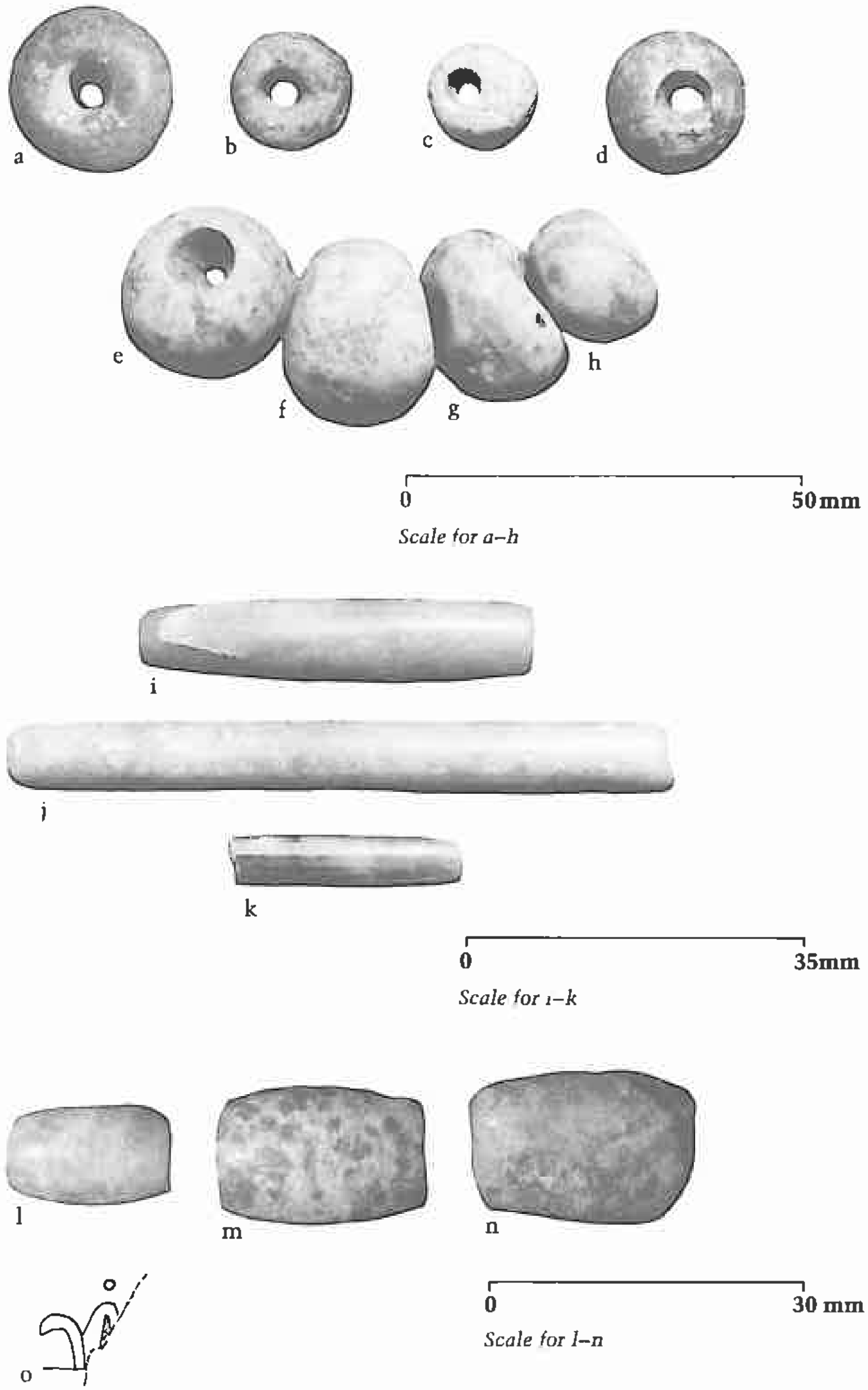

Figure 17.10. Beads: *a–d*, subspherical; *e–h*, bag-shaped; *i–k*, tubular (*i*, T-25, Burial 109; *j*, PC Structure 4, Burial 40; *k*, T-25, Structure 2); *l–n*, barrel-shaped; *o*, engraved.

Bag-shaped beads (Fig. 17.10*e–h*) are large, heavy beads pierced off-center by two drill holes intersecting at about a 120° angle. The sides of the bead converge toward the drill hole at the top. They tend to be made of Chalcatzingo mottled jadeite. The drill holes are conical and very large in proportion to the size of the bead. Two-thirds of the bag-shaped beads come from caves in the Cerro Delgado. They also occur in Classic contexts on T-20 and T-27 and at Postclassic Tetla. Only one has a certain Cantera phase date.

Tubular beads are of two kinds: elegant, long, thin, and highly polished with an extremely fine bore; and short, stubby, cylindrical beads. The longest tubular bead (Fig. 17.10*j*) is made of translucent sea-green jadeite and was found with Burial 40 on PC Structure 4.

Other beads were classified as discoid, barrel-shaped (Fig. 17.10*l–n*), and miscellaneous.

A hollow bell-shaped bead, unfortunately fragmentary, has an engraved design on it (Fig. 17.10*o*). A lobed bead of jadeite is similar to those found at La Venta (P. Drucker 1952: Pl. 52).

The fact that some greenstone types appear to correlate with specific bead forms (e.g., imperial green jadeite and subspherical beads) suggests the possibility that all of the Cantera phase beads at Chalcatzingo were not made at the same manufacturing source. Some may have been locally made, others imported.

***Tools* (25 specimens)**

None of the tools excavated at Chalcatzingo was found in what could be interpreted as a workshop context. Two adzes and two awl points were found in burials. I have included awl points in this category, although they may not have functioned as tools.

Twelve adzes were uncovered at Chalcatzingo (Fig. 17.11), from contexts ranging from the Barranca phase to Middle Postclassic. They are made of jadeite, serpentine, and other materials. The one jadeite adze (Fig. 17.11*d*) would have served as a good tool for shaving serpentine and other soft stones. The other adzes may have been woodworking tools. These tools were small in size, ranging mostly between 23 and 55 mm in length.

One celt was found in Cave 1, in a probable Middle Postclassic context; another celt was found at Tetla (not included in Chalcatzingo totals). The celt fragment excavated in the Tetla house

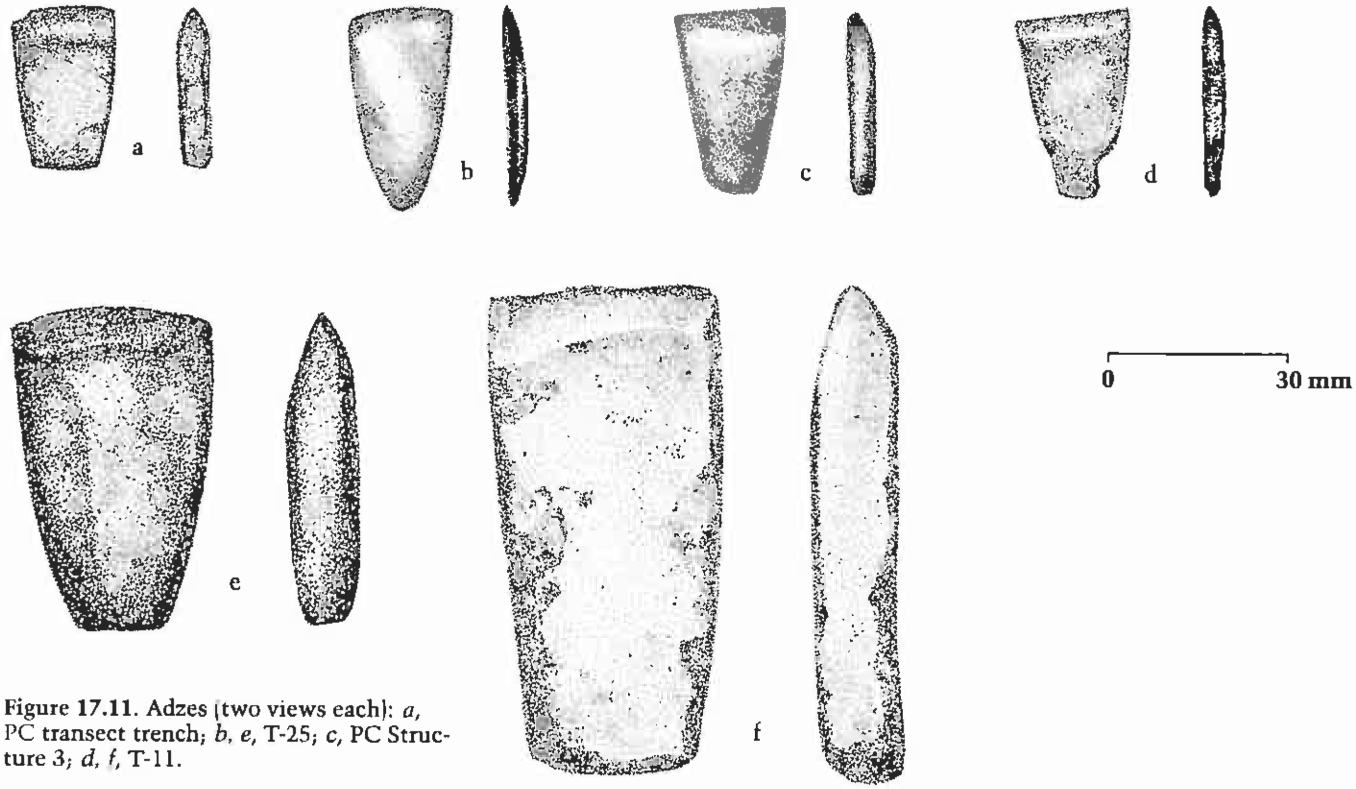

Figure 17.11. Adzes (two views each): *a*, PC transect trench; *b*, *e*, T-25; *c*, PC Structure 3; *d*, *f*, T-11.

excavations is a highly polished dark green. Lime plaster adhering to this artifact suggests that it was reused as a plaster smoother.

Five awl points were found (Fig. 17.12), the finest of these being transparent pale green jadeite shaped to a strong point (Fig. 17.12*d*). This awl occurred with the burial (no. 33) associated also with the serpentine Olmec figure (Fig. 17.1). Jadeite awls were found in tombs at La Venta (P. Drucker 1952: Pl. 53) and at a cache at Seibal dating to 800 BC (Willey 1970: 321). Awl points represent an artifact form which probably functioned for ceremonial mutilation and blood-letting.

Other tools include two abrader saws made of gritty sandstone, which could have functioned as either stone or woodworking tools. There were also five smoothed and rounded stones which may have been used for polishing pottery in the leather-hard state.

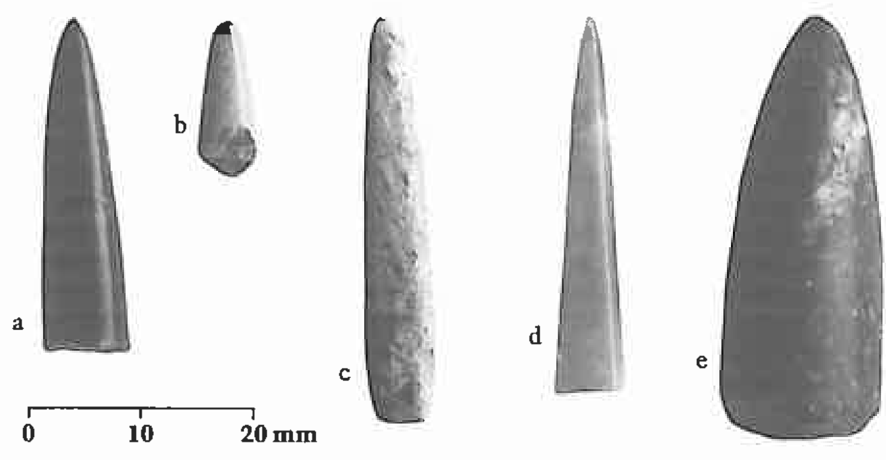

Figure 17.12. Awl points/bloodletters: *a*, T-9A; *b*, PC Structure 1, Burial 32; *c*, Cave 8; *d*, PC Structure 1, Burial 33; *e*, T-9B.

Drill Cores (6 specimens)

Drill cores, the cylinders left when a tubular drill has perforated stone, are prima facie evidence of stone-working activity. Four of the Chalcatzingo specimens are from good Cantera phase contexts. Most of these artifacts are made of serpentines common to other artifacts at the site. One drill core was of the same serpentine used to manufacture the "paper-thin" earflares. Its diameter (ca. 14 mm) would have been appropriate for the first stages of manufacturing a thin earflare.

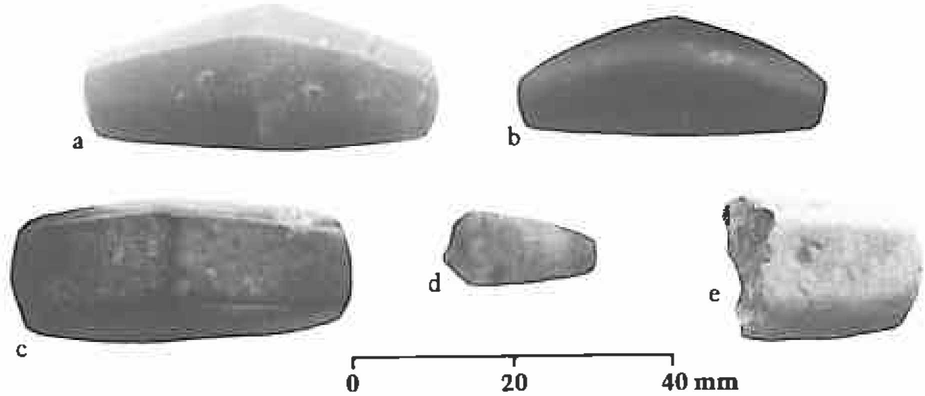

Figure 17.13. *Pulidores: a*, PC excavations; *b*, CT-1; *c*, T-23; *d–e*, PC Structure 1.

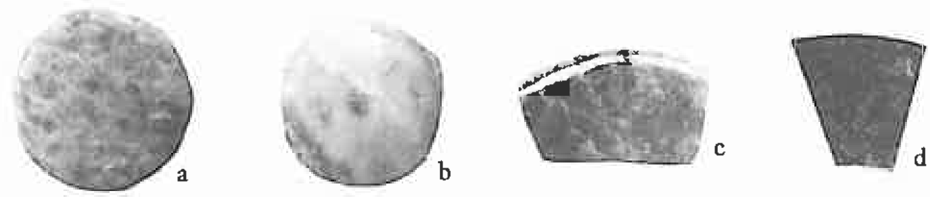

Figure 17.14. Discs: *a*, Cave 1; *b*, Cave 5; *c*, PC Structure 4; *d*, PC Structure 3.

0 10 20 mm

Serpentine is a relatively soft stone and not difficult to work. There is no evidence, however, that the abrasives or technology necessary to work jade, an extremely hard and tough stone, were present at Chalcatzingo. The finding of serpentine drill cores is the strongest evidence for assuming that at Chalcatzingo serpentine and other soft stones were worked into artifacts. Serpentine was in broad use at the site, and artifacts of serpentine occur in every category of artifact except the *pulidor*.

***Pulidores* (5 specimens)**

The *pulidores* at Chalcatzingo are the single exception to the generalization that the range of fine stones employed was green or greenish. The material of some *pulidores* is hard and translucent with a brown to orange hue.

The *pulidores* (Fig. 17.13) are so called because it was originally thought that they were tools and that their facets derived from abrasion in a number of different planes as the stones were worked against other materials. The faceting patterns on the five examples from Chalcatzingo are all different. The bodies of the four complete specimens are cut into twelve, six, five, and seven facets. It is my opinion that these were magical stones used by shamans for divination. One specimen was recovered by Vaillant at Zacatenco (1930: Pl. 61, bottom row, no. 2). They have also been found at Tlatilco (Tolstoy 1971b: 291) and are said to occur at sites in Guerrero.

***Discs* (9 specimens)**

Two types of thin greenstone discs occur at Chalcatzingo. The first type, mosaic discs, is only probable, for the evidence consists of two wedge-shaped jadeite pieces which were apparently part of such mosaic discs. One of the specimens (Fig. 17.14*c*) was found within the looted tomb on PC Structure 4 (Chapter 4); it is made of fine imperial green jadeite. The second example (Fig. 17.14*d*) was recovered from PC Structure 3 excavations.

The second disc type is a thin circular disc (e.g., Fig. 17.14*a–b*). Among these greenstone discs, the earliest occur in Late Barranca subphase contexts. The small circular discs are reminiscent of and possibly predecessors to Classic and Postclassic Maya jade discs.

However, most of the discs at Chalcatzingo differ from Maya discs in an essential regard: only two are pierced. Maya jade discs are invariably pierced for suspension or attachment, usually through the center and again at one edge (Proskouriakoff 1974: Pl. 35).

***Miscellaneous and Worked Stone* (48 specimens)**

Miscellaneous stone artifacts are not discussed here. Stone fragments showing signs of workmanship (forty-one specimens) include imperial green jadeite, Chalcatzingo mottled jadeite, chrysoprase, chalcedony, basalt, volcanic tuff, schist, pink quartz, serpentine, and other materials. These worked stones did not cluster in any part of the site that might have been interpreted as a workshop area.

CONCLUSIONS

Some of the lapidary work of Chalcatzingo, like the relief carvings on rock faces of the Cerro Chalcatzingo, shows relationships to the Olmec culture of the Gulf Coast. The nature and degree of relationship can be assessed along six lines of inquiry: the materials of the Chalcatzingo artifacts, their forms, their context, their workmanship, their abundance, and their time of deposition.

The forms of some of the Chalcatzingo jade and stone ornaments (lobed beads, duck-billed pendants, spoon pendants, the standing Olmec figure, and the torso of a seated figure) have direct counterparts in the burial artifacts at La Venta. The context for these objects is also a mortuary context. The workmanship of the Chalcatzingo stone artifacts might yield clues of relationship to Olmec artifacts if the La Venta and Chalcatzingo assemblages could be studied together.

The material of the Chalcatzingo fine

stone artifacts is the same as that of the La Venta grave goods. Specifically, the fine imperial green jade with cracked surface, the blue-green "Costa Rican" jade, and the use of lesser stones like fuchsite, chrysoprase, and chalcedony is the same at both sites. I believe that three Olmec figures from La Venta Offering 4, now in the Smithsonian Institution in Washington, D.C., are made of the stone I have called Chalcatzingo mottled jadeite. Thus, the inhabitants of Chalcatzingo during the Middle Formative were connected to the same supply mechanism for fine stones that served La Venta.

The time of burial of the jade and stone carvings at Chalcatzingo, mostly during the Cantera phase (700–500 BC), accords well with the time of deposition of similar artifacts at La Venta. The quantity of jade and fine stone encountered at Chalcatzingo, however, marks it as a minor provincial site, if La Venta is taken as the standard for the volume of stone in trade at this time. No jade celts, worked blocks of stone, or lavish offerings of jade were encountered at Chalcatzingo. The actual volume of excavated jade is very small.

Thus, if the jade and stone work excavated at Chalcatzingo is taken as an indicator of the site's importance in the Middle Formative, it would appear that the site was of minor religious and economic importance in the Olmec sphere of influence, though a consumer of Olmec forms and materials as evidenced by their appearance in the site's graves of that period.

RESUMEN DEL CAPÍTULO 17

Casi 400 piezas de jade y piedra preciosa fueron recobradas in Chalcatzingo. De éstas, 146 resultaron ser de jadeita, incluyendo una variedad llamada "jadeita moteada Chalcatzingo." Otras materias primas identificadas fueron la fusita, la crysoprasa, la calcedonia, y la serpentina. Se encontró poca evidencia en el patrón de uso de distintos materiales para artefactos específicos con excepción de la serpentina y la fusita, las cuales se emplearon principalmente en la manufactura de orejeras delgadas. La mayoría de los artefactos de piedra verde se recobraron de contextos ajenos a enterramientos, pero los objetos de mayor calidad provienen de las tumbas de la fase Cantera.

Los artefactos de piedra verde se clasificaron en las siguientes categorías: figuras, pendientes, orejeras, cuentas, herramientas, puntas de barreno, pulidores, miscelánea, y piedras parcialmente trabajadas. De las tres figuras de piedra, una es definitivamente de estilo olmeca (Cat. 73.1) aún cuando difiere levemente de las figuras olmecas de la costa del Golfo tales como las de la Ofrenda 4 en La Venta. Se recobró del Entierro 33 en cripta. Otras figuras de piedra fina son el torso de un hombre sentado, cuya posición es semejante a la del arte monumental olmeca, y una cabeza pequeña de piedra típica del Clásico teotihuacano.

Los pendientes presentan una variedad de formas, algunos muy semejantes a los artefactos de La Venta, p.e., pendientes de colmillo, un pendiente de pico de pato, y dos pendientes "cuchara" en forma T. *También se encontraron un pendiente en forma de mono bien hecho, y seis "hachas" pendientes los cuales presentan incisiones de figuras antropomórficas crudas mediante el empleo de la técnica del período Clásico.*

Fueron encontrados cerca de cien orejeras y fragmentos casi todos del Formativo Medio, la mayoría de los cuales son de la variedad "papel delgado," y la minoría con el ensanchamiento común. Las orejeras delgadas presentaron todas estado fragmentario, y casi todas fueron recobradas de contextos ajenos a entierro. Las orejeras comunes, por otra parte, se encontraron más frecuentemente asociadas a entierros y algunas estaban intactas.

Las 145 cuentas presentaron fundamentalmente forma subesférica aun cuando ocurrieron también en otras formas. Casi todas las cuentas, muchas de las cuales son de jadeita verde imperial fina, fueron encontradas en los dos entierros de alto rango en PC Str. 4, y las llevaban puestas los difuntos al momento de ser enterrados.

Las herramientas de piedra verde incluyen azuelas, hachas (Postclásico), puntas de lezna, sierras de desgastar, y posibles piedras para pulir. Algunas de estas herramientas pueden haber sido usadas para hacer otros objetos de piedra verde, y junto con los cilindros del hueco perferado constituyen buen testimonio de que algunos objetos de piedra finos se hacían en el sitio. Las puntas de lezna pudieron no haber servido como herramientas sino como artefactos para el sangrado ritual. Los llamados pulidores probablemente no fueron herramientas, sino que sirvieron también un propósito ritual.

Los discos de piedra verde ocurren como discos delgados completos y como secciones de disco, aparentemente parte de un mosaico. A diferencia de los discos mayas, no están agujereados y por ello su función es incierta (p.e., como adorno).

Casi todo el jade de Chalcatzingo se presenta en contextos del Formativo Medio, el mismo período cuando el jade se usó con mayor intensidad en La Venta. Las materias primas en Chalcatzingo parecen ser las mismas que se encontraron en la costa del Golfo, y las formas y los estilos con frecuencia son semejantes; sin embargo la cantidad de los objetos de piedra verde en Chalcatzingo es muy pequeña comparada con La Venta.

18. Middle Formative Lithic Industries at Chalcatzingo

SUSAN S. BURTON

At a site such as Chalcatzingo, with a complex and lengthy depositional history, it is often difficult to establish basic functional interpretations for specific site areas. Yet such interpretations are needed as a foundation for higher-level socio-economic inferences. With this problem in mind, the Chalcatzingo chipped stone analysis was undertaken not only to provide basic descriptive information but also to explore the possible usefulness of lithic data in supporting and amplifying intrasite functional interpretations. The analysis presented here is of an exploratory nature. It is explicitly designed as a rapid survey of selected features of the chipped stone collection. The results, it is hoped, will indicate the general value of such data at this kind of site.

The chapter is divided into two parts. The first is a description of the classes of lithic artifacts present in the collection. The second is the analysis of the artifacts in terms of intrasite functional variability. Supplementary data on the lithic artifacts are contained in Appendix G.

DESCRIPTION OF THE GENERAL LITHIC COLLECTION

Selection of the Sample

Selected chipped stone materials were analyzed to provide basic descriptive information regarding the Middle Formative lithic industries at Chalcatzingo. Selection of a statistically controlled sample of lithic specimens from the very large quantity of material recovered during the excavations at Chalcatzingo was not feasible and, given the limited aims of this study, did not seem necessary. Instead, a purposive sample was selected from areas where functional and chronological inferences were available based on other types of data. The first basis for sample selection was an association with ceramics dated to the Cantera phase. Within this context, materials were selected from several functionally distinct situations. One Barranca phase sample from T-9B was included for its comparative value.

Unfortunately, the Chalcatzingo excavations seldom yielded clearly definable house floors; however, a number of probable domestic structures were excavated, and possible floor levels and associated activity areas were identified. The analyzed lithic collections from Terraces 9A, 9B, 11, 23, and 24 were derived from such loci. Specifically, the collections from T-9A, T-9B, and T-23 are from possible floor levels within domestic structures. The T-11 collection came from a possible interior floor level and outside activity areas immediately adjacent to the structure on that terrace. Materials from T-24 came from an activity area and trash deposit probably associated with the domestic structure.

Samples were also drawn from more specialized areas. Materials were selected from the levels associated with the construction and use of the stone altar on T-25 and from the probable elite house structure, PC Structure 1. The PC Structure 1 sample came from the upper levels, which included the subfloor burials, and from the crypt burials and trash deposits.

The remaining analyzed collections represent less easily characterized areas. Materials from two features on T-37 were analyzed. The first of these, the concentration of obsidian workshop debris (T-37ob), is the subject of Chapter 19; however, description of tools from the concentration will be included here. The second collection (T-37fea) was derived from a presumed outside activity area evidenced by a line of three postholes cut into the floor of a bedrock depression. Materials were also selected from the possible ceramic manufacturing area on S-39 (see Chapter 16). The analyzed S-39 sample came from an activity area (possible house floor) and trash areas in the vicinity of the large lime deposit on that terrace.

Analytical Methods

The analysis of the lithic sample, which was carried out entirely on the macroscopic level, combined a basic descriptive classification with the recording of a small series of tool attributes selected for their potential functional significance. For each provenience unit, the chipped stone materials were initially divided on the basis of raw material type, obsidian vs. chert. Within each of these raw material categories, the assemblages were sorted into a series of general morphological classes: blades, flakes, cores, other debris (including chunks, chips), and modified pieces. Cores were further subdivided into a series of morphological subclasses linked with different technological approaches to flake/blade production. Certain specialized blade and flake types (i.e., crested blades, core recovery flakes, core platform rejuvenation flakes) directly related to reduction of obsidian blade cores were also identified as special subclasses. (See Chapter 19 for definitions of these types.)

Modified pieces are defined as lithic items showing macroscopic evidence of modification (i.e., chipping, grinding, crushing, and battering) through use as tools and/or through intentional retouch. The more cumbersome term "modified piece" is used here rather than the simpler "tool" because the analyzed sample includes large quantities of unmodified obsidian blades. The blade industry here and throughout Mesoamerican prehistory was a highly developed technological process which yielded a very high proportion of usable cutting edges as a direct product of core reduction. The vast majority of the blade fragments in the Chalcatzingo collection show no macroscopic evidence of use, but all have or at least once had extremely sharp cutting edges and thus may have functioned as tools or parts of tools. Blades used on soft materials which did not cause obvious damage to the working edges would show no direct evidence of use as tools. It is important then to realize that the class "modified pieces" probably includes only a fraction of the actual "tools" present in the Chalcatzingo lithic sample.

Modified pieces were divided into two major subclasses identified as "shaped" and "edge-modified." Shaped pieces have been retouched extensively enough that the overall outline of the original tool blank (blade, flake, core fragment, etc.) has been modified. Virtually all the shaped pieces in the analyzed Chalcatzingo collection show some attempt at a finished product with bilateral symmetry. However, it is the extent of retouching and shaping, rather than the occurrence of bilateral symmetry, which defines this subclass. Edge-modified pieces are chipped stone items which have not undergone overall shaping of the basic tool blank. Instead, the blank in large part retains its original form, and only an individual edge or edges have been worked. Edge modification on these pieces may be entirely the result of use or may involve intentional retouching designed to shape or sharpen the working edge. Within these two major subclasses, shaped and edge-modified, the analyzed pieces were further divided into a series of general morphological categories based on the extent, positioning, and general nature of the modification.

Edge-modified pieces were divided into a series of categories on the basis of tool blank type (i.e., blade, flake, chunk, core). Each of these was then further divided into subcategories on the basis of certain working edge characteristics: (1) utilization, (2) retouch, (3) grinding, and (4) battering. An individual edge-modified piece might have several working edges, and these edges might fall into different subcategories. Each working edge was analyzed independently. See Appendix G for a more detailed description of these categories.

Seven categories of shaped modified pieces were found to be useful in the analysis of the Chalcatzingo lithic sample: projectile points, drill-like pieces, wedge-shaped pieces, coarsely shaped pieces, finely retouched blades, other shaped blades, and unidentifiable shaped pieces. In general, an effort was made to avoid functional labels for these categories, although two which seem meaningful (projectile points and drill-like pieces) were used. The defining characteristics of each of these categories are outlined in Appendix G.

In addition to the morphological classification, a number of individual attributes were recorded for each modified piece. The attributes, all assumed to have functional significance, related to the working edges and included edge angle (measured in 5° intervals), edge shape, type of modification, and depth of chipping. These data are summarized in Appendix G.

Discussion

Grey obsidian, often with dark banding, is the dominant lithic raw material in the chipped stone collection analyzed from Chalcatzingo (see Chapter 23 for source analysis data). The principal products of the obsidian industry were prismatic blades, which occur in substantial quantities in all areas sampled (see Appendix G).

Obsidian flakes also occur throughout the site, both as debitage and as modified pieces; however, no obsidian flake cores were identified in the collection.This suggests that rather than being a primary product of core reduction, the entire obsidian flake assemblage was the result of blade core preforming and trimming. Excluding the T-37 obsidian concentration which is the subject of a separate discussion, some 20 percent of the flake debitage in the collection consists of flake types (core platform rejuvenation flakes and core recovery flakes) which are clear products of blade core trimming. The remaining 80 percent presumably includes waste from core preforming and possibly additional unidentified trimming flakes.

Although not universally present, obsidian blade cores occur in many areas of the site, and the analyzed obsidian collection includes a wide variety of modified tools. A more detailed discussion of these cores and artifacts is found in Appendix G. Table 18.1 provides data on distribution of obsidian blades, cores, and flakes. Distributional data for the modified obsidian artifacts are given in Table 18.2 (edge-modified pieces) and Table 18.3 (shaped pieces).

Although nowhere abundant, chert cores, debitage, and tools occur in all areas of Chalcatzingo included in the analyzed lithic sample (see Table 18.4). The raw material involved is variable, ranging in texture from coarse, quartzitic types to very fine, lustrous examples. Color is also variable, including dark to light grey, white, grey-blue, pink, dark red, and occasional yellows, oranges, and browns. The most common materials are light grey to white with a smooth but lusterless surface texture. It is presumed that this chert was obtained locally, although the total sample may not derive from the chert source in the southern valley (Chapters 21, 23; Appendix H, RAS-108).

Although not universally present, chert flake cores occur in most areas of the site and, in fact, are almost as numerous as obsidian blade cores. Excluding the special situation of T-37ob, the analyzed collection includes thirty-nine obsidian blade cores and fragments (twenty discarded and nineteen used as tools), while there are thirty-six chert flake cores. However, despite the relative frequency of chert cores, chert debitage and tools make up a much smaller proportion of the entire collection than do their obsidian counterparts. Of the total cores in the collection (N = 75), 48 percent are chert, but only seventeen percent of the total debitage (N = 4,652) and eleven percent of the modified pieces (N = 858) are chert. Although other factors such as patterns of core disposal may be involved, the different core-to-debitage ratios indicated here clearly reflect the more efficient use of raw material inherent in blade production.

The distribution of modified chert pieces is given in Table 18.5 for both edge-modified and shaped artifacts. Shaped chert tools are rare in the analyzed Chalcatzingo collection, and only three of the seven categories defined for obsidian artifacts are represented in chert.

The two chipped stone industries at Chalcatzingo are obviously very different in magnitude. Although the numbers of obsidian and chert cores in the analyzed collection are remarkably similar, in all other aspects obsidian is overwhelmingly dominant. Specifically, excluding the T-37 obsidian concentration, some 2,513 obsidian blades and 1,328 pieces of debitage compare with only 811 items of chert debitage. Among modified pieces, including those from T-37ob, edge-modified obsidian items number 610 with a total of 977 working edges, while there are only 84 chert pieces with just 98 working edges. The

Table 18.1. Obsidian Cores, Blades, and Debitage in the Analyzed Lithic Collection from Chalcatzingo[a]

Provenience	Blade Cores	Blades	Crested Blades	Core Platform Rejuvenation Flakes	Core Recovery Flakes	Other Flakes	Other Debris (Chunks)	Totals
PC Str. 1	5	942	3	18	46	226	40	1,280
T-9A	1	30	1	1	0	11	1	45
T-9B	0	46	0	3	5	10	4	68
T-11	0	20	0	1	1	4	3	29
T-23	1	176	1	14	14	63	9	278
T-24	12	1,060	3	49	47	541	34	1,746
T-25	1	133	2	7	10	34	9	196
T-37fea	0	24	0	1	5	9	1	40
S-39	0	82	0	13	12	67	5	179
Totals	20	2,513	10	107	140	965	106	3,861

[a]T-37 obsidian concentration not included.

Table 18.2. Distribution of Edge-Modified Obsidian Pieces by Working Edges in the Analyzed Lithic Collection from Chalcatzingo

	Working Edges on Blades				Working Edges on Flakes				Working Edges on Chunks			Working Edges on Blade Cores			
Provenience	U	R	G	Sub-totals	U	R	G	Sub-totals	U	R	Sub-totals	R	B	Sub-totals	Totals
PC Str. 1	114	0	8	122	38	19	3	60	0	3	3	0	7	7	192
T-9A	43	0	0	43	0	0	0	0	0	0	0	0	0	0	43
T-9B	43	0	0	43	10	2	0	12	0	0	0	0	0	0	55
T-11	24	3	3	30	1	0	0	1	0	0	0	0	0	0	31
T-23	117	1	7	125	12	7	0	19	1	1	2	0	0	0	146
T-24	12	0	1	13	9	14	0	23	0	0	0	0	0	0	36
T-25	140	4	6	150	45	7	3	55	0	0	0	1	1	2	207
T-37fea	5	0	0	5	0	1	0	1	0	0	0	0	0	0	6
T-37ob	25	2	0	27	9	5	0	14	0	0	0	0	0	0	41
S-39	92	2	89	183	20	6	11	37	0	0	0	0	0	0	220
Totals	615	12	114	741	144	61	17	222	1	4	5	1	8	9	977

U = utilized; R = retouched; G = ground; B = battered.

Table 18.3. Distribution of Shaped Obsidian Tools in the Analyzed Lithic Collection from Chalcatzingo

					Finely Retouched Blades				
Provenience	Projectile Points	Drill-like Pieces	Wedge-Shaped Pieces	Coarsely Shaped Pieces	Bi-Pointed	Constricted	Other Shaped Blades	Unidentifiable Shaped Pieces	Totals
PC Str. 1	20	2	5	19	3	1	10	4	64
T-9A	1	0	0	1	0	0	0	0	2
T-9B	2	0	0	2	0	0	0	0	4
T-11	1	0	0	4	0	0	1	0	6
T-23	0	0	1	13	1	2	1	3	21
T-24	8	2	3	5	2	2	7	2	31
T-25	5	1	3	11	4	0	1	0	25
T-37fea	0	0	0	1	0	0	0	0	1
T-37ob	2	3	1	6	0	1	3	3	19
S-39	0	2	0	20	1	6	2	1	32
Totals	39	10	13	82	11	12	25	13	205

Table 18.4. **Chert Cores and Debitage in the Analyzed Lithic Collection from Chalcatzingo**[a]

Provenience	Blocky Flake Cores	Prepared Flake Cores	Flakes	Chunks	Totals
PC Str. 1	5	3	235	59	302
T-9A	0	0	41	5	46
T-9B	1	3	20	4	28
T-11	0	0	22	30	52
T-23	0	0	40	10	50
T-24	9	1	154	33	197
T-25	1	1	14	6	22
T-37fea	1	0	26	4	31
S-39	11	0	91	17	119
Totals	28	8	643	168	847

[a]T-37 obsidian concentration not included.

Table 18.5. **Distribution of Modified Chert Pieces in the Analyzed Lithic Collection from Chalcatzingo**

	Edge-Modified Pieces (Number of Working Edges)								Shaped Pieces			
	Flakes				Chunks							
Provenience	U	R	G	Subtotals	U	R	Subtotals	Totals	PP	CS	US	Totals
PC Str. 1	7	7	0	14	0	2	2	16	1	0	1	2
T-9A	2	1	0	3	1	0	1	4	0	0	0	0
T-9B	2	4	0	6	0	0	0	6	0	0	0	0
T-11	4	1	0	5	0	0	0	5	0	0	0	0
T-23	2	1	0	3	0	0	0	3	0	1	0	1
T-24	8	6	0	14	0	1	1	15	1	0	2	3
T-25	7	2	0	9	0	0	0	9	1	0	0	1
T-37fea	2	0	0	2	0	1	1	3	0	0	0	0
T-37ob	1	1	0	2	0	1	1	3	0	0	1	1
S-39	10	11	13	34	0	0	0	34	0	4	0	4
Totals	45	34	13	92	1	5	6	98	3	5	4	12

U = utilized; R = retouched; G = ground; PP = projectile points; CS = coarsely shaped pieces; US = unidentifiable shaped pieces.

contrast in shaped pieces is similar, with 205 obsidian items as opposed to only 12 chert tools.

Unmodified obsidian blades are by far the largest component in the analyzed lithic collection, outnumbering the next most frequent lithic category (i.e., all obsidian flakes) by nearly two to one. They clearly were the principal available source of useful working edges, and it is assumed that many or most of the apparently unmodified specimens were, in fact, used as tools. The importance of blades as tools is also evident in the fact that they are the dominant blanks for both edge-modified and shaped tools.

The dominant modified tool form is the edge-modified item with utilized working edge. There are 760 such edges on obsidian blanks and 46 in chert for a total of 806 utilized edges. Edge-modified items with a ground edge are next in importance, with 131 obsidian and 13 chert or a total of 144 edges. Although the least frequent of the edge-modified pieces, items with a retouched edge still outnumber any of the categories of shaped tools. There are a total of 117 retouched edges, including 78 obsidian and 39 chert. (Note: The figures cited here refer to working edges. Many of the 694 edge-modified pieces have more than one such edge.)

Among the 217 shaped tools, coarsely shaped pieces ($N = 87$) are decidedly the most frequent items, accounting for 40 percent of the total. Projectile points ($N = 42$) make up 19 percent of the shaped pieces, and the remaining categories vary from 12 percent to 5 percent of the total. Among the latter, finely retouched blades ($N = 23$) and other shaped blades ($N = 25$) are the most substantial categories. With the exception of tool categories requiring blades as tool blanks, chert and obsidian seem to have been used in the same general manner for shaped tools although chert was obviously of very minor importance.

ANALYSIS OF THE SAMPLE LITHIC ASSEMBLAGES

The analyzed lithic collection was selected from a series of terrace areas which appear to fall into several functionally distinct categories. As stated previously, with one exception, all were drawn from Cantera phase contexts in order to hold constant possible temporal variability in the chipped stone materials. The exception, the T-9B sample, is derived from a Barranca phase residential structure and was included for comparative purposes. Preliminary functional assignments for the selected loci were based upon observations, primarily of architectural and ceramic data, made during excavation and laboratory analyses.

Using these functional assignments as a starting point, the present analysis begins by outlining certain logical possibilities or expectations regarding the lithic tool kits from the sampled loci. The overall contents of the various assemblages are then compared, and the results are related back to the expectations outlined here.

Expected Tool Kit Characteristics

Five of the sampled loci, T-9A, T-9B, T-11, T-23, and T-24, were identified as common residential areas on agricultural terraces (specifically, house floors and adjacent outside activity areas). A wide variety of activities would be expected for such loci, including, for example, food processing and preparation, manufacture and maintenance of clothing and household furnishings, maintenance and possibly some manufacture of agricultural implements and other household tools, and so on. It is expected that this range of activities would be reflected in the lithic assemblages in the following manner:

1. Relatively diverse assemblages. This is the logical adjunct of the wide variety of activities expected for these loci.

2. Emphasis on general-purpose tools. The wide variety of tasks to be performed should encourage the use of general-purpose items such as coarsely shaped tools and edge-modified blades and flakes with simple utilized working edges. More highly specialized items suited to single tasks may be present but are not likely to occur in quantity.

3. Debitage and possibly flake cores in moderate quantity. Obsidian blade manufacture was almost certainly a specialized activity which did not take place on the individual household level; however, other aspects of tool manufacture, hafting, and maintenance (resharpening, reshaping) may very well have taken place at these loci.

The other sampled loci are presumed to have been devoted to more specialized activities. PC Structure 1 is defined as an elite residence, the altar area of T-25 is an apparent ceremonial location, the obsidian concentration on T-37 (T-37ob) has been identified as a trash deposit from a blade manufacturing workshop, and S-39 may have been a ceramic manufacturing area. Although no specific function could be assigned to it, the posthole feature on T-37 (T-37fea) has no clear connection with a domestic structure and thus is grouped with the special-activity loci. The narrower range of activities expected at these locations would be reflected in the lithic assemblages as follows:

1. More restricted assemblages. This is the logical adjunct of the supposition that each of these loci was devoted to a delimited ceremonial, craft, or other activity or closely related set of activities.

2. Potential emphasis on special-purpose tools. The need for special-purpose tools would, of course, be dependent on the actual activity being carried out; however, such tools (e.g., finely retouched blades, edge-modified pieces with ground edges) are more likely in specialized assemblages.

3. Debitage potentially either very important or very scarce. Once again the actual activity being performed is crucial here. Lithic manufacturing areas should show very high proportions of debitage, but there should be other areas where tool manufacture is very unlikely (e.g., elite residences, ceremonial loci) and debitage is only a very minor component of the assemblage.

On the basis of the expectations outlined for common residential and special-activity tool kits, it is presumed that the two sets of assemblages will be significantly different. It is also expected that the residential collections will tend to share the same generalized tool kit. On the other hand, unless closely related activities are involved, the special-activity assemblages are expected to differ from each other as well as from the common residential materials.

Comparison of Assemblages

The ten lithic assemblages included in the chipped stone sample are evaluated here on the basis of a series of twelve general variables. First, the assemblages are compared on an individual variable-by-variable basis, and then a summary of these results is used to produce groupings of like assemblages.

As an initial analytical step, for each assemblage the relative proportions of each attribute state defined for a given variable were calculated, and the results were plotted as a simple line graph. Percentages rather than absolute frequencies were used because assemblage size varies so widely. The array of graphs illustrating the attributes of a particular variable for the ten assemblages were then visually compared, and assemblages which showed similar overall profiles were grouped together. The graphic comparisons for each of the twelve variables are outlined below. The basic data upon which the graphs are based are provided in Appendix G (Tables G.8–G.19).

Variable 1: Raw Material

Two attribute states are defined for the first variable, obsidian and chert, and all analyzed lithic items are included in the tabulations. The resulting graphs tend to form a continuum but may be divided into three classes (Fig. 18.1). In the first class, obsidian is highly dominant (over 80 percent): PC Str. 1, T-23, T-24, T-25, T-37ob. In the second, obsidian is still dominant but more moderately so (ca. 70 percent): T-9B, S-39. In the third class, the two raw material types are close to being equal in importance: T-9A, T-11, T-37fea.

Variable 2: General Assemblage Composition, Obsidian

The three attribute states defined for Variable 2 are modified pieces (including all edge-modified and shaped tools), unmodified blades, and debitage and cores. Again, three classes are observed (Fig. 18.2). In the first class, unmodified blades are clearly the most important feature of the assemblages: PC Str. 1, T-23, T-24, T-37ob, T-37fea. In the second, unmodified blades and modified pieces are roughly equal in importance, and both are more significant than cores and debitage: T-9A, T-9B, T-11, T-25. In the third, modified pieces are the dominant category with blades and debitage of lesser and roughly equal importance: S-39.

Variable 3: General Assemblage Composition, Chert

Variable 3, the chert complement of Variable 2, includes two attribute states, modified pieces and debitage/cores. There is very little variation among assemblages, but two classes are indicated (Fig. 18.3). In the first, the proportion of modified pieces is very low (15 percent or less): PC Str. 1, T-9A, T-9B, T-11, T-23, T-24, T-37ob, T-37fea. In the second, modified pieces are more significant (20–30 percent): T-25, S-39.

Variable 4: Lithic Workshop Identifiers

The six attribute states defined for Variable 4 include: unmodified obsidian

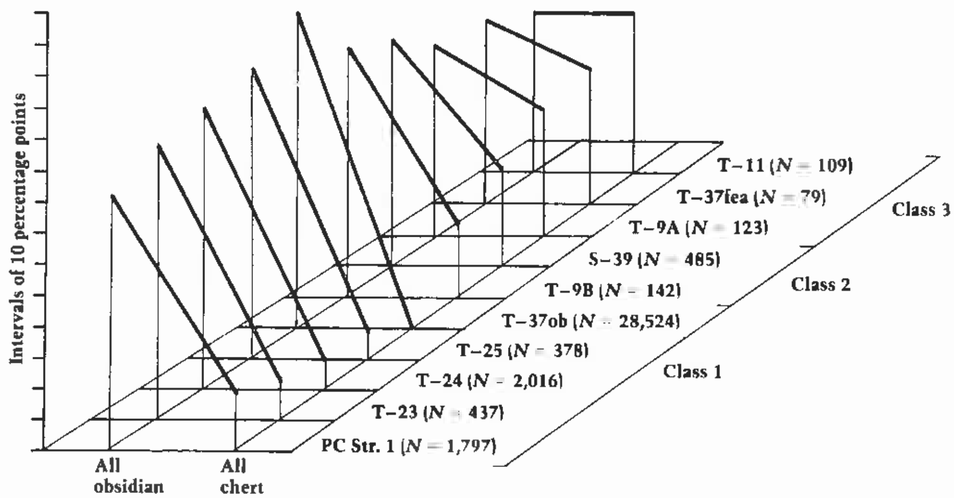

Figure 18.1. Comparison of Chalcatzingo lithic assemblages for Variable 1, raw material.

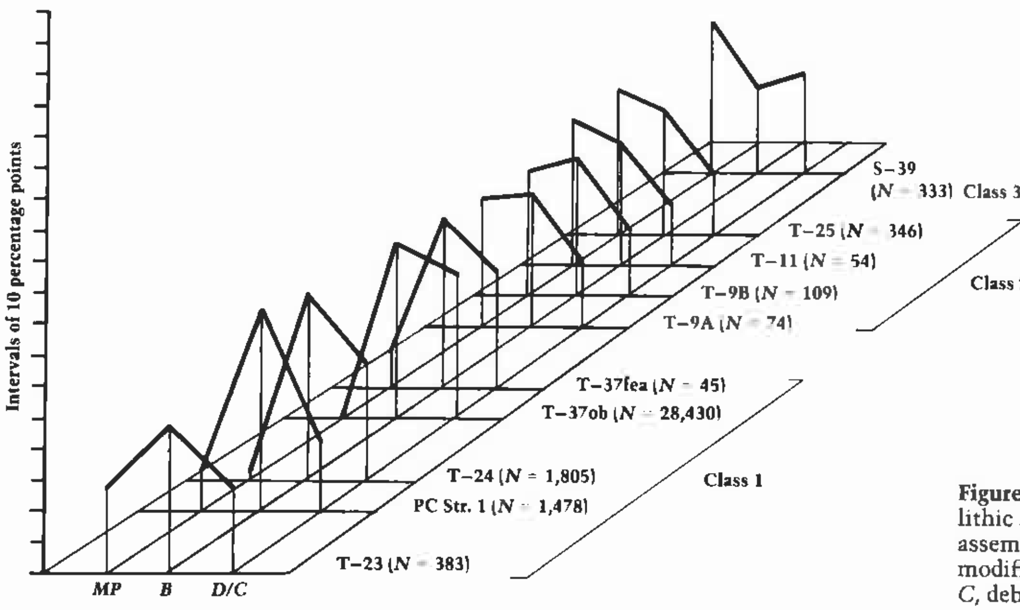

Figure 18.2. Comparison of Chalcatzingo lithic assemblages for Variable 2, general assemblage composition, obsidian: *MP*, all modified pieces; *B*, unmodified blades; *D/C*, debitage and cores.

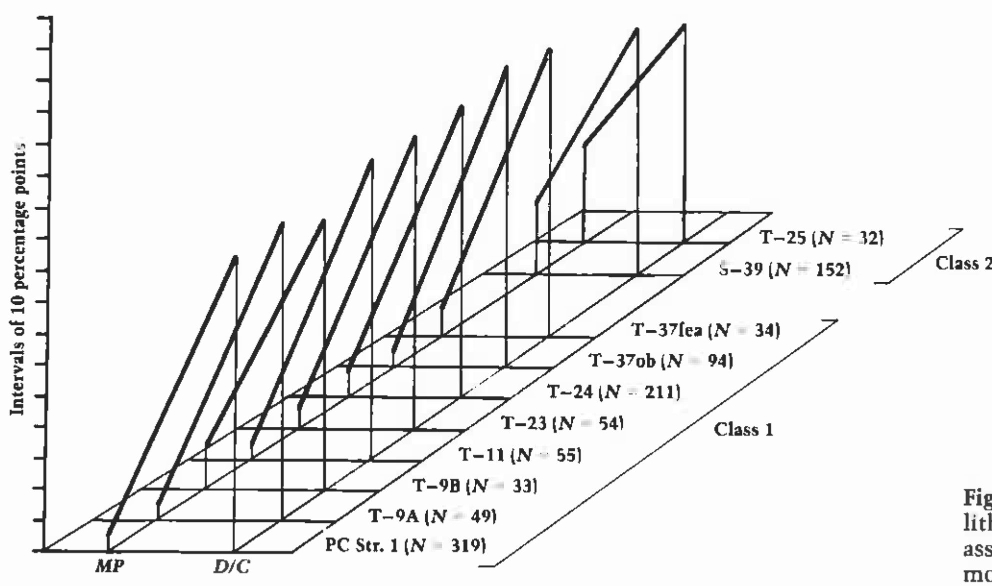

Figure 18.3. Comparison of Chalcatzingo lithic assemblages for Variable 3, general assemblage composition, chert: *MP*, all modified pieces; *D/C*, debitage and cores.

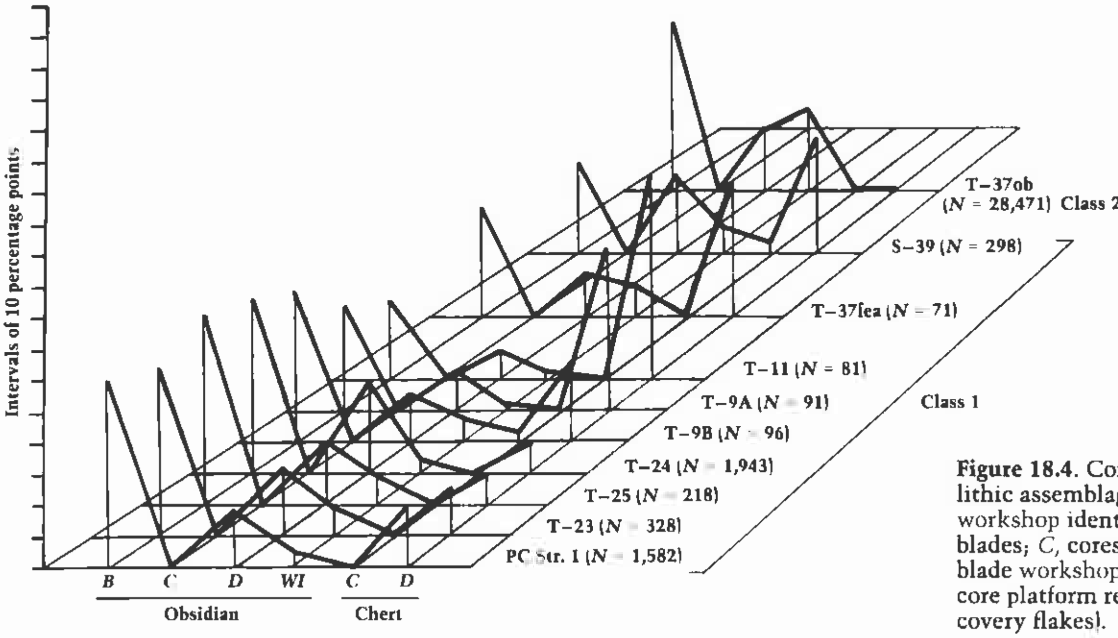

Figure 18.4. Comparison of Chalcatzingo lithic assemblages for Variable 4, lithic workshop identifiers: *B*, unmodified blades; *C*, cores; *D*, general debitage; *WI*, blade workshop identifiers (crested blades, core platform rejuvenation flakes, core recovery flakes).

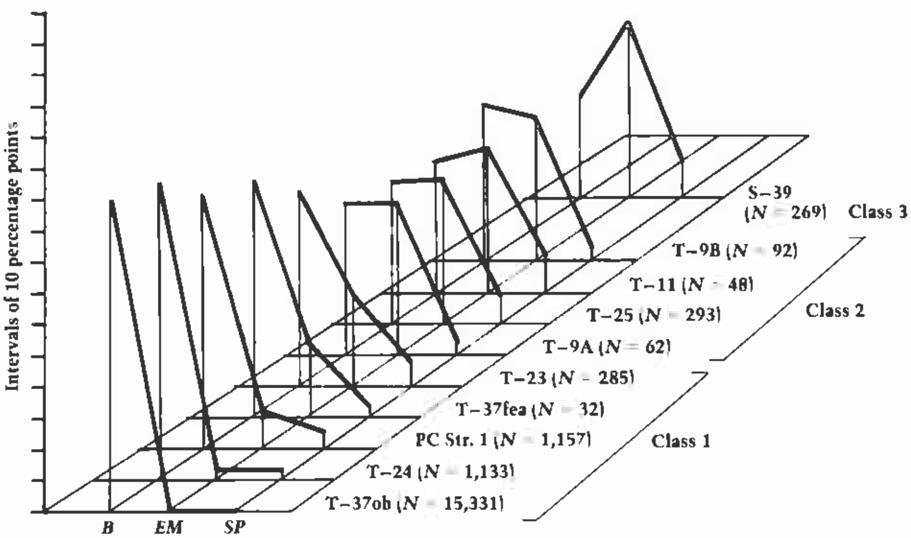

Figure 18.5. Comparison of Chalcatzingo lithic assemblages for Variable 5, general tool classes: *B*, unmodified blades; *EM*, edge-modified pieces; *SP*, shaped modified pieces.

blades, obsidian cores, general obsidian debitage, obsidian debitage directly relatable to blade manufacture (i.e., crested blades, core platform rejuvenation flakes, and core recovery flakes), chert cores, and chert debitage. The relative importance of obsidian cores, blade manufacturing debitage, and chert cores are the significant features here. Since the overall distribution of obsidian and chert has already been examined (Variable 1), variability on that level is not considered here.

Only two classes are indicated by the graphs for Variable 4 (Fig. 18.4). For all sampled areas other than T-37ob, various workshop identifiers are an insignificant feature of the overall lithic assemblage. In contrast, although cores continue to be unimportant, obsidian debitage directly relatable to blade manufacture accounts for a substantial portion of the T-37ob assemblage.

The importance of blade workshop identifiers in the T-37 obsidian concentration will be discussed in some detail in Chapter 19. Variable 4 was included in the comparative analysis as a means of separating out other lithic manufacturing loci should they exist in the areas sampled.

Variable 5: General Tool Classes

The fifth variable contrasts unmodified blades with the two general modified tool classes. The three attribute states are unmodified blades, edge-modified pieces (including blades, flakes, chunks, and cores), and shaped modified pieces. Both raw material types are included in these figures. All unmodified blades are regarded as possible tools although the actual fact of their utilization cannot be established.

Comparison of the graphs for Variable 5 indicates three classes of assemblages (Fig. 18.5). In the first class, unmodified obsidian blades are clearly the dominant feature (over 60 percent), with both edge-modified and shaped pieces of little importance: PC Str. 1, T-23, T-24, T-37ob, T-37fea. In the second class, unmodified blades and edge-modified pieces are of roughly equal significance with shaped tools still a minor element: T-9A, T-9B, T-11, T-25. In the third class, although unmodified blades are an important feature of the assemblage, edge-modified pieces are the dominant tool class: S-39. Although still the smallest tool class in the S-39 collection, shaped pieces are slightly more important than elsewhere.

Variable 6: Modified Tool Classes

The sixth variable eliminates the unmodified blades to provide a closer look at the general modified tool classes. The three attribute states for Variable 6 are edge-modified blades, other edge-modified pieces (flakes, chunks, cores), and shaped modified pieces.

The graphs for this variable are summarized in five assemblage classes (Fig. 18.6). In the first class, edge-modified blades are clearly the dominant tool class with both other edge-modified pieces and shaped tools of minor importance: T-9A, T-11, T-23. Graphs for the second class show an almost straight downward progression from edge-modified pieces to shaped pieces: T-9B, T-25, S-39. In the third class, the graphs approximate a straight horizontal line with all three modified tool classes roughly equal: PC Str. 1, T-37ob. In the fourth class, the progression seen in the second group is essentially reversed. In this case the near straight-line progression moves upward from edge-modified blades to the dominant class, shaped pieces: T-24. In the fifth class, edge-modified blades and other edge-modified pieces are roughly equal in importance while the proportion of shaped pieces is very low: T-37fea. It should be noted that the sample size for T-37fea is very low (N = 8) making its evaluation here somewhat uncertain.

Variable 7: Shaped Tool Categories

The attribute states for Variable 7 are the seven shaped tool categories defined for the Chalcatzingo lithic sample: (1) projectile points, (2) drill-like pieces, (3) wedge-shaped pieces, (4) coarsely shaped pieces, (5) finely retouched blades, (6) other shaped blades, and (7) unidentifiable shaped pieces. The resulting graphs are summarized in three assemblage classes (Fig. 18.7). In the first class, although projectile points have some prom-

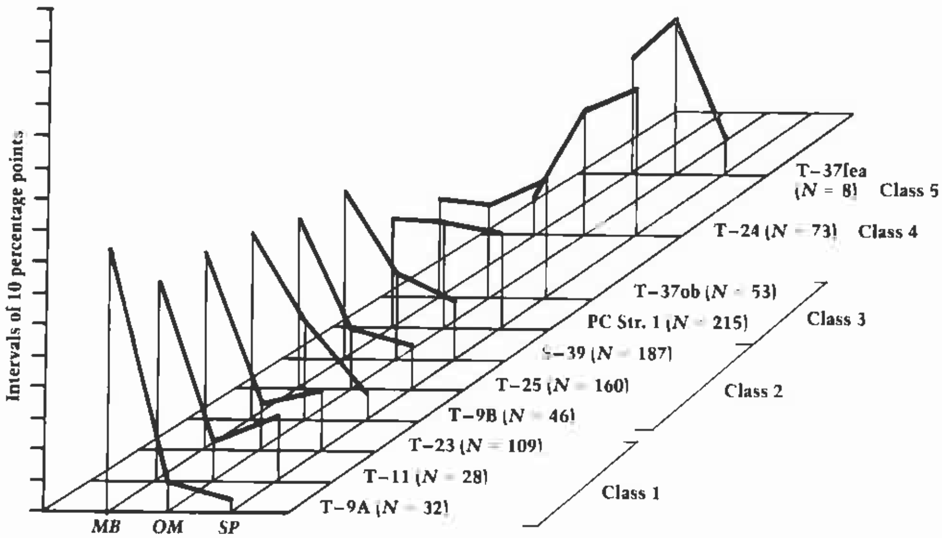

Figure 18.6. Comparison of Chalcatzingo lithic assemblages for Variable 6, modified tool classes: *MB*, edge-modified blades; *OM*, other edge-modified pieces (flakes, chunks, cores); *SP*, shaped modified pieces.

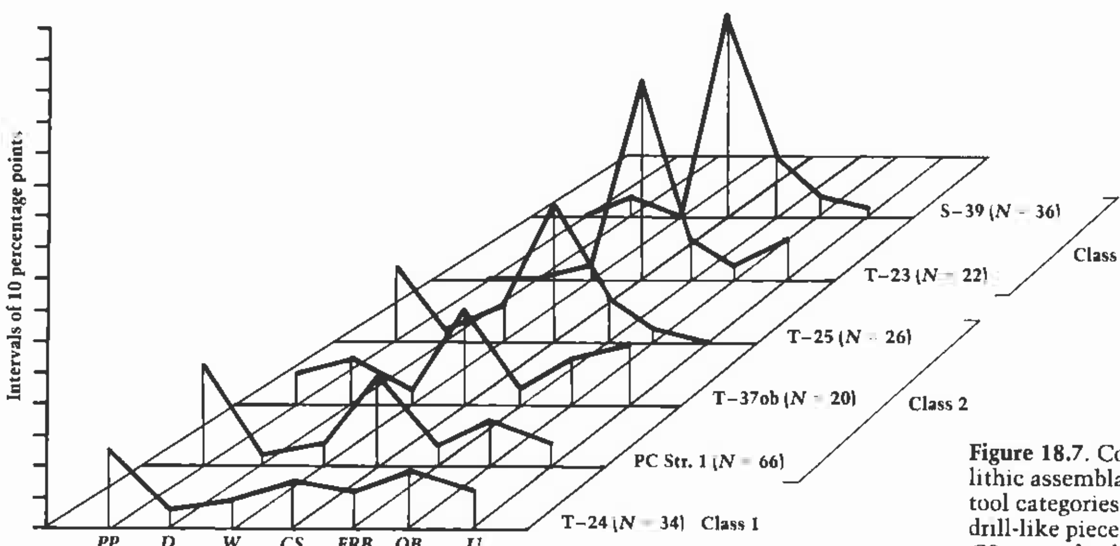

Figure 18.7. Comparison of Chalcatzingo lithic assemblages for Variable 7, shaped tool categories: *PP*, projectile points; *D*, drill-like pieces; *W*, wedge-shaped pieces; *CS*, coarsely shaped pieces; *FRB*, finely retouched blades; *OB*, other shaped blades; *U*, other unidentifiable shaped pieces. T-9A, T-9B, T-11, and T-37fea excluded because of small sample size.

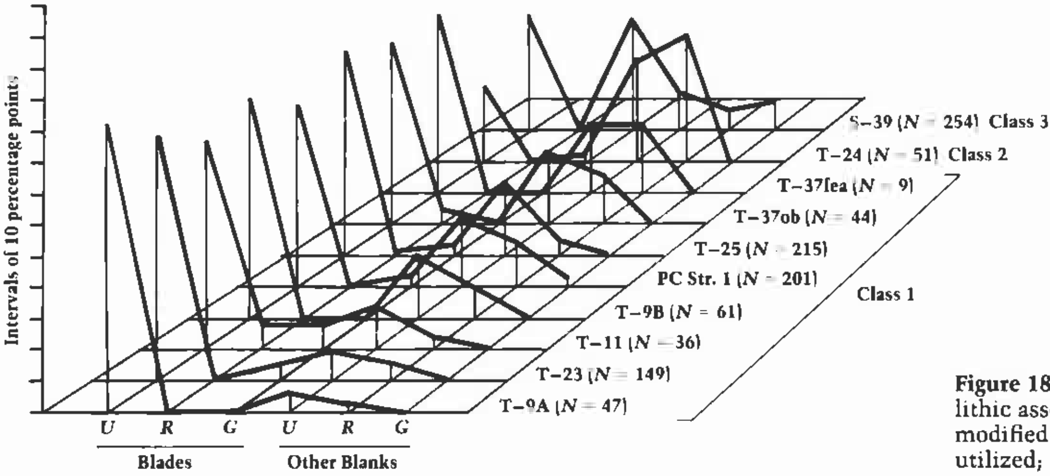

Figure 18.8. Comparison of Chalcatzingo lithic assemblages for Variable 8, edge-modified pieces, working edge types: *U*, utilized; *R*, retouched; *G*, ground.

inence, the graph approaches a horizontal line with all tool categories roughly equal in importance: T-24. In the second, coarsely shaped pieces and a second category (either projectile points or unidentified pieces) are of roughly equal importance with all others low: PC Str. 1, T-25, T-37ob. In the third class, coarsely shaped pieces make up the bulk of the sample (over 60 percent) with all other tool categories low: T-23, S-39. In four instances the shaped tool collections were too small to provide meaningful comparative data: T-9A (*N* = 2), T-9B (*N* = 4), T-11 (*N* = 6), T-37fea (*N* = 1).

Variable 8: Edge-Modified Pieces, Working Edge Types

The various working edge types defined for edge-modified pieces form the basis for Variable 8. The six attribute states used for comparison of assemblages include (1) utilized blade edges, (2) retouched blade edges, (3) ground blade edges, (4) utilized edges on other blanks (i.e., flakes, chunks, cores), (5) retouched edges on other blanks, and (6) ground edges on other blanks. Edges on blades were separated from edges on other types of pieces in order to get a fuller picture of assemblage composition. In order to avoid simply comparing relative proportions of blades and other pieces (see Variable 6), the definitions of assemblage classes for Variable 8 treat these two tool groups individually.

Three assemblage classes result from comparison of the graphs for Variable 8 (Fig. 18.8). The first class, which includes PC Str. 1, T-9A, T-9B, T-11, T-23, T-25, T-37ob, and T-37fea, is characterized as follows: (1) utilized blade edges are very important while the frequency of both retouched and ground blade edges is very low; (2) edge types on other pieces show a downhill progression from utilized to retouched to ground. The small size of the T-37fea collection (*N* = 9) makes it difficult to evaluate, and its inclusion in this class must be regarded as tentative.

The second class, which includes a single assemblage, T-24, differs only slightly from the first class: (1) blade edge distribution is like that of the first class; (2) on other types of pieces, retouched edges are slightly more important than utilized edges, while ground edges are again the least important type.

The third class also includes only a single assemblage, S-39; however, its characteristics are more markedly different than those of the other two classes: (1) ground blade edges equal utilized edges in importance while retouched blade edges are very scarce; (2) on other types of blanks, ground edges again nearly equal utilized edges while retouched edges are of minor importance.

Variable 9: Edge-Modified Pieces, Placement of Chipping

The four attribute states defined for Variable 9 include unifacial chipping on blades, bifacial chipping on blades, unifacial chipping on other blanks, and bifacial chipping on other blanks. Figures for utilized and retouched edges are combined in the examination of Variable 9. Again, the two major tool blank groups (blades and other types of pieces) are examined separately in the definition of assemblage classes.

Two classes result from the comparison of the graphs for this variable (Fig. 18.9). In the first, bifacial and unifacial chipping are of generally equal importance on blade edges while on other types of pieces unifacial chipping is the dominant variety: PC Str. 1, T-24, T-37ob, T-37fea, S-39. In the second, bifacial chipping occurs on the great majority of blade edges while on other types of pieces unifacial and bifacial chipping are roughly equal in importance: T-9A, T-9B, T-11, T-23, T-25.

Variable 10: Edge-Modified Pieces, Working Edge Angles

The five edge angle classes which serve as attribute states for Variable 10 were defined after examining the overall distribution of edge angles (measured in 5° intervals) for the collection of edge-modified pieces. Although utilized blade edges tended to have a unimodal distribution, there was sufficient suggestion of bimodality to justify the definition of two classes of angles. Angles of retouched blade edges and both utilized and retouched edges on other tool blanks showed a fairly clear trimodal distribution. The five attribute states for Variable 10 are thus defined as (1) utilized blade edges, 30–55°; (2) utilized blade edges, 60–95°; (3) all other utilized and retouched edges, 30–55°; (4) all other utilized and retouched edges, 60–80°; and (5) all other utilized and retouched edges, 85–105°.

Variation in the edge angles of utilized blades appears to be the only clear differentiating factor among the graphs for this variable (Fig. 18.10). Two assemblage classes are defined on this basis. In the first class, higher edge angle blades are equal to or more important than lower angle blades: PC Str. 1, T-24, T-37ob. In the second class, lower angle blades are

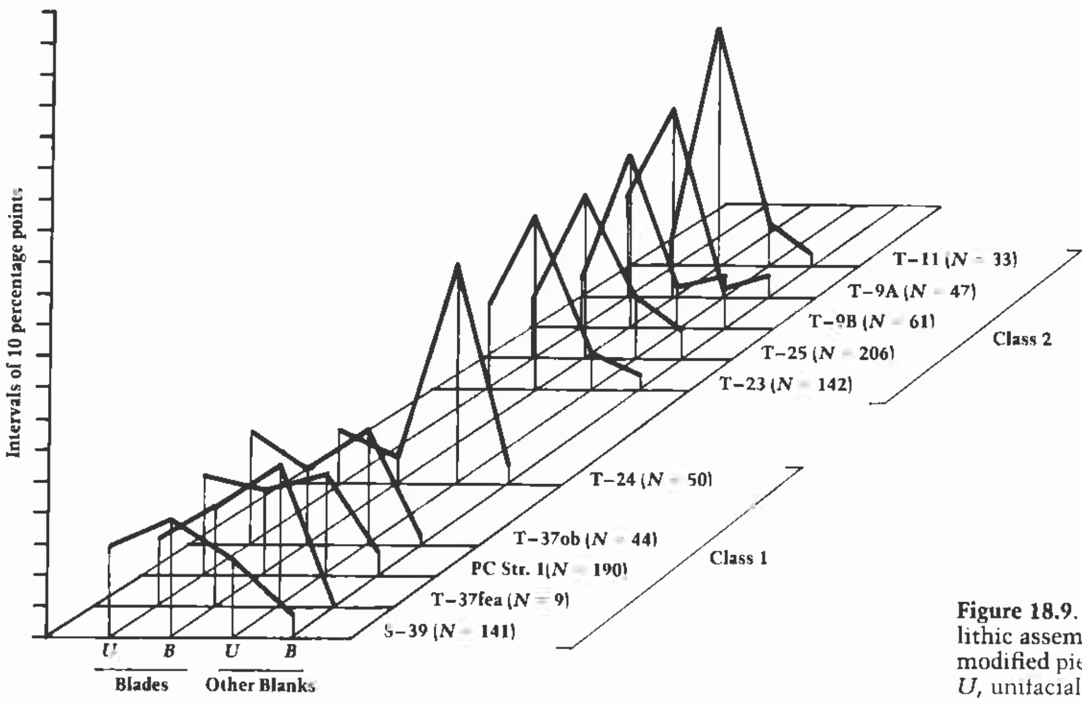

Figure 18.9. Comparison of Chalcatzingo lithic assemblages for Variable 9, edge-modified pieces, placement of chipping: *U*, unifacial; *B*, bifacial.

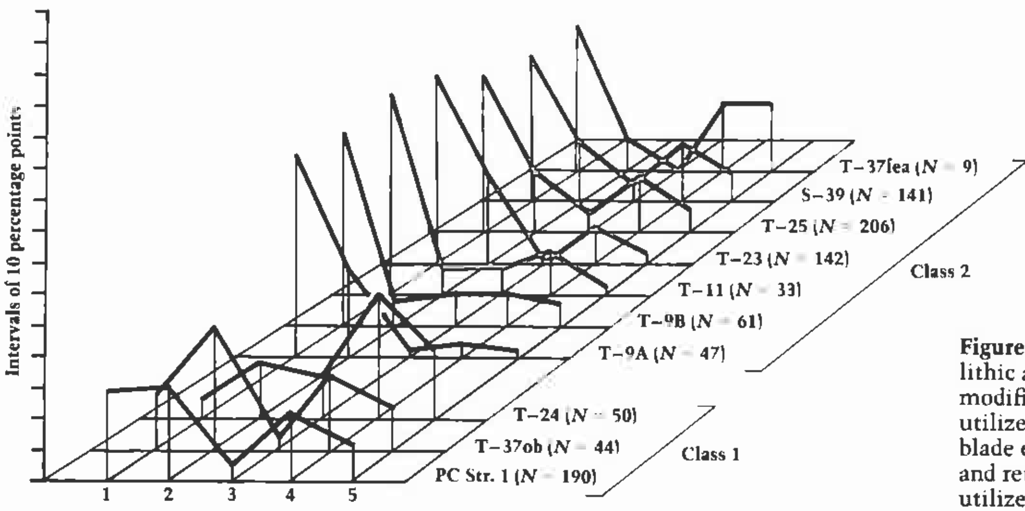

Figure 18.10. Comparison of Chalcatzingo lithic assemblages for Variable 10, edge-modified pieces, working edge angles: 1, utilized blade edges, 30–55°; 2, utilized blade edges, 60–95°; 3, all other utilized and retouched edges, 30–55°; 4, all other utilized and retouched edges, 60–80°; 5, all other utilized and retouched edges, 85–105°.

clearly the dominant category: T-9A, T-9B, T-11, T-23, T-25, T-37fea, S-39.

In virtually all cases, the edge angles on retouched blades and other utilized and retouched pieces show a pattern, with the intermediate edge angle category the most significant of the three. In two instances (T-9B and T-37fea), the intermediate category is equaled by either the high or low category, but the variation here is not sufficient to demand definition of separate classes for these two assemblages.

Variables 11–12: Edge-Modified Pieces, Working Edge Shapes

Variables 11 and 12 are essentially complementary. Variable 11 involves shapes of all utilized and retouched working edges on edge-modified blades. Variable 12 involves the same attribute states for utilized and retouched edges on other tool blanks. The attribute states for both variables are straight edges, convex edges, concave edges, and other shapes. Several additional edge shapes were recorded, but all are rare and so are simply combined as "other shapes."

On the basis of the graphs for blade edges (Variable 11), two assemblage classes are defined (Fig. 18.11). As would be expected, given the basic morphology of all blades, straight edges are by far the most significant category for all assemblages. Therefore, variations in the other categories are the source of class definitions. In the first class, the convex, concave, and other shape categories are all low and roughly equal: T-9A, T-9B, T-11, T-23, T-24, T-25, S-39. In the case of T-24, the concave category appears significantly lower than the other two;

however, the sample size here (*N* = 12) is relatively small and thus does not warrant definition as a separate class. In the second class, although still low, the concave category is somewhat more important than the convex and other shape categories: PC Str. 1, T-37ob. Sample size for T-37fea (*N* = 5) was too small to allow its inclusion in the Variable 11 analysis.

Three classes are indicated by the graphs for working edges on other tool blanks (Variable 12; Fig. 18.12). Most of the blanks in this group are flakes, and as would be expected on the basis of general flake morphology, convex edges tend to be the dominant form. In the first class, convex edges are clearly the most important category with all others relatively low: PC Str. 1, T-24, T-25, S-39. In the second class, although still the most frequent, convex edges are almost equaled by straight edges: T-9B, T-23. In the third class, concave edges are clearly the dominant category: T-37ob. Three assemblages were excluded from this comparison on the basis of small sample size: T-9A (*N* = 4), T-11 (*N* = 6), T-37fea (*N* = 4).

Summary

The variable-by-variable comparison of assemblages is summarized here in the form of a matrix specifically arranged to maximize the clustering of high values (Fig. 18.13). Each cell in the matrix indicates the number of variables for which the two indicated assemblages fall into the same class. A pair of assemblages identical on all variables would thus receive a score of 12 in the matrix. The cells along the lower diagonal of the matrix indicate the number of unique occurrences for each assemblage (i.e., the number of instances in which the assemblage was the only member of its class).

The summary matrix essentially provides a quick index to the overall similarity between assemblages. A general inspection indicates that there is a good deal of variability in the levels at which assemblages resemble or fail to resemble each other. Although no two collections are exactly alike, six pairs agree on eight to ten variables out of the twelve possible. On the other hand, while there are no complete misses, sixteen pairs agree on only one to three variables.

On another, more interesting level, two distinct groups of assemblages are evident in the matrix as clusters of high values. In both cases the groupings have good internal consistency, and even more significantly the two assemblage sets are clearly mutually exclusive. Specifically, internal consistency is evident in the fact that all possible assemblage pairs in a given cluster show relatively high scores. The exclusiveness of the two

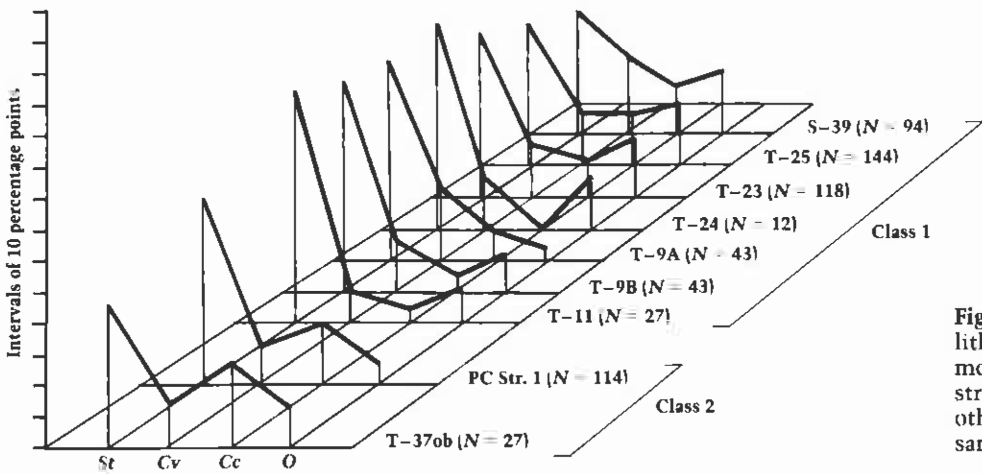

Figure 18.11. Comparison of Chalcatzingo lithic assemblages for Variable 11, edge-modified blades, working edge shapes: *St*, straight; *Cv*, convex; *Cc*, concave; *O*, other. T-37fea excluded because of small sample size.

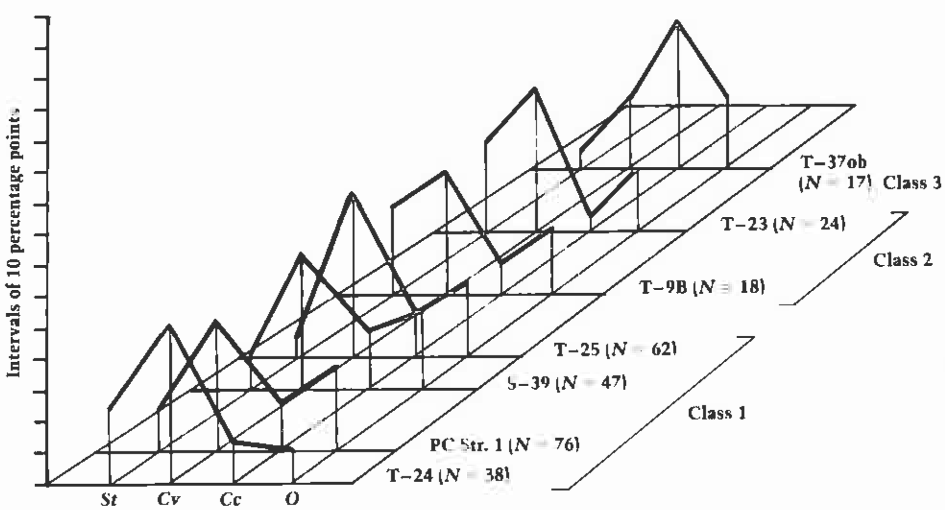

Figure 18.12.. Comparison of Chalcatzingo lithic assemblages for Variable 12, other edge-modified pieces (flakes, chunks, cores), working edge shapes: *St*, straight; *Cv*, convex; *Cc*, concave; *O*, other. T-9A, T-11, and T-37fea excluded because of small sample size.

groups is demonstrated by the fact that all assemblage pairs combining members of opposing groups have low scores.

These two groups of assemblages do not entirely correspond to the expected functional differentiation of lithic tool kits outlined at the start of this analysis. Both groups include common residential areas and more specialized loci. Group A consists of three residential samples (T-9A, T-9B, T-11) and the supposed ceremonial area (T-25), while Group B includes the elite residence (PC Str. 1), the blade workshop trash deposit (T-37ob), and a common residence (T-24).

Among the three assemblages which fall outside Groups A and B, the other domestic area, T-23, resembles all other assemblages on a moderate level (i.e., scores for all possible pairings range from 4 to 7) and thus holds an intermediate position between the two groups while tending slightly toward Group A. T-37fea also falls in a position between the groups but tends to have a greater affinity with Group B. The generally low scores for pairings with S-39 separate this assemblage out as the one real loner in the collection. The greatest affinities of S-39 are with T-25 and T-9B, both members of Group A, but there is very little similarity between S-39 and the other two members of that group.

	T-37ob	PC-1	T-24	T-37fea	T-23	T-25	T-9B	T-9A	T-11	S-39
T-37ob	2*	10	6	5	5	3	2	2	2	1
PC Str. 1	Group B	0*	8	6	6	5	3	3	3	3
T-24			3*	5	6	4	3	3	3	4
T-37fea				1*	6	3	4	5	5	3
T-23					0*	6	7	7	7	4
T-25						0*	8	7	7	6
T-9B						Group A	0*	8	8	5
T-9A								0*	10	3
T-11									0*	3
S-39										3*

Figure 18.13. Matrix summarizing the variable-by-variable comparison of the ten sample lithic assemblages. Each cell indicates the number of variables for which the two indicated assemblages fall into the same class. Cells along the lower diagonal (*) indicate the number of unique occurrences for each assemblage. The matrix is specifically arranged to maximize the clustering of high values. Clusters of high values are indicated as Groups A and B.

Discussion

The variable analysis shows that there is some diversity among the ten assemblages making up the sample. Although the expected pattern of functional differentiation is not entirely borne out, there is a tendency for the assemblages from common residential areas to be similar. Three of the five residential collections cluster in Group A, while a fourth (T-23) shares many features with this group. Among the residential loci, only T-24, which falls into Group B, has a distinctive assemblage.

As was expected, the specialized loci, with the exception of T-25, tend to differ from the common residential areas; however, they do not differ as strongly from each other as was expected. Somewhat surprisingly, PC Str. 1, T-37ob, and T-37fea are all quite similar to S-39, the only really distinctive assemblage from a specialized area. In order to better understand the functional variability suggested by the analysis, the results are reviewed here with emphasis placed on the similarities and differences between both assemblages and assemblage groups.

Beginning on the most general level, the ten analyzed assemblages tend to share a number of characteristics providing a background against which the individual collections can be viewed. These shared characteristics present a basic pattern dominated by rapidly produced, multifunctional items such as unmodified blades, simple utilized blades, and coarsely shaped tools. The nature of this underlying pattern suggests that the generalized tool kit expected for residential areas actually forms some part of every assemblage.

The specific characteristics shared by the majority of assemblages include such basic elements as raw material types and general assemblage composition as well as some of the more detailed attributes related to tool form. Although the relative proportions vary, both local chert and imported obsidian are present at all loci. The great bulk of the chert tends to be debitage with both edge-modified and shaped tools quite rare. Within the obsidian component, unmodified blades are a major element of almost all assemblages. Unmodified blades are best regarded as potential tools. They may, in fact, include (1) actual tools briefly utilized in a manner leaving no macroscopic evidence, (2) potentially usable tool blanks, or the least likely possibility, (3) discarded workshop waste unsuitable for tool use.

Several more detailed attributes related to tool form are also almost universally shared. The majority of these characteristics suggest that beyond initial blank production only very limited effort was put into tool manufacture and maintenance. Shaped tools, in either obsidian or chert, form an insignificant part of all assemblages. Among the shaped items that do occur, the dominant form tends to be coarsely shaped pieces which are not refined for any specialized function. Edge-modified blades are generally the most important tool class, but this is hardly unexpected, given the overall importance of blades in the collections in general. Among all edge-modified pieces (i.e., blades, flakes, chunks, cores) utilization is a good deal more important than retouching or grinding; however, the relative proportions of unifacial and bifacial edges are variable. Finally, several widely shared characteristics of the edge-modified tool samples are essentially direct expressions of basic tool blank morphology. Specifically, working edges of edge-modified blades tend to be straight and to be worked at low angles (30–55°). Conversely, working edges on flakes and other blanks tend to be convex, and to be worked at moderate angles (60–80°).

On a more specific level, the various traits typical of Group A and the related collection from T-23 seem to support and possibly even to amplify the tendency of all assemblages toward an unspecialized tool kit. Generally, these collections, which are largely from common residential loci, involve diversity in raw material and very limited variety in modified pieces.

Among the Group A assemblages, both raw material types tend to be of significance and in some cases are actually of equal importance (T-9A, T-11). Exceptions occur, however, with the bulk of both the T-23 (88 percent) and T-25 (92 percent) collections made up of obsidian. Dominance of obsidian is typical of the Group B assemblages.

The significance of the relative obsidian-chert proportions is open to more than one interpretation. Chert, which was available nearby, was a "cheaper" raw material; thus its presence in quantity may reflect a lower economic status for a particular area. On the other hand, a mix of obsidian and chert may simply result from a lesser need for the special tool blank characteristics of obsidian blades. Both of these factors may have been operative in the sense that if the more specialized product is also the more "expensive," then it probably will not be obtained unless its particular properties are needed. Although chert is significant in several Group A assemblages, it is largely present as debitage showing no macroscopic signs of utilization; therefore, its real functional importance is difficult to ascertain.

The modified portions of the Group A assemblages share certain interesting characteristics. In most cases edge-modified pieces and unmodified blades are of equal importance; however, T-23 is again the exception with blades much more numerous than edge-modified tools. Although other types of utilized pieces achieve a secondary significance in two of the assemblages (T-9B, T-25), the great bulk of edge-modified tools in the Group A collections consists of utilized blades. Bifacial working edges with low edge angles and edge shapes concomitant with basic blank morphology (i.e., straight for blades and convex for others) are additional attributes typical of Group A tool kits.

Shaped tools occur in such low numbers in most of the Group A samples (T-9A, T-9B, T-11) that the relative importance of the various defined types cannot be assessed. Coarsely shaped pieces are the dominant shaped tools in the T-23 and T-25 assemblages.

The characteristics outlined for the modified portion of the Group A assemblages provide a basis for several generalizations. The utilized tools, which are such an important feature of these assemblages, must be the result of fairly heavy, and possibly repeated, activity sufficient to produce clearly visible edge damage. The low angle bifacial edges indicate cutting as the primary tool function. In general there seems to have been little need for specially shaped working edges (retouched) or purposefully shaped tools.

The inclusion of the T-9B assemblage as a typical member of Group A is of particular interest since this sample from a Barranca phase house (T-9B Str. 1) was included in the analysis for comparative purposes. While this structure cannot be considered as definitely representative of Barranca phase non-elite residences at Chalcatzingo, the fact that it is not significantly different from the Cantera phase Group A structures in its lithic assemblage suggests that there may have been no major changes in household tool kits and use patterns during the Middle Formative at the site.

The strong association within Group A of the T-25 assemblage with materials from common residential loci also has interesting implications. When the T-25 sample was chosen for analysis, it was assumed to be reflective of activities which took place in a ceremonial precinct around the table-top altar, Monument 22. If this assumption is retained, then the activities involved apparently were much like those which took place in ordinary households (food preparation, maintenance of tools and household goods, and so on). Alternatively, the basic assumption of a direct association between the altar and the lithic collection may be invalid, and the assemblage may actually reflect activities at a residential locus. Prior to altar construction, T-25 was the location of a Barranca phase residence; later it was the site of a post-altar platform mound (T-25 Str. 2) which may have been the substructure for an elite residence. The long, complex occupational history of this terrace (see Chapter 7) makes functional evaluation of the lithic assemblage difficult.

The general impression given by the Group B assemblages is in large degree the opposite of that given by the residential collections of Group A. Specifically, raw material is less diverse while modified pieces show greater variability.

Obsidian is clearly the dominant raw material (over 80 percent) among Group B assemblages. The largest portion of this obsidian consists of unmodified blades, which greatly outweigh modified pieces in importance. This abundance of blades points to a probable need for the sharp cutting edges provided by such tool blanks. The little chert present in Group B collections again occurs largely in the form of simple debitage.

In the Group B assemblages, utilized blades do not hold the same dominant position they occupy in the modified portion of the Group A collections. Not only blades but also types of blanks other than blades (i.e., flakes, chunks, cores) are of some significance among edge-modified pieces, and shaped tools actually equal or surpass edge-modified blades in importance.

Although utilization is generally the most frequent working edge form on edge-modified tools, here again variability is greater than it is in Group A assemblages. Among working edge characteristics for edge-modified pieces, unifacial chipping is generally more important than bifacial, preference is for moderate rather than low edge angles, and edge shapes are again largely those dictated by basic blank morphology. Among the shaped tools there is a tendency for at least two categories (i.e., coarsely shaped pieces and either projectile points or unidentified shaped pieces) to be of importance in most assemblages, and in the case of T-24 all defined types are virtually equal in significance.

In general, the modified portion of the Group B collections suggests a greater emphasis on matching tool characteristics to a fairly wide variety of specific functions. Tools which have been extensively shaped to meet functional requirements (i.e., shaped modified pieces) are more numerous in these assemblages and occur in a greater variety of forms. Among edge-modified pieces, both the variety of blanks used and the mix of working edge types suggest that rather than utilize any readily available piece, people selected tool characteristics to meet specific functional needs.

PC Structure 1 can be described as having the most "normal" of the Group B assemblages. It fits well with both the general pattern for all assemblages and the specific pattern for Group B areas and does not appear to have any special distinguishing features. It does show a slightly greater proportion of concave edges on edge-modified pieces than is usual, but this does not really serve to set it apart. The variable analysis certainly did not highlight any unusual tool types or combination of attributes identifiable as possible elite items.

It is at least logically possible that the "average" character of the PC Structure 1 assemblage is the combined product of numerous burial offerings of lithic items associated with normal everyday activities; however, during excavation, lithic items were almost never noted as intentional grave goods. It seems much more likely that the lithic materials from the upper levels of the structure and adjacent trash deposit reflect a variety of activities which took place in this general portion of the Plaza Central. The characteristics which are part of the general pattern possibly relate to basic household tasks, while the greater specificity in tool function seen in this and other Group B areas presumably relates to the performance of more specialized tasks or crafts.

Because of the special nature of the deposit (see Chapter 19), the strong affinities of the T-37 obsidian concentration with the other Group B loci come as something of a surprise. Within the context of the variable analysis, T-37ob clearly shares in both the general pattern defined for all assemblages and the more specific pattern pertinent to the Group B assemblages; however, it also has certain unique characteristics.

The first characteristic unique to T-37ob is, of course, the basic feature which links the deposit with the manufacture of obsidian blades, or, specifically, the very significant proportion of workshop debitage in the assemblage. This particular type of debitage occurs throughout the site, but only in this sample collection is it more than an extremely minor element.

The second unique feature of the T-37ob assemblage is an unusual frequency of concave edges on both edge-modified blades and other edge-modified blanks. This edge shape suggests possible wood- or bone-working activities, and it is intriguing, if highly speculative, to see a possible link between this and preparation of the pressure tools and clamps required for blade manufacture.

The remarkable density of the T-37ob deposit is another unique characteristic of this assemblage but one which is really not considered within the context of the variable analysis. Since the analysis focuses only on the relative proportions of materials within individual assemblages, it does not provide information on variability in the overall density of artifacts. Comparisons on this level are certainly of possible interest, but unfortunately the necessary data were not recorded for all sampled loci.

T-24 is the only common residential locus included in Group B. Its assemblage shares in the general pattern and in the pattern specific to Group B areas but also exhibits several unique characteristics. All these unusual features involve the modified portion of the assemblage. First, this is the only collection in which both edge-modified tools on non-blade blanks and shaped tools are more numerous than edge-modified blades. Second, retouching, rather than utilization, is the dominant working edge type on the unusually abundant edge-modified tools on non-blade blanks. Third, all seven of the shaped tool categories are significant.

The emphasis in the T-24 assemblage on retouched edges and on a diversity of shaped tools seems to be an extension of the greater specificity in tool function seen to some degree in Group B assemblages in general. The apparent importance of edge and overall tool shaping and the unusual variety among the shaped tools may actually point to T-24 as a specialized locus of tool manufacture.

Like the T-23 sample, the T-37fea assemblage falls in an intermediate position between Groups A and B. The T-37fea collection is small and as a result rather difficult to evaluate. Because of its inadequate size, it was not included in the analysis of several variables. It appears to share in the general pattern for all assemblages and in part in the pattern specific to Group B. However, lack of data on certain aspects of the modified portion of the collection (i.e., shaped tools and edge shapes for edge-modified pieces) makes it impossible to establish whether or not the tendency of Group B assemblages toward more specialized tool forms is actually present here.

In the summary matrix, the S-39 collection displays such an unusual combination of characteristics that it appears not to belong with any of the other analyzed samples. Closer inspection indicates, however, that its special situation is largely an artifact of analytical procedures rather than a true characteristic of the assemblage.

The S-39 sample includes a remarkable abundance of one particular lithic item which presumably reflects a special activity peculiar to that locus. This unique item, a kind of tool (edge-modified piece with ground working edges) influences the evaluation of several variables, and as a result, its importance in the overall analysis is somewhat inflated. Specifically, it appears not only as an unusual abundance of ground edges (i.e., nearly half of the working edges on edge-modified blades and a third of those on other tool blanks) but also as an unusual frequency of tools in general.

The ground edges which are such an important feature of the S-39 assemblage appear to be a direct product of tool utilization. In some cases, use chipping is partially smoothed over by subsequent grinding, but in many instances raw blade and flake edges have simply been ground down through use. The sharp corners of blade sections as well as their edges are often ground as a result of having been drawn across an abrasive surface. The probable source of these ground working edges, incising or engraving activities, could be related to the ceramic manufacturing believed to have taken place in this area (see Chapter 16).

If edge-modified pieces with ground working edges are set aside and the remainder of the S-39 assemblage examined, the results conform with the general pattern for all assemblages and show a mix of the more specific patterns for Groups A and B. As in most Group A areas, the raw materials used at S-39 include a significant proportion of chert, primarily in the form of debitage. Also as in these collections, modified pieces and unmodified blades are of equal significance in the obsidian portion of the assemblage. As in Group B areas, on the other hand, within the modified portion of the collection edge-modified blades, edge-modified pieces on other blanks, and shaped tools are equal in importance. Specific tool characteristics show a mix of Group A and B traits. Among the edge-modified pieces bifacial and unifacial chipping occur at about the same frequency, low angle working edges are the most common form, and edge shapes tend to conform with basic blank morphology. Coarsely shaped pieces are the only important shaped tool category.

Detailed evaluation of the S-39 assemblage thus suggests that, like the Group B loci, this area supported normal household tasks as well as some sort of specialized craft activity. This area differs from the other specialized loci in that its special function is reflected in the abundance of a single unique tool type, edge-ground pieces. Elsewhere, specialized activities are reflected in an overall tendency toward a greater variety of tools chosen or prepared to meet specific functional requirements.

Conclusions

On the basis of the foregoing discussion, it is evident that the preliminary functional interpretations for the ten sample areas are generally supported by the variable analysis. As was expected, the common residential areas and the specialized areas tend to separate into distinct groups with definite indications of general-purpose tool kits at the former and more specialized tool kits at the latter. In two cases a functional re-evaluation is indicated by the analytical results. The supposed specialized assemblage from T-25 actually seems to reflect ordinary household activities while the collection from T-24 is more specialized than expected for a non-elite residence.

Although the general dichotomy between common residential and specialized loci is supported, the more detailed expectations outlined at the beginning of the analysis are not entirely in accord with the final results. The general-purpose character of common residential tool kits was expected to be manifested in a variety of unspecialized tools occurring in small quantities accompanied by moderate quantities of debitage. The actual analytical results indicate that debitage in moderate quantities is present in virtually all the assemblages and, thus, is not a distinguishing feature of residential collections. In addition, instead of a variety of simple tools, the residential assemblages are dominated by a single generalized tool type, the bifacial utilized blade.

In opposition to the diversity proposed for residential assemblages, it was expected that the specialized collections would be much more restricted. These loci were envisioned as special-activity areas devoted to a single task or a closely related group of tasks. Such specialized activities were expected to call for only a small variety of lithic items, and at least some of these items were expected to be selected and/or prepared to meet very specific functional requirements.

The actual analytical results again seem to be the reverse of those expected. Generally, the specialized assemblages share a basic generalized tool kit much like that of the residential loci, but in addition to this, they share a certain emphasis on a variety of slightly more complex prepared working edges and/or tools. The expected tendency toward tool specialization is, thus, present, but the proposed emphasis on a strictly limited variety of tools is not. The S-39 assemblage with its one abundant unique tool type is actually the only collection which approximates the highly restricted special-activity-area tool kit outlined in the original expectations.

In general, although the basic functional dichotomy proposed prior to analysis is supported by the results, the more detailed tool kit expectations appear to provide an inaccurate model. Specialized loci apparently supported activities requiring more specialized tools than did common residential areas. However, these loci also supported activities much like those typical of ordinary household areas. Thus, the original model of intense, localized specialization occurring to the exclusion of all other activities is not supported.

To conclude briefly, detailed examination of the sample assemblages has revealed variability in the chipped stone collection with significance for general problems concerning site structure. Preliminary functional interpretations of specific loci have been either confirmed or revised, and for some loci suggestions relating to the specific activities involved have been advanced. The lack of evidence for intense localized craft activities carried out in isolation from more generalized household tasks suggests that full-time specialization, at least as evidenced by lithic tools, was not a feature of the late Middle Formative economic organization at Chalcatzingo.

RESUMEN DEL CAPÍTULO 18

Con objeto de obtener la información descriptiva básica y explorar la variación dentro del sitio de las actividades asociadas con las herramientas de piedra se emprendió el análisis de las esquirlas de artefactos de piedra. Se formó una muestra de artefactos intencionada (no al azar), proveniente de las áreas de los pisos de las casas elíticas y no elíticas de las residencias Barranca y Cantera, así como de algunas áreas más especializadas, tales como el altar T-25, la concentración de obsidiana en T-37, y el posible centro de manufactura de cerámica en S-39. El muestreo así reunido se clasificó de acuerdo con el material empleado (obsidiana o cuarzo), y después se dividió en clases morfológicas. También se hicieron las observaciones correspondientes a las características de la forma de trabajo de los filos.

El material lítico predominante es la obsidiana gris, y el producto principal del trabajo de la obsidiana son las hojas prismáticas, las cuales ocurren en cantidades importantes en todas las áreas donde se llevó al cabo el muestreo y fueron usadas como herramientas y como bases para hacer herramientas modificadas. La pedacería, herramientas, y centros de cuarzo también ocurren en todas las áreas de muestreo, pero en mucho menor cantidad.

Se espera que diferentes actividades requieran una variedad de herramientas de piedra para labrar, y que la distribución de los tipos de herramienta, a través del sitio, refleje las actividades realizadas. Las actividades relacionadas con el mantenimiento general de una casa habitación se presume necesitaban de un surtido de piedra que se caracteriza por la diversidad, con énfasis en las herramientas de uso general, una moderada cantidad de pedacería sobrante. Las actividades más especializadas, por otra parte, tales como la manufactura o las demostraciones público-rituales, pudieron caracterizarse por su surtido más reducido, con énfasis en las herramientas de utilidad especial, y restos sobrantes ya sean abun-

dantes o escasos, de acuerdo con la actividad de cada caso.

Estas situaciones ideales que conciernen a las herramientas asociadas a las áreas de actividad residencial común en oposición a las de actividad especial, se aplicaron al análisis comparativo de los artefactos al través del sitio. Se utilizaron doce variables como base para comparar las diferentes áreas de donde se obtuvo la muestra lítica, habiéndose comparado variable por variable en cada muestreo, se sumaron después todas en la forma de una matriz. Aun cuando existe bastante variabilidad entre los muestreos provenientes de cada terraza, la matriz revela la existencia de dos grupos distintos cuyas variables líticas parecen aglutinarse. Resulta de interés, el hecho de que los dos grupos de muestreo no correspondan completamente con las situaciones ideales propuestas para oponer los juegos de herramientas de residencia común a los de función especial, y el que ambos grupos incluyan los esperados restos residenciales y de lugares especializados.

El grupo A consiste en tres muestreos residenciales (T-9A, T-9B, T-11) y la supuesta área ceremonial (T-25). Estas colecciones líticas reflejan generalmente la existencia de un juego de herramientas no especializado, y presentan pocos ejemplos de herramientas con filo hecho a propósito o con los filos de trabajo retocados. El cuarzo constituye una materia prima de importancia además de la obsidiana. T-9B es una residencia de la fase Barranca, y el hecho de haberse incluido en el grupo A sugiere que haya habido poco o ningún cambio en los juegos de herramientas generales entre las fases Cantera y Barranca.

El grupo B está compuesto por la residencia elítica (PC Str. 1), el depósito de basura del taller de hojas en T-37, y una residencia común en T-24. Este grupo se caracteriza por mostrar menos diversidad en las materias primas, con el cuarzo casi ausente, y una mayor diversidad en las herramientas modificadas. Parece ser que aquí se dio mayor énfasis a emparejar las características de la herramienta con una aceptable variedad de funciones específicas. Aun cuando S-39 no cae dentro del grupo B, también parece ser un área que incluía las actividades normales de una unidad habitacional al mismo tiempo que alguna clase de actividades de trabajo especializado.

Aun cuando la situación esperada de que los juegos de herramientas se separen claramente en dos grupos, generales y especializados, a través de todo el sitio parece comprobarse, el hecho de asignar áreas a priori a uno de los dos grupos resultó ser falso en algunos casos, y no todas las situaciones específicas esperadas pudieron ser comprobadas. La pedacería de desecho se encuentra presente, en cantidades moderadas, en cada uno de las muestras ensambladas por lo que no resultó ser un rasgo distintivo de uno u otro juego de herramientas. Las muestras residenciales no se caracterizan por una diversidad de herramientas sino por la existencia de un solo tipo de herramienta de uso general, la hoja bifacial utilitaria. Al revés, las actividades especializadas que se presumía necesitaran tipos de herramienta más restringidos resultaron tener mayor diversidad que la esperada, mostrando una variedad de filos de trabajo preparados con mayor complejidad. Finalmente, el modelo original de que el localizar la especialización intensiva trajera consigo la exclusión de las otras actividades, más generales, correspondientes a las de unidad habitacional no fue confirmado por los datos.

19. Obsidian Blade Manufacturing Debris on Terrace 37

SUSAN S. BURTON

During the investigations at Chalcatzingo an extremely dense concentration of obsidian debris was noted on the surface of T-37. The apparent size of this concentration suggested that it was not just an ordinary trash deposit. An accumulation of blade manufacturing debris seemed an obvious possibility, and in the hope of verifying this the area was examined in detail.

DESCRIPTION OF THE CONCENTRATION

Excavation indicated that the surface manifestations were part of a remarkably dense deposit of obsidian flakes and blade fragments in a minimal soil matrix. A small quantity of sherds and other artifactual debris occurred mixed with the lithic material and provided a basis for dating the deposit to the Late Cantera subphase (Ann Cyphers, personal communication). Several features of apparent late Middle Formative age were recorded in the immediate vicinity of the obsidian concentration and presumably represent roughly contemporary activity in the area. Unfortunately, no direct connection could be established between the concentration and the features, which included two burials and a possible activity area evidenced by a line of three postholes cut into bedrock.

The obsidian concentration was excavated in 1 m × 1 m × 10 cm grid units (Fig. 19.1). Arbitrary levels were used since no useful natural or cultural strata were observable. The natural soil stratigraphy on the terrace generally involved only two zones, a loose plow zone and a grey-brown friable subsoil (Fig. 19.1). The highly disturbed plow zone was shoveled off without screening for artifacts. The remainder of the excavation was largely carried out with trowels and ice picks, at some hazard to the workers, who suffered many cuts and nicks from the abundant and very sharp obsidian.

The bulk of the concentration was recovered by screening through ¼″ screen. However, the overwhelming quantity of obsidian in the first screen loads made it obvious that complete recovery would be unreasonably time-consuming. As a result, only pieces approximately 1 × 2 cm or larger were saved. Even without the small pieces discarded from the screen and the material from the plow zone, the concentration still yielded over 28,000 individual obsidian pieces weighing about 51.4 kg altogether. The total area of the obsidian deposit below the plow zone was roughly 2 m^3; therefore there were approximately 25 kg of obsidian per m^3.

The concentration covered a horizontal area of about 2 × 3 m and extended from the ground surface to bedrock, a distance of approximately 40 cm (Fig. 19.1). The upper 10 cm level had been extensively disturbed by plowing and thus was spread out somewhat, but the main body of the deposit seemed to have fairly sharply defined boundaries. There was generally an abrupt shift from the obsidian deposit area to the surrounding normal situation for the terrace (i.e., soil with a light intermixing of artifactual debris including some obsidian). No change in the composition or color of the soil itself seemed to occur at the concentration boundary; the minimal soil matrix within the concentration appeared to be just like the surrounding terrace soil.

In addition to the small quantity of other artifactual remains mixed with the obsidian, a few fragments of human bone were recovered from the densest part of the concentration. Tentatively designated a burial (no. 138), this scatter consisted of skull fragments plus a second cluster of fragments including two poorly preserved long bones, possibly femurs. Obsidian was tightly packed around most of the bones, both above and below, making excavation extremely difficult. The possible femurs, which were resting side by side in a parallel alignment, occurred just at the southern edge of the obsidian concentration and extended beyond it into an unexcavated unit to the south.

It was not possible to obtain a clear picture of the depositional relationship between Burial 138 and the obsidian concentration; the bone was far too fragmentary and eroded. The only bones giving any suggestion of an articulated position were the probable femurs which occurred just at the edge of the concentration. This suggests that the burial may pre-date the obsidian and that the two may have become mixed during deposition of the lithic debris.

The overall evidence indicated that the obsidian concentration was a trash pile deliberately deposited on that spot by human agents. The configuration of the entire deposit, with its long axis perpendicular rather than parallel to the terrace slope, eliminated the possibility of wash from higher terraces. Furthermore, the extreme density and compactness of the concentration made it obvious that if the material was manufacturing waste, it certainly was not a primary deposit on a workshop floor. No indications that the obsidian filled a pre-existing pit were noted during the excavations, so it was presumed that the material was originally piled on the terrace surface. Subsequent deposition then raised the soil level until the trash pile was almost covered.

It seemed possible that evidence of a blade manufacturing workshop might be located nearby since there is no obvious reason for the waste to have been moved a great distance from its source. However, although test pits were excavated elsewhere on T-37 and on the terrace immediately above and to the south, no evidence of such an area was located.

COMPOSITION OF THE DEPOSIT

By an analysis of the items which made up the deposit, it should be possible to test our assumption that the concentration was trash from blade manufacturing activities. The types of debris to be expected from such activities can be outlined using Don Crabtree's (1968) detailed technological reconstruction of Mesoamerican obsidian blade production.

1. *Percussion flakes from core preforming.* Core preforming should produce a body of percussion flakes of various shapes and sizes. Since Chalcatzingo is not located at an obsidian source, the raw material for blade manufacture must have been transported into the site. Research at obsidian quarry sites (e.g., Holmes 1900; Graham and Heizer 1968; Spence and Parsons 1972; Sheets 1975) indicates that a substantial amount of core preforming, producing both biface blanks and "macrocores" (Hester 1972), was generally carried out prior to transportation. However, final shaping to produce such refinements as the desired overall core form, suitable core platform surface, and straight corner ridges presumably would have taken place at Chalcatzingo.

2. *Crested blades* (or *lames à crête*). These waste blades are the result of a particular pattern of core preforming. According to Crabtree, "an unconditional requisite of preforming polyhedral cores is to first establish corners (ridges) on the preformed core. Without these ridges there can be no polyhedral shaped and no prismatic blades, for they are used to remove and guide the blades, and they are the inception of the 'faceted' shape of this core. If the percussion preforming has left these corners (or ridges) uneven, or not straight, they must be straightened by careful retouch" (Crabtree 1968:460). One means of straightening these corners involves "removing a series of alternate short flakes along the vertical length of the material" (ibid.: 455). These prepared ridges will direct the first blades removed from the core, and the result will be the "crested blade" (Crabtree 1972:72) easily identified on the basis of the bidirectional flake scars on either side of the dorsal ridge.

3. *Waste blades.* Ideally, once the core is correctly preformed, blade production should generate little waste. However, as they are pressed off, the blades leave the core at considerable velocity, and accidental breakage and dulling were probably a continuing problem. Waste blades might also be produced by misjudging the angle and/or intensity of pressure applied in removing them from the core. Blades judged to be too thick or too short as well as blades ending in a hinge fracture or carrying away the entire distal end of the core might also contribute to the accumulation of waste blades in a workshop.

4. *Core recovery flakes.* During blade production, internal faults in the raw material and/or errors on the part of the maker may damage the core and interfere with the continued production of prismatic blades. In some cases careful trimming may correct problems of this type and allow for a fuller utilization of the damaged core (Crabtree 1968:466–467). Flakes produced during core rejuvenation of this sort would characteristically show remains of parallel blade scars on their dorsal side, edges, and/or flake platform.

5. *Core platform rejuvenation flakes.* During the actual analysis of the Chalcatzingo materials, core platform rejuvenation flakes were found to be both easily identifiable and relatively abundant, and as a result were tabulated separately from the bulk of more generalized core recovery flakes. Specifically, core platform rejuvenation flakes are flakes removed from the proximal or platform end of a blade core by a blow transverse to the core's long axis. Remnants of parallel blade scars occur around the edges of such flakes and are the characteristic feature which makes them so readily identifiable.

The attempt to rework the platform of a blade core by transverse flaking of this sort is suggested as a response to several possible situations. It might be used to correct the damage caused by crushing the platform edge during blade removal or to improve the configuration of the platform surface for better seating of the pressure tool. It might also be used on nearly exhausted cores to remove the proximal end which will have become severely constricted as a normal result of blade production. The slightly thicker bulbs of force at the tops of the blades will result in the top of the core constricting more rapidly than the lower portions (Crabtree 1968:457, 463, 467).

Crabtree indicates that the most efficient or ideal method of platform rejuvenation would involve the removal of the entire core platform with a single blow. Flakes of this sort are generally referred to as "core tablets" (e.g., Hester, Jack, and Heizer 1971; Sanger 1968; Movius et al. 1968). Although there are complete "core tablets" in the Chalcatzingo collection, there are also many other flakes removed transverse to the long axis of cores which did not carry away the entire platform. Many were probably produced subsequent to initial tablet removal to improve the configuration of the new platform. Both complete core tablets and these other transverse flakes from the proximal ends of cores are included in the category "core platform rejuvenation flakes."

6. *Exhausted cores.* Exhausted cores and fragments of cores are a probable component of workshop debris. However, exhausted cores are known to have been utilized as tools in a number of Mesoamerican contexts (see Hester 1973), and so their presence in large numbers cannot be regarded as an absolute requirement for a workshop deposit.

7. *Small trimming flakes.* A quantity of small pressure flakes should be produced while keeping the blade core in trim for continuing blade removal. This category of manufacturing debris is mentioned here as a final logical possibility. If such flakes were present in the T-37 obsidian concentration, most were probably too small to have been recovered by the screening procedures used during excavation.

Two technical steps which are sources of small pressure flakes are mentioned by Crabtree (1968:462–465). First, after the removal of each series of blades around the core, it is necessary to trim off the small lip or overhang left around the top edge of the core by the bulbs of pressure. Secondly, small flakes may be produced in preparing the blade platforms. A secure seat for the pressure tool used in blade production can be provided by removing a small flake at the edge of the core platform at right angles to the long axis of the core. Platforms may also be prepared by scoring or grinding.

Having outlined categories of debris which would be the logical products of a workshop, it is possible to evaluate the question of whether or not the T-37 concentration is in fact a deposit of blade manufacturing. For analytical purposes the deposit was divided into four quads (see Fig. 19.1). The actual composition of each of these units is presented in Table 19.1.

The analytical categories used in this

table do not precisely duplicate those just outlined and so require some further explanation. Complete blades, proximal blade fragments, distal blade fragments, and blade midsections are all self-explanatory categories of prismatic blades. The category "waste blades" discussed above, although a logical component of blade production debris, was not usable in an analytical context. Unless obviously malformed, waste blades and their fragments are likely to be very much like the remains of blades which have been used as tools and discarded. Breakage, dulling, and battering which occur after deposition as a result of natural erosional actions and later human activities should serve to strengthen the similarities between waste blades and blades discarded after use. Flakes and flake fragments serve as residual categories for all other flakes not included in the specialized categories, core recovery flakes and core platform rejuvenation flakes. Specifically, the category designated as "flakes" includes whole flakes and flake fragments with striking platform present. "Flake fragments" are portions of flakes which lack the striking platform area. "Chunks" is a residual category for blocky bits of debris which do not belong in any of the recognizable categories.

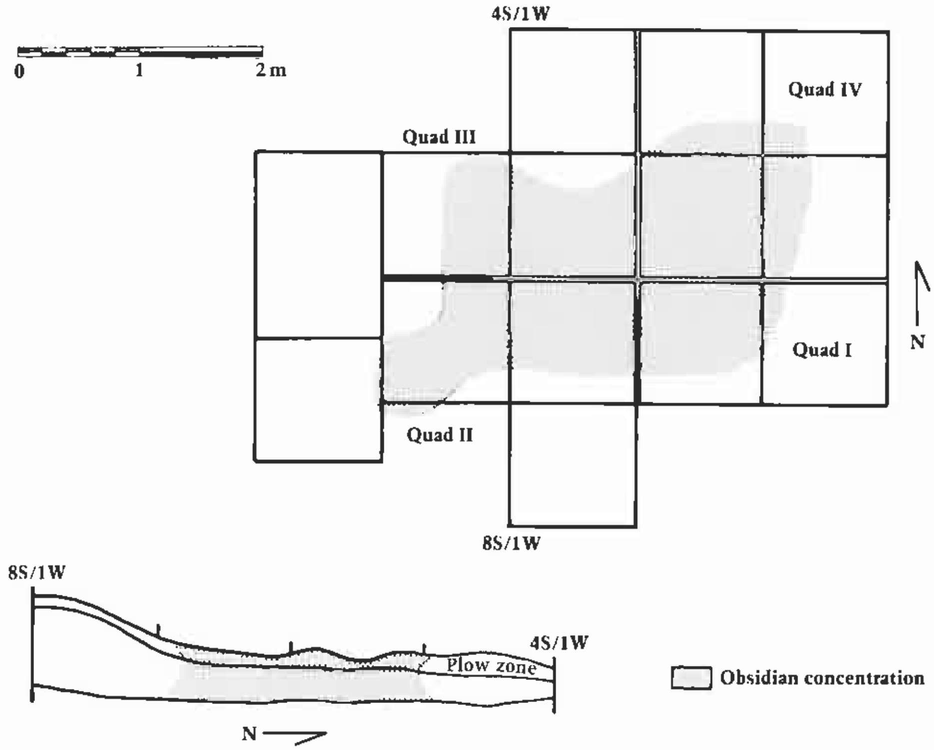

Figure 19.1. T-37 excavation units showing plan and profile of obsidian concentration (shaded).

Turning to Table 19.1, it is evident that slightly more than 25 percent of the lithic material in the concentration falls into the categories which are definitely recognizable as workshop debris. Specifically, crested blades make up 0.6 percent of the deposit, core platform rejuvenation flakes make up 11.5 percent, and core recovery flakes make up 14.4 percent. Blade cores and fragments, however, are rare, accounting for less than 0.1 percent of the material.

When the frequency of these workshop identifiers in the T-37 concentration is compared with their frequency in the analyzed lithic sample from other areas of Chalcatzingo (see Chapter 18), the differences are clearly significant (Table 19.2). Comparing crested blades, core platform rejuvenation flakes, and core recovery flakes with all other obsidian flakes and blades, the workshop identifiers make up 27 percent of the obsidian concentration collection and only 7 percent of the collection from other areas of the site. This evidence strongly supports the identification of the concentration as a specialized deposit associated with blade manufacturing activities. On an associational basis, it can be assumed that most of the concentration debris classified in the more generalized flakes and blade categories was also a product of workshop activities.

It is interesting that polyhedral blade cores and core fragments make up only a tiny portion of the T-37 concentration. In fact, when compared with the rest of the analyzed Chalcatzingo lithic sample, it is obvious that cores are significantly more frequent in other areas of the site (Table 19.3). Comparing cores and core fragments with all obsidian blades, cores can be seen to be eight times more frequent in the lithic sample from other areas. Specifically, they make up 0.09 percent of the core/blade assemblage from the T-37 concentration and 0.79 percent of the same assemblage from other areas.

The evidence thus suggests that cores were disposed of in some special manner and did not remain with the general manufacturing trash. Discarded blade cores and/or fragments are found in small numbers in all areas of Chalcatzingo. In addition, cores which have been utilized and in some cases reshaped as tools are also known from various parts of the site. Their economic value as tools may, in fact, explain the separation of exhausted cores from workshop debris.

TECHNOLOGICAL DISCUSSION

This large accumulation of manufacturing debris supplies a variety of interesting insights into the blade manufacturing procedures used during the Cantera phase at Chalcatzingo. The absence of large, rough trimming flakes in the concentration and elsewhere on the site and the general lack of cortex on the flake debris indicate that obsidian entered the site as partially prepared core blanks rather than as nodules or large irregular chunks. The fact that the majority of exhausted cores have a half-cylindrical shape with one flat, unworked side suggests that the core blanks may have had a tabular form.

There are really no very clear indications of the original size of these blanks. All the known cores from the T-37 concentration and elsewhere are exhausted specimens. The dimensions of the three complete specimens from T-37 are generally typical: (1) 63 mm long × 23 mm wide with a platform circumference of

***Table 19.1.* All Lithic Materials Recovered from T-37 Obsidian Concentration**

	Obsidian Cores and Debitage										
Provenience	*Complete Blades*	*Proximal Blade Frags.*	*Distal Blade Frags.*	*Blade Mid-sections*	*Crested Blades*	*Flakes*	*Flake Frags.*	*Core Platform Rejuv. Flakes*	*Core Recovery Flakes*	*Complete Blade Cores & Frags.*	*Chunks*
Quad I											
10–20 cm	3	276	159	352	4	156	191	181	186	2	7
20–30 cm	5	717	364	930	28	447	442	390	394	0	14
30–40 cm	20	586	260	588	2	142	430	210	440	2	24
Quad II											
10–20 cm	1	381	222	515	9	191	228	218	225	0	15
20–30 cm	6	509	306	733	14	263	244	309	348	3	13
30–40 cm	1	315	205	294	13	132	139	191	279	4	19
40–50 cm	0	13	12	22	0	6	9	9	7	0	0
Quad III											
10–20 cm	4	704	501	895	26	316	336	445	653	0	31
20–30 cm	6	849	622	940	29	356	385	565	813	2	28
30–40 cm	1	36	31	50	0	24	17	28	37	0	1
Quad IV											
10–20 cm	4	401	238	465	14	186	240	356	278	0	13
20–30 cm	2	533	329	715	18	292	357	375	437	0	22
Subtotals	53	5,320	3,249	6,499	157	2,511	3,018	3,277	4,097	13	187
% of total collection	0.2	18.7	11.4	22.9	0.6	8.8	10.6	11.5	14.4	<0.1	0.7

	Chert Cores and Debitage				*Modified Pieces*			
					Obsidian		*Chert*	
Provenience	*Flakes*	*Flake Frags.*	*Blocky Flake Cores & Frags.*	*Chunks*	*Edge-Modified Pieces*	*Shaped Pieces*	*Edge-Modified Pieces*	*Shaped Pieces*
Quad I								
10–20 cm	4	3	0	0	2	0	0	0
20–30 cm	2	1	1	1	0	2	0	0
30–40 cm	0	5	0	0	0	1	0	0
Quad II								
10–20 cm	7	3	0	1	2	3	0	0
20–30 cm	0	4	2	5	2	2	0	0
30–40 cm	0	1	0	4	2	0	0	0
40–50 cm	1	0	0	0	3	1	1	0
Quad III								
10–20 cm	2	5	0	4	6	2	1	0
20–30 cm	7	4	0	2	6	5	0	0
30–40 cm	0	0	0	0	1	0	0	0
Quad IV								
10–20 cm	4	5	1	1	5	0	1	1
20–30 cm	3	4	2	1	4	3	0	0
Subtotals	30	35	6	19	33	19	3	1
% of total collection	0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1

Total obsidian cores and debitage	28,381 (99.5%)
Total chert cores and debitage	90 (0.3%)
Total modified pieces	56 (0.2%)
Grand total	28,527

***Table 19.2.* Comparison of Blade Workshop Identifiers in the T-37 Obsidian Concentration and in the Lithic Sample Analyzed from Other Areas of Chalcatzingo**

Provenience	*Workshop Identifiers*[a]	*All Other Obsidian Blades and Flakes*	*Totals*
Obsidian Concentration	7,531	20,650	28,181
Other Areas	257	3,478	3,735
Totals	7,788	24,128	31,916
	$\chi^2 = 703.90$ $p < .001$		

[a]Crested blades, core platform rejuvenation flakes, and core recovery flakes.

***Table 19.3.* Comparison of Blade Core Frequency in the T-37 Obsidian Concentration and in the Lithic Sample Analyzed from Other Areas of Chalcatzingo**

Provenience	*Polyhedral Blade Cores and Fragments*	*All Obsidian Blades*	*Totals*
Obsidian Concentration	13	15,121	15,134
Other Areas	20	2,513	2,533
Totals	33	17,634	17,667
	$\chi^2 = 57.62$ $p < .001$		

78 mm and a weight of 42 gm; (2) 67 × 16 mm with a 40 mm platform circumference and a weight of 19 gm; (3) 63 × 22 mm with a 62 mm platform circumference and a weight of 30 gm. Larger core sizes are indicated by platform circumferences of as much as 145 mm as evidenced by certain platform rejuvenation flakes which preserve the entire core tablet.

The presence of crested blades in the workshop debris indicates, as would be expected, that additional preforming of the cores took place after the core blanks reached Chalcatzingo. The general flake debris in the concentration is presumably at least partially a result of this activity also.

The abundance of general core recovery flakes and the specialized core platform rejuvenation flakes indicate that serious and presumably fairly extensive efforts were made to maximize the available raw material by reworking cores to improve their configuration after some blade removal had been accomplished. The platform rejuvenation flakes are of particular interest as evidence of this activity. Their frequency indicates that platform renewal was a standard procedure, while their size range (i.e., a significant proportion indicate larger platform areas than are typical of the known exhausted cores) suggests that such modification may have been effected more than once during the life of an individual core.

A second specialized type of core recovery flake was noted during analysis but because of the small size of the group was not tabulated separately. (Detailed attribute analysis would doubtless reveal other such subtypes.) This group consisted of relatively small flakes and short blades which had been pressed up from the distal end of the core in the direction opposite that of normal blade removal. Crabtree (1968:468) suggests just such a procedure as one means of correcting the problem created when a blade has hinged off rather than terminating properly: "This may be accomplished by creating a platform on the distal end of the core directly in line with the blade broken from the top of the core, though this is very difficult. When such a platform can be made, then the broken blade is pressed from the distal end of the core to intersect the hinge or step fracture and, if successful, the worker recovers the core and can continue in the original manner of blade removal."

Although not a major component of the workshop debris, the exhausted polyhedral blade cores are important technological indicators. The complete specimens and large fragments recovered from the T-37 concentration are typical of cores from the entire analyzed sample of Chalcatzingo lithics and as such will be described in some detail here. The dimensions of the three complete specimens have already been mentioned.

Three complete cores and five sizeable fragments were recovered from the obsidian concentration. Two raw material types were represented, a grey obsidian with dark banding (five specimens) and a grey obsidian with small, white, spherical inclusions (three specimens) (see Chapter 23 on obsidian source analysis). The majority of the specimens (five) had a half-cylindrical shape with one flat, unworked side. The three remaining specimens had had blades removed from their entire circumferences. Where present, the distal ends of all the cores were pointed.

Where it could be determined, the number of facets around the core circumference ranged from ten to thirteen, and maximum facet width ranged from 8 to 11 mm. Within this small sample, comparison of fully cylindrical and half-cylindrical cores did not indicate any differences in these ranges.

Only two specimens had intact core platforms; one was a single-facet surface and the other a multiple-facet surface. In both cases, the platform edges showed some crushing and other indications of final abortive attempts at blade removal. In the other three cases with proximal end intact, an attempt (apparently unsuccessful) had been made to rejuvenate the core. In each case, the old platform had been struck off by a single blow transverse to the core's longitudinal axis. The circumferences of the proximal ends of these five specimens ranged from 40 to 78 mm with a mean of 60.4 mm (SD = 14.975).

The exhausted cores in the concentration did share one characteristic not typical of cores from other proveniences—five of the eight specimens were fire-cracked. In fact, each of the three complete specimens was actually reconstructed from two or three fire-cracked fragments. This breakage had occurred after the cores were exhausted and platform rejuvenation, where present, had been attempted. This type of breakage was not observed elsewhere, and there is no clear explanation for its occurrence here. It may, however, explain the presence of these particular specimens in the workshop debris. As discussed previously, cores apparently did not normally remain with the workshop trash. The fire-cracked specimens were apparently broken in the workshop, either accidentally or as a result of some special usage, and then were swept up with the rest of the trash.

The blade fragments which make up the bulk of the obsidian concentration also provide certain technological information. As was indicated previously, the blades in the concentration do not generally seem to differ from the blade fragments found throughout the site. Again, an exhaustive attribute analysis might provide a basis for distinguishing between workshop waste and blades discarded after use, but at the present analytical level this was not possible.

As was true for the lithic sample in general, the blades in the concentration were parallel-sided and in a majority of cases showed two parallel ridges running the length of the dorsal side. A smaller proportion of the blades had a single dorsal ridge, and very rarely three or more parallel ridges were observed. At the proximal end, the blades constricted to a tiny platform which in the majority of cases was single-faceted; crushed platforms and more rarely multifaceted platforms were also noted in the collection. Neither blade platforms nor core platforms showed any signs of preparation by striating or grinding.

Based on a 10 percent random sample of blade midsections ($N = 71$) from the second level of unit 5–6S/0–1W (Quad III), blade width ranged from 7 to 26 mm with a mean of 13.6 mm (SD = 4.057). Blade thickness ranged from 1 to 7 mm with a mean of 2.5 mm (SD 0.976). For the same sample, 72 percent of the specimens had two dorsal ridges, while 28 percent had only one. None of the specimens in this particular group had more than two dorsal ridges. Turning to blade platform characteristics, a 10 percent random sample of proximal blade fragments ($N = 61$) from the same unit and level included 70 percent with single-faceted platforms and 30 percent with crushed platform areas. No multi-faceted platforms occurred in this sample.

A group of complete blades from the obsidian concentration were also examined in detail, and their physical characteristics are of some interest. It is, however, important to remember that if the entire deposit is workshop waste, then these complete blades almost certainly do not represent the optimal results of late Middle Formative blade production at Chalcatzingo. A collection of thirty blades from all four quads were analyzed. All of the specimens in this collection had normal distal ends (that is, none had hinged off). Blade length ranged from 42 to 93 mm with a mean of 61.2 mm (SD = 13.114); blade width ranged from 8 to 28 mm with a mean of 16.7 mm (SD = 5.192); thickness ranged from 2 to 9 mm with a mean of 4.3 mm (SD = 2.006); and blade weight ranged from less than 1 to 12 gm with a mean of 4.0 gm (SD = 3.918). Crushed platform areas were noted for 14 (47 percent) of the complete blades, while one specimen had a multifaceted platform; the remainder (fifteen) were single-faceted. Ten (33 percent) of the blades had a single dorsal ridge and four (13 percent) had three or more ridges; the remaining 16 (53 percent) had two dorsal ridges.

INTERNAL STRUCTURE OF THE CONCENTRATION

It was initially supposed that the obsidian concentration would be internally homogeneous, since the deposit seemed to be a secondary trash dump rather than a primary activity area. With a little further consideration of the problem, however, it was realized that secondary deposition would not necessarily lead to complete mixing of materials. Any original patterning of the material on the workshop floor would probably be reflected in a distorted and confused manner in the trash deposit. In addition, the very act of gathering up the debris and redepositing it might result in some unintentional sorting. An everyday example of this second possibility is evident in the way that particle sizes are sorted as dust is swept up into a dustpan.

The internal homogeneity of the obsidian concentration is examined in Tables 19.4 and 19.5. The overall results indicate that when the various excavation levels are compared across the entire deposit, homogeneity is quite evident (Table 19.4). However, when the four quads making up the deposit are compared, distribution of material is no longer random (Table 19.5). Specifically, although Quads I and III appear to be quite similar in composition, they are significantly unlike Quads II and IV. The vertical homogeneity is largely maintained when levels are compared on an individual quad by quad basis. Similarly, the nonrandom horizontal character of the deposit is generally supported when the quads are compared on a level by level basis.

The horizontal differentiation in the deposit presumably is a reflection of one or both of the potential sources of sorting mentioned above. The vertical homogeneity suggests that the manufacturing activities which produced the debris remained constant throughout the period of deposition. This in turn suggests that the entire period of deposition may have been relatively brief.

A second line of evidence also supports the idea that deposition occurred over a short period. As mentioned previously, each of the three complete cores recovered from the concentration consisted of several fragments. In one case, both fragments came from the same unit in Quad II, Level 2 (20–30 cm); however, the elements of the other two were more widely separated. One of these cores involved two pieces, one in Quad II, Level 3 (30–40 cm) and the other in Quad III, Level 2 (20–30 cm). The third core involved three pieces, one each in Quad I, Level 1 (10–20 cm); Quad I, Level 3 (30–40 cm); and Quad II, Level 3 (30–40 cm). Thus, Levels 1, 2, and 3 (10–40 cm) of Quads I, II, and III are all linked by these core fragments.

PRODUCTION ESTIMATES

Recognition of the obsidian concentration as a specialized deposit of workshop debris leads to the intriguing question of how much labor or how many original blade cores it might represent. Since the cores themselves are not present, the quantity of crested blade seems the best available basis for an estimate. Crabtree

(1968:460–462) indicates that a blade core can be started with only one prepared corner but may have two, three, four, or as many more as the knapper cares to create. The fact that the majority of the exhausted cores recovered from the concentration have a half-cylindrical shape with one unworked side suggests that corner preparation at the Chalcatzingo workshop was often restricted to only one or two ridges. Cores which are preformed with three, four, or more ridges will develop the full polyhedral shape. This observation, then, provides a basic assumption for use in estimating the number of cores represented by the deposit.

Other essentially uncontrollable factors also need to be mentioned, however. On the one hand, corner preforming can be accomplished without the special bidirectional flaking which results in a crested blade. In other words, the number of crested blades may be smaller than the number of prepared corners in the original group of cores represented by the concentration. On the other hand, the lithic items classified as crested blades during the analysis include both complete blades and fragments of blades. This means that several fragments from a single corner may be included as separate items, thus inflating the estimate of the number of cores represented. These two factors may tend to cancel each other out to some extent.

Keeping all these difficulties in mind, Table 19.6 provides estimates of the number of cores at T-37 based on one crested blade per original core and on two per original core. Using an estimate of 50–150 blades per core (Sheets 1975), it is then possible to estimate the total blade production these cores would have represented.

Assuming that all the blades in the concentration represent manufacturing waste, it is also possible to relate this figure to the estimated original cores and the blades they would have produced. Using two crested blades per core as a basis, the total waste per core is estimated at between 100 percent and 45 percent of core output. This would be an extremely low level of efficiency in the production of usable blades, and it suggests that if all the blades in the concentration are in fact waste, then the estimated number of cores is too small. When only a single crested blade per core is assumed, the waste per core becomes 66 percent to 20 percent, which seems more reasonable although probably still on the high side.

A second cross-check on the estimated number of cores is provided using the core platform rejuvenation flakes. No good estimate of the number of such flakes which might be produced in the reduction of a single core seems to be available; however, there is a tendency in the literature (Crabtree 1968:463, 467; Hester, Jack, and Heizer 1971:80) to see the process of core truncation as primarily a last-ditch effort to get a few more blades off a nearly exhausted core. This would suggest a rather small number per core. On the other hand, Crabtree also suggests that in some obsidian blade technologies difficulties in finding a secure seat for the pressure tool on the blade platform might lead to repeated core truncation. Specifically, he sees this problem arising where neither grinding nor scoring was used in platform preparation. Neither of these techniques is evidenced in the T-37 concentration. Hence, platform rejuvenation flakes might be somewhat more numerous per core. Still, it must be remembered that each truncation would shorten the core, making it doubtful that this operation could be carried out very many times before the core became too short for use.

Using two crested blades per core as a basis for estimating 80 original cores gives a total of 41 core platform rejuvenation flakes per core. Just as the propor-

Table 19.4. **Comparison of the Composition of Levels 1, 2, and 3 for the Entire T-37 Obsidian Concentration**

Provenience: Levels (Quads I–IV)	*All Obsidian Blades and Fragments*	*All Obsidian Flakes and Fragments*	*Totals*
1 (10–20 cm)	*5,181.24*[a]	*4,378.76*	
	5,174[b]	4,386	9,560
2 (20–30 cm)	*7,626.61*	*6,445.39*	
	7,655	6,417	14,072
3 (30–40 cm)	*2,423.15*	*2,047.85*	
	2,402	2,069	4,471
Totals	15,231	12,872	28,103
	$\chi^2 = 0.77$		
	$p = .70$		

[a]Expected
[b]Observed

Table 19.5. **Comparison of the Composition of Quads I, II, III, and IV for the Entire T-37 Obsidian Concentration**

Provenience: Quads (Levels 1–3)	*All Obsidian Blades and Fragments*	*All Obsidian Flakes and Fragments*	*Totals*
I	*4,283.19*[a]	*3,619.81*	
	4,294[b]	3,609	7,903
II	*3,409.54*	*2,881.46*	
	3,524	2,767	6,291
III	*4,698.34*	*3,970.66*	
	4,694	3,975	8,669
IV	*2,839.93*	*2,400.07*	
	2,719	2,521	5,240
Totals	15,231	12,872	28,103
	$\chi^2 = 19.69$		
	$p < .001$		

[a]Expected
[b]Observed

Table 19.6. **Possible Estimates of the Total Number of Original Obsidian Blade Cores Represented by the T-37 Debris Concentration**

	Estimates Based on 1 Crested Blade per Core	*Estimates Based on 2 Crested Blades per Core*
Estimated no. of original cores (rounded) (157 crested blades used as basis)	160	80
Estimated total blade production (cores × blades per core[a])	8,000–24,000	4,000–12,000
Waste blades per core (5,373 waste blades[b] ÷ cores)	34	67
Proportion of total estimated blade production represented by waste blades (waste blades per core ÷ blades per core)	68%–23%	100%–45%
Core platform rejuvenation flakes per core (3,277 CPRF ÷ cores)	20.5	41

[a]An average of 50–150 blades is estimated for the typical Mesoamerican blade core (Sheets 1975).

[b]Complete blades (53) and proximal blade fragments (5,320) are combined to arrive at minimum total waste blades in the concentration.

tion of waste for the 80 core estimate seemed too high, this figure seems too large. When one crested blade per core is used to arrive at a 160 core estimate, the figure for platform flakes is reduced to 20.5 per core. As was the case with waste blades, this figure seems more reasonable although still on the high side. The final conclusion thus seems to be that the concentration represents the waste from a minimum of 160 cores and may well represent more.

Having set caution aside to a large degree in attempting to arrive at a figure for minimum estimated cores (MEC), it seems worthwhile to speculate a bit more. It should be kept in mind, however, that the MEC figure which forms the basis for these additional estimates is largely unsubstantiated.

It has been estimated that an expert worker would have needed from two to four hours per blade core for core preforming and removal of blades (Santley 1977a:8). This being the case, the 160 MEC represented by the T-37 concentration would have required 320–640 worker-hours for blade production. In other words, one full-time worker could have produced the waste deposit in two to four months. There is, of course, no reason to suppose that knapping was carried out on a full-time basis.

Using well-controlled data from a Late Formative site and a Classic village, Robert Santley (1977a:7) has proposed certain average annual rates of obsidian consumption. Although these figures may not be directly transferable to the situation at Chalcatzingo, they do provide a tantalizing means for taking the T-37 production estimates one tentative step further. For the Late Formative site, Santley estimates that a household of five discarded approximately forty obsidian fragments per year or the equivalent of six to nine blades and seventeen pieces of debitage. Using these figures as a basis, the 160 MEC represented by the T-37 debris would have produced the annual blade quota for approximately nine hundred to four thousand households or a ten-year supply for ninety to four hundred households.

Bearing in mind that these estimates are rough at best, the figures suggest that the T-37 blade manufacturing debris could easily have been produced by one or two part-time artisans. The volume of material produced would have been appropriate to supply Chalcatzingo and nearby smaller agricultural communities with obsidian tools for approximately a decade.

RESUMEN DEL CAPÍTULO 19

Las excavaciones T-37 revelaron la existencia de una abundante concentración de desperdicio de obsidiana en la subfase Cantera Tardío, lo cual hizo surgir la hipótesis de que fuera el resultado de la manufactura intensa de esquirlas cortantes en esta área. La concentración cubría un área de 2 × 3 m y se extendía 40 cm desde la superficie del suelo hasta el tepetate. Las perforaciones de prueba, hechas alrededor de la concentración, revelaron no haber muestra de que un taller de manufactura de esquirlas cortantes pudiera haber estado asociado a los desechos, aun cuando se pudo determinar que la concentración de obsidiana constituía un montón de basura puesto intencionalmente en ese lugar.

El análisis de las herramientas propiamente dichas y de los desechos que constituían la concentración revela que fueron definitivamente producto de la manufactura de hojas de obsidiana. Los identificadores del taller de hojas constituyen el 27 por ciento de los depósitos de basura y solamente el 7 por ciento del conjunto de obsidiana de las otras áreas del sitio. La ausencia de lascas de corte burdo y de cortex en el desperdicio de las lascas indica que la obsidiana que entró al sitio había sido preparada parcialmente en forma de núcleos limpios en vez de nódulos o pedazos grandes. La preparación adicional se llevó a cabo después de que los núcleos en blanco hubieron llegado al sitio. Los núcleos fueron retrabajados varias veces con objeto de conseguir el mayor número de esquirlas cortantes en la producción.

Si se emplea el número de hojas cumbreras como criterio para reconstruir el número de núcleos utilizados en la producción de este hacinamiento de desperdicio, puede llegarse a estimar el número de hojas provenientes de cada núcleo. El número mínimo de núcleos calculados, 160, se estima además haya requirido 320–640 horas hombre, tal vez el trabajo de uno o dos artesanos no totalmente dedicados a esta labor durante uno o dos meses. Es posible que el esfuerzo que refleja esta sola concentración de obsidiana haya producido la cuota anual de esquirlas cortantes que requería 900–4,000 unidades habitacionales, ciertamente lo suficiente para proveer a Chalcatzingo y las comunidades de sus alrededores durante varios años.

20. Ground Stone Artifacts

DAVID C. GROVE

During the course of the excavations, surface reconnaissance of the site, and other daily research activities, a variety of ground stone artifacts were found. For the purpose of lab analysis and description we have classified these into three major categories: utilitarian (manos, metates, barkbeaters, smoothers), miscellaneous (function unidentifiable), and portable sculpture.

The majority of the utilitarian artifacts are related to food preparation. Our analysis of these has been cursory, and the data presented in this chapter are primarily descriptive. We did not perform microscopic wear analyses of grinding stones, and thus cannot divide mulling stones from manos as did Richard S. MacNeish, Antoinette Nelken-Terner, and Irma and W. Johnson (1967: 101). Few significant patterns, either chronological or spatial, were ascertained during our analyses of these materials. Those which do occur are discussed within the descriptions which follow.

Although we could not ascertain the functions of certain artifacts, some questions have been raised by the patternings. For example, why are over 50 percent of the manos recovered during our research in fragments? Was the breakage accidental (which in most instances seems unlikely), or ritual, or for some other reason? Why do 23 percent of the manos recovered come from the area of the Plaza Central Structure 2 complex, a structure group which appears to have lacked domestic functions? Were broken grinding stones reused for other purposes in this area (either ritual or utilitarian purposes)? A similar question can be asked of the large quantity of spheroidal manos found in the same area.

As has been mentioned in other chapters, the fields at Chalcatzingo are heavily littered with stone. This abundance of surface stone is due both to the proximity of the archaeological zone to the cliffs and talus slopes of the site's two *cerros*, to prehispanic constructions of stone which once occurred on the site, and to the need during Chalcatzingo's long history for suitable stone for other purposes, such as food preparation. The barranca of the Río Amatzinac, near the foot of the site, provides an almost unlimited supply of igneous boulders and cobbles. Much of the surface stone at Chalcatzingo comes from this latter source.

The selection of stone for the different categories obviously varied. Food preparation tools such as manos and metates were manufactured usually from stones retrieved from the barranca. These are normally finer-grained than the granodiorite of the local *cerros*. Sculptures and carvings, on the other hand, are primarily from the granodiorite. Some denser, finer-grained stone may also have been brought from other areas (particularly during the Classic and Postclassic). However, in general it appears meaningless to attempt a "source analysis" of the ground stone artifacts (both utilitarian and carvings), for the variety of stones recoverable from the barranca source alone is so great that it would be nearly impossible to detect an "import" in the majority of the cases. Thus, our description of the artifacts does not give special attention to the petrographic composition of the individual pieces.

Comparisons in this chapter are drawn primarily from highland Formative period sites. Unfortunately, the comparative materials are not extensive. Although some data have been published from Gulf Coast sites (e.g., Coe and Diehl 1980), those comparisons which can be made do not appear to be meaningful.

UTILITARIAN ARTIFACTS

Manos **(Fig. 20.1)**

Turtle-Back Manos ***(41 whole specimens, 95 fragments; Fig. 20.1*****a*****)***

Dimensions in cm: length, 11.7–27.0, average 18.1; width, 7.5–10.9, average 8.7; thickness, 4.9–8.4, average 5.9.

Turtle-back manos constitute 22 percent of the total manos recovered and were the most common type used at Chalcatzingo. They are characterized by their convex dorsal side. The ventral grinding surface is flat from side to side, but curved from end to end. Also characteristic is a sharp angular contact between the dorsal and ventral surfaces. The overall form strongly resembles a turtle shell. Their shape indicates that they were used in trough-like metates with a concave grinding surface, most likely rectangular tripod or legless metates.

Turtle-back manos occur in both the Barranca and Cantera phases. There are no data at Chalcatzingo suggesting they are earlier, but several have been found in Late Formative and Classic period contexts. Similar manos are found at Tlatilco (Lorenzo 1965: 36–37, Fig. 43), in the Ayotla and Manantial phases at Zohapilco (Niederberger 1976: Fig. 27, nos. 1, 2, 5, 6), and in the Ajalpan and Santa María phases at Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967: 111, Fig. 91, bottom; 112–113, Fig. 93, bottom). Over 80 percent of the turtle-back manos recovered in our excavations were manufactured from vesicular basalt. Illustrated examples from Zohapilco and Tehuacan also appear to be of vesicular basalt.

Loaf-Shaped Manos ***(5 whole specimens, 9 fragments; Fig. 20.1*****b*****)***

Dimensions in cm: length, 12.9–19.4, average 16.6; width, 7.4–10.5, average 8.6; thickness, 7.5–12.0, average 9.3.

Four of the five whole loaf-shaped manos are manufactured of vesicular basalt.

All specimens are shaped like bread loaves. Their thickness is usually equal to or greater than their width. The grinding surface is generally flat, or with only a very slight curve. Although one grinding surface is common, a few specimens have two, three, or four ground surfaces. Their shape indicates these manos were utilized with metates having a flat grinding surface.

These manos occur primarily in Cantera phase contexts. Two occur in the subfloor levels of Plaza Central Structure 1, one occurs on a Cantera phase floor of PC Structure 2, and others appear in similar contexts. No good comparison can be found at other central highlands Formative sites.

Quadrangular Manos *(14 whole specimens, 30 fragments; Fig. 20.1c)*
Dimensions in cm: length, 12.9–26.3, average 17.7; width, 7.1–11.3, average 9.0; thickness, 5.3–9.8, average 7.3.

Quadrangular manos differ from loaf-shaped manos in that their thickness is less than their width. The shape in top and side views is rectangular with rounded edges. The cross section is quadrate. The grinding surface is relatively flat, indicating their use on metates with flat grinding surfaces. They are manufactured primarily of vesicular basalt.

Although possibly occurring in the Barranca phase, quadrangular manos appear primarily in the Cantera phase, where they occur in domestic and burial contexts. Manos with the same general form are found at Tlatilco (Lorenzo 1965: 37, Fig. 46) and at Zohapilco in the Manantial phase (Niederberger 1976: Fig. 28, nos. 7, 8).

Large Triangular Manos *(14 whole specimens, 20 fragments; Fig. 20.1d)*
Dimensions in cm: length, 12.2–19.1, average 16.1; width, 6.3–11.9, average 8.6; thickness, 4.6–10.4, average 6.4.

Large triangular manos generally have two or three flat grinding surfaces, two of which come together to form an angle between 30° and 60°. They are similar in form to the two types described below, but are considerably larger.

This mano type is found most often in domestic contexts (house refuse and trash pits) from the Cantera phase. One example was found beneath an oval metate associated with Burial 54 on T-4. No examples were found in the few Barranca phase house areas excavated.

Triangular manos are found with burials at Tlatilco (Lorenzo 1965:37, Fig. 44) indicating presumably that, although not found in Early Formative contexts at Chalcatzingo, they were utilized in the central highlands during the Early Formative. Triangular manos also occur at Zacatenco (Vaillant 1930:37, 48, Pl. 47, nos. 4, 5, 7, 8).

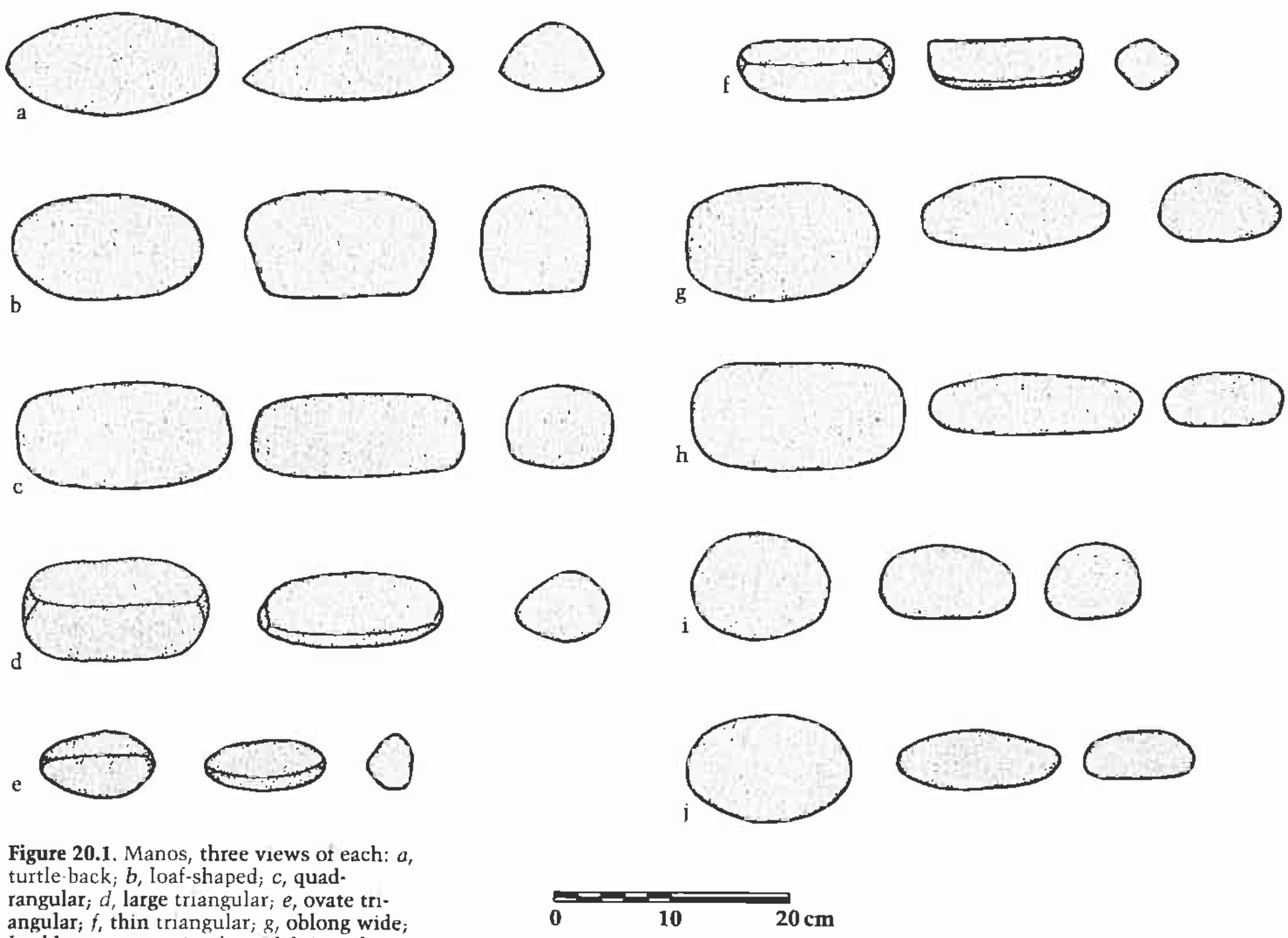

Figure 20.1. Manos, three views of each: *a*, turtle-back; *b*, loaf-shaped; *c*, quadrangular; *d*, large triangular; *e*, ovate triangular; *f*, thin triangular; *g*, oblong wide; *h*, oblong narrow; *i*, spheroidal; j, oval.

Ovate Triangular Manos *(11 whole specimens, 22 fragments; Fig. 20.1e)*
Dimensions in cm: length, 8.1–11.8, average 9.4; width, 4.2–6.7, average 5.4; thickness, 2.2–5.5, average 3.9.

Ovate manos are smaller than those described above, but like them have two to three flat grinding surfaces. Two grinding surfaces meet to form an angle of 30° to 60°. The width of this mano type is more than half the length. Their relatively small size suggests that they functioned for grinding purposes other than maize processing.

Seventy percent of the ovate triangular manos come from the area of the Plaza Central, the majority from the excavations of the Structure 2 complex. Of the thirteen specimens recovered from this area, only one unbroken example was recovered, the other specimens being fragments. The greatest quantity of iron ore fragments recovered on the site also come from PC Structure 2 (see Chapter 23). It is possible that some manos were used to grind hematite here. However, these manos do not appear to correlate with Str. 2 areas from which raw or ground hematite chunks were excavated, nor do hematite stains appear on the grinding surfaces of any of these manos (such a "stain" attribute apparently means very little). One ovate mano was recovered from a probable Barranca phase context; the others are primarily in Cantera phase contexts.

Similar manos are illustrated from Ticoman (Vaillant 1931: Pl. 89, bottom row, nos. 4, 5).

Thin Triangular Manos *(7 whole specimens, 18 fragments; Fig. 20.1f)*
Dimensions in cm: length, 8.1–15.8, average 13.2; width, 3.3–6.4, average 5.0; thickness, 3.9–5.8, average 4.5.

While similar to the above two types in form, thin triangular manos are smaller than large triangular manos, and are differentiated from ovate triangular manos in that they are thin, with their width less than half their length. Like ovate triangular examples, these seem too small to have functioned for maize processing.

These manos occur primarily in Cantera phase contexts. Although over half of the entire sample occurs in Plaza Central contexts, five of the seven whole manos were recovered from adjacent Terraces 25 and 27.

Oblong Wide Manos *(14 whole specimens, 43 fragments; Fig. 20.1g)*
Dimensions in cm: length, 10.3–16.4, average 13.1; width, 6.9–10.0, average 8.5; thickness, 4.4–6.6, average 5.6.

Thirteen of the fourteen whole specimens are manufactured from vesicular basalt. In top view these manos are oblong in shape. Their grinding surface laterally is flat. Their width is more than one-half their length, and their thickness more than one-third their length.

Although one whole oblong wide mano was recovered from the fill of a Classic structure, the other specimens are primarily from Cantera phase contexts.

Similar manos are illustrated from the Tehuacan Valley and cover a long time span in that region (MacNeish, Nelken-Terner, and Johnson 1967: 111, Fig. 90).

Oblong Narrow Manos *(10 whole specimens, 30 fragments; Fig. 20.1h)*
Dimensions in cm: length, 12.1–17.5, average 14.7; width, 6.4–8.9, average 7.8; thickness, 4.1–5.7, average 4.9.

These manos have an oblong shape, with their width usually less than half their length. Their thickness is approximately one-third their length. They generally have more rounded ends than oblong wide manos. Normally only one grinding surface is present. Among the whole specimens the sample is equally divided between manos made of vesicular basalt and those made of fine-grained igneous rocks.

Oblong narrow manos occur primarily in Cantera phase contexts. A mano of similar form but larger size is illustrated from Zohapilco (Niederberger 1976: Fig. 27, no. 3).

Spheroidal Manos *(76 specimens, whole and fragmentary; Fig. 20.1i)*
Dimensions in cm: length, 8.7–15.3, average 11.5; width, 7.1–11.8, average 8.8; thickness, 4.4–9.0, average 6.8.

Relatively round stones, spheroidal manos have at least one grinding surface, although some examples seem to have been utilized on all sides. This type of mano occurs primarily on the Plaza Central (66 percent), and there they occur in greatest quantities around the Structure 2 complex (57 percent of site total). Only one spheroidal mano exhibiting hematite stains was recovered. Of the nine metates and fragments from the same area, only three (two egg-shaped, one irregular shaped) have grinding areas of the type that would match the grinding surface of spheroidal manos.

With few exceptions, spheroidal manos from our sample occur in Cantera phase contexts. They are similar to the spherical manos from the Tehuacan Valley (MacNeish, Nelken-Terner, and Johnson 1967: 108–110, Fig. 89, top row), but larger than the stone balls recovered by Vaillant at Zacatenco, El Arbolillo, and Ticoman (see Balls, under Miscellaneous Artifacts, below).

Oval Manos *(18 whole specimens, 23 fragments; Fig. 20.1j)*
Dimensions in cm: length, 6.6–13.1, average 10.6; width, 3.3–9.1, average 6.9; thickness, 1.7–5.3, average 3.7.

Oval in form with relatively flat bottoms, the width of these manos is half or more than half their length. Normally only one grinding surface is present.

Oval manos occur in both Barranca and Cantera phase house contexts. They are similar to both ovoid mullers and ovoid manos described for the Tehuacan Valley (MacNeish, Nelken-Terner, and Johnson 1967: 106–108, Pls. 88, 89, bottom).

Irregular Shaped Manos *(9 whole specimens, 105 fragments)*
Dimensions in cm: length, 8.1–16.1, average 11.7; width, 5.2–9.5, average 6.8; thickness, 4.1–7.7, average 5.5.

These are unshaped, irregular rocks which exhibit at least one grinding surface. Because they are unshaped, they do not fit within any of the other mano categories. Although over 50 percent of the specimens recovered come from Plaza Central archaeological deposits, no whole specimens were found in this area. Whole irregular shaped manos were recovered in both Barranca and Cantera phase house contexts from other site areas.

***Metates* (Fig. 20.2)**

Rectangular Tripod Metates *(1 whole specimen, 27 fragments; Fig. 20.2a)*
Dimensions in cm: length (1 example), 38.9; width, 22.1–34.9, average 27.6; height, 5.6–9.8, average 7.4. Grinding surface: length, 34.1 (1 sample); width 20.4–30.0, average 23.7; depth, 0.1–7.2, average 3.4.

This metate type is characterized by its rectangular shape with rounded corners and by its three stubby legs. Two legs occur at one end of the metate, and a single leg is centered at the opposite end. This last leg may be slightly taller. Leg shape is rounded or ovoid. Our specimens occur in good Cantera phase contexts.

Rectangular tripod metates are not uncommon at other sites in the central highlands from the Formative through the Postclassic and exhibit little change except occasionally in leg form and

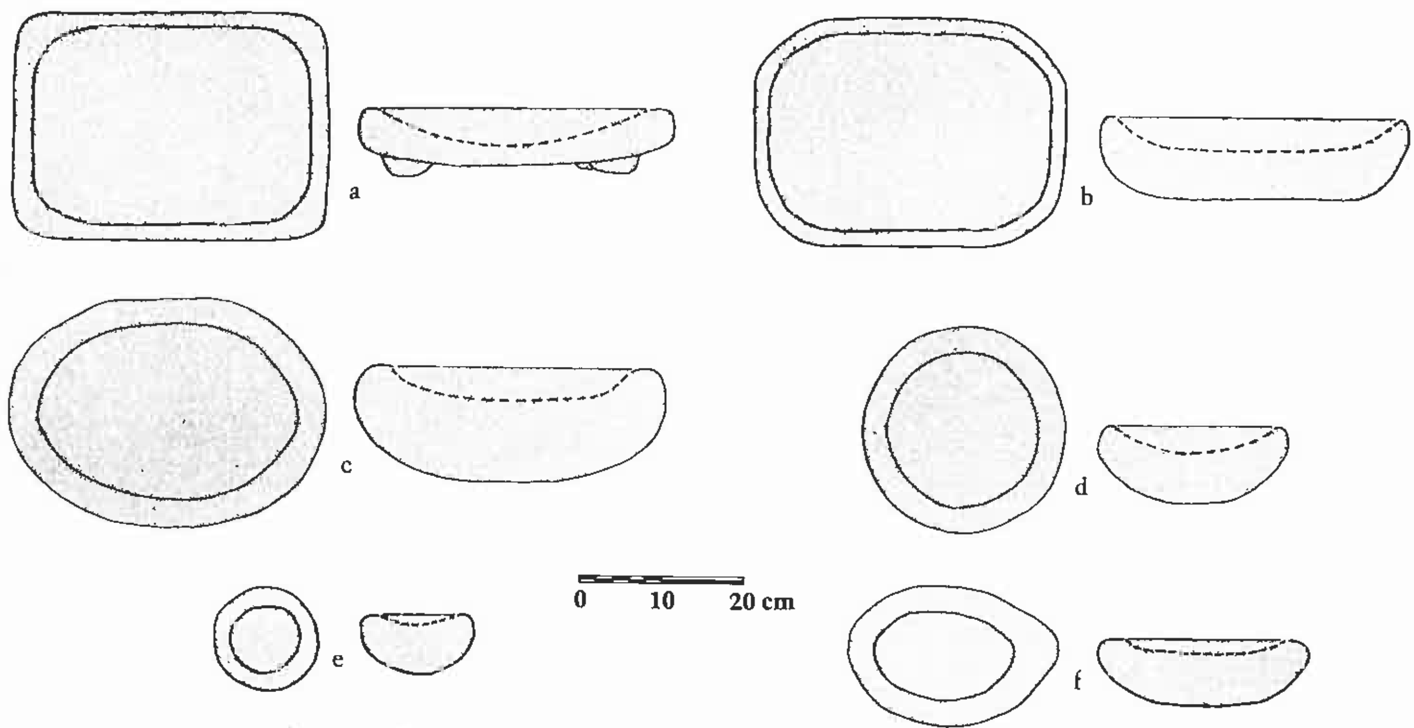

Figure 20.2. Metates, two views of each: *a*, rectangular tripod; *b*, rectangular legless; *c*, oval; *d*, circular; *e*, hemispherical; *f*, egg-shaped.

height. They are mentioned for La Nopalera cave during the Classic period (García Cook 1967:106, Pl. 37, Chart 24), and during the Classic and Postclassic at Tehuacan, where the change through time seems to be from ovoid to rectangular feet (MacNeish, Nelken-Terner, and Johnson 1967:120–121). No tripod metates are reported from the Early Formative at Tlatilco. Well-made tripod metates are illustrated by Vaillant from Zacatenco (1930:Pl. 66, nos. 1, 7), although the legs are better defined than those on our Chalcatzingo sample. Legged metates are also present at Ticoman (Vaillant 1931:Pl. 89) and San Lorenzo Tenochtitlan, Veracruz (Coe and Diehl 1980:1:228, Fig. 214).

Rectangular Legless Metates *(4 whole specimens, 44 fragments; Fig. 20.2*b*)*
Dimensions in cm: length, 28.8–48.4, average 41.2; width, 18.2–34.8, average 28.4; height, 6.9–13.6, average 9.6. Grinding surface: length, 26.0–45.7, average 39.1; width, 15.4–31.6, average 24.1; depth, 0.7–7.3, average 4.3.

These legless metates are characterized by a generally rectangular shape although they have heavily rounded corners. While the basin- or trough-shaped grinding area usually has well-defined edges, in several samples the grinding surface is relatively shallow. Specimens come from both Barranca and Cantera phase contexts. Similar metates are found at Tlatilco (Lorenzo 1965:35, Fig. 41) and at Zohapilco (Niederberger 1976: Figs. 26, 27, no. 8). Although most of the Tlatilco and Zohapilco samples are from Early Formative contexts, one Zohapilco specimen is contemporaneous to our Chalcatzingo examples. No similar metates are illustrated from Zacatenco or El Arbolillo.

Circular Metates *(3 whole specimens, 14 fragments; Fig. 20.2*d*)*
Dimensions in cm: diameter, 16.3–24.7, average 20.5; thickness, 6.3–9.7, average 7.6. Grinding surface: diameter, 7.7–20.2, average 15.2; depth, 0.1–2.7, average 0.7.

This category consists of circular or near-circular legless metates with shallow, slightly concave grinding surfaces. They occur in both Barranca and Cantera phase contexts. Circular "mortars" are present at Tlatilco (Lorenzo 1965:38, Fig. 48), but I hesitate to give that term to our specimens. Our examples are more similar to "saucer-shaped lipped metates" from Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967:120), which are restricted to the Formative period in that area.

Hemispherical Metates *(4 whole specimens, 3 fragments; Fig. 20.2*e*)*
Dimensions in cm: diameter, 10.9–12.6, average 10.8; thickness, 5.0–5.7, average 5.3. Grinding surface: diameter, 3.9–9.1, average 6.7; depth, 0.3–1.2, average 0.8.

These legless grinding stones are circular and in that respect similar to circular metates. However, they are significantly smaller, and in addition have an almost hemispherical cross-section. Interestingly, several also have a shallow concavity pecked into their base. As with small oval grinding stones, these do not appear to have functioned in maize processing. Because of the small quantity of hemispherical metates recovered during our research, their chronology and distribution pattern on the site is unclear.

Oval Metates *(5 whole specimens, 17 fragments; Fig. 20.2*c*)*
Oval metates can be subdivided into two subcategories by size:

Large (1 whole specimen, 5 fragments). Dimension in cm: length, 37.3 (1 example); width, 19.8–28.7, average 24.0; height, 7.2–9.5, average 8.5. Grinding surface: length, 32.9 (1 example); width, 15.4–26.2, average 20.1; depth, 0.9–8.0, average 3.3.

Small (4 whole specimens). Dimensions in cm: length, 12.5–16.2, average 14.4; width, 9.7–11.1, average 10.2; height, 4.3–7.0, average 5.4. Grinding surface: length, 7.7–11.6, average 10.0; width, 5.4–7.3, average 6.6; depth, 0.2–1.0, average 0.7.

(Twelve fragments were not classified into the two subcategories.)

These metates, oval in shape and legless, fall into two definite size categories. Although the large metates were apparently used for maize grinding, it is uncertain what food or materials were ground on the smaller ones.

The differential distribution of these artifacts appears to be significant. The large oval metates are generally associated with Cantera phase house structures. One of the four complete metates comes from within the inner structure of the large Formative period earthen platform mound on the Plaza Central (Str. 4) and thus dates to the Amate phase. The remaining three come from T-25—two from a pre-altar, Barranca phase trash pit adjacent to the altar (see Chapter 7), the third in association with late Cantera wall lines on the north side of the terrace. Although no direct comparisons have been found between small oval metates and those described at other central highland sites, the large oval metates are similar to Tehuacan's boulder trough metates and basin-shaped metates (MacNeish, Nelken-Terner, and Johnson 1967: 118–120, Fig. 99).

Egg-Shaped Metates *(1 whole specimen, 10 fragments; Fig. 20.2f)*
Dimensions in cm: length, 25.4 (1 example); maximum width, 12.8–17.9, average 15.8; thickness, 3.6–10.2, average 7.1. Grinding surface: length, 17.2 (1 example); maximum width, 8.9–12.2, average 10.5; depth, 0.1–2.1, average 0.9.

These metates are egg-shaped boulders with oval grinding areas. While occurring in Cantera phase deposits, they may also continue into the Classic period. The closest similarities lie with the "boulder metate-milling stones" at Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967: 118, Fig. 98).

Irregular Metates *(1 whole specimen, 8 fragments)*
Dimensions in cm for single whole specimen: length, 35.7; width, 20.0; thickness, 10.9. Grinding surface: length, 32.2; width, 15.5; depth, 0.4.

These are irregularly shaped boulders which do not fit within the categories above. They seem similar to "boulder metate-milling stones" described for Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967: 118, Fig. 98). It is possible that our egg-shaped and irregular metates should be combined into a single category.

Flat Palettes *(11 whole specimens, 22 fragments)*
Dimensions variable.

These are irregular, unshaped flattish stones which exhibit grinding wear on one flat surface. They are similar to "whetstones" described by MacNeish, Nelken-Terner, and Johnson (1967: 126) from Tehuacan. Twenty-six of the thirty-three specimens from our excavations come from Plaza Central contexts, with 55 percent of the total quantity coming from the Structure 2 complex area. This area, as has been noted, produced the greatest quantity of iron ore fragments found on the site. Some of these iron ore specimens had been ground flat on one surface. However, none of the flat palette-like stones recovered contained any visible traces of hematite pigment.

Bark Beaters

Oval Beaters *(3 specimens; Fig. 20.3)*
Dimensions in cm: (*a*) length, 15; maximum width, 13.5; maximum thickness, 7.25; (*b*) broken length, 11.5; broken width, 10; thickness, 4.5; (*c*) broken length, 6.7; broken width, 9; thickness, 3.75.

Oval beaters are heart-shaped stones (maximum width near one end of the long axis, with a long taper to the artifact), with striations running parallel to the long axis. On artifact *a* (Fig. 20.3*a*), the striations are crudely engraved and not quite parallel. On artifacts *b* (Fig. 20.3*b*) and *c* (Fig. 20.3*c*) they are better executed. On *a* and *b*, the striations cover a surface area of only about 6 × 4 cm, while on *c*, they run across the entire width of the stone (which is broken, so their length is unknown). Artifacts *a* and *c* have curved surfaces which are striated, while *b* has a flat surface.

Artifacts *b* and *c* are surface finds. Beater *a* occurred in a Cantera phase archaeological context. Although some disturbance was present in the context, it

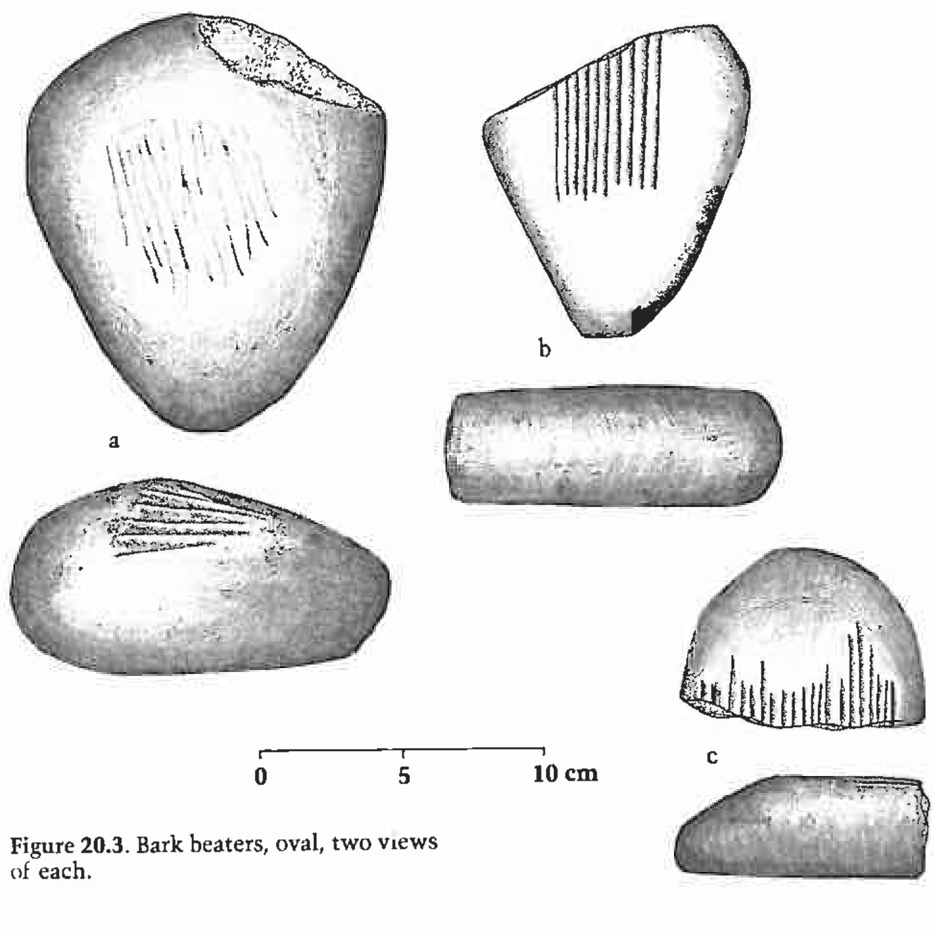

Figure 20.3. Bark beaters, oval, two views of each.

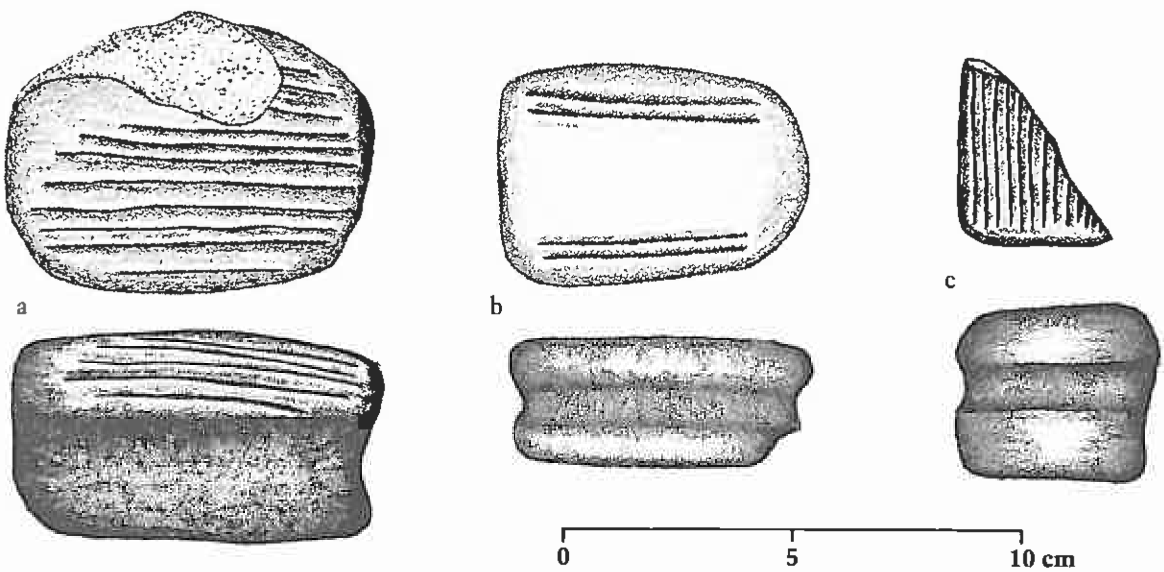

Figure 20.4. Bark beaters, rectangular, two views of each.

is due to intrusive Cantera phase burials. These artifacts could have been hand-held or anvil stones, for no hafting grooves occur such as are found with rectangular beaters (see below). Christine Niederberger (1976: Pl. 30, no. 10) illustrates a striated stone of slightly similar shape from Manantial phase deposits at Zohapilco. If these artifacts are bark beaters, they are the earliest reported for Mesoamerica.

Rectangular Beaters *(3 specimens; Fig. 20.4)*

Dimensions in cm: (*a*) length, 8.25, width, 6.25, thickness, 4.8; (*b*) length, 6.8, width, 4.7, thickness, 2.1; (*c*) too fragmentary to measure except thickness, 3.8. Hafting groove is 1 cm wide and ca. 4 mm deep.

The form of these three artifacts is typical of Mesoamerican bark beaters. They are rectangular stones which have an encircling groove around their side for hafting (see MacNeish, Nelken-Terner, and Johnson 1967: Fig. 135 for hafted example). Two artifacts in our sample, *a* (Fig. 20.4*a*) and *b* (Fig. 20.4*b*), have parallel striations on both sides, while *c* (Fig. 20.4*c*) has them on only one side. One striated surface of *a* is flat, and the other is slightly curved. The hafting groove on *a* is wide and shallow, while on *b* and *c* it is a deep channel. Both ends of artifact *a* are worn, as if part of the tip of the beater was used for grinding. Beater *b* has striations on both sides but only along the edges, suggesting that the central striations may have been ground down through other use of this artifact. Thus, two of the three beaters may also have been used for grinding.

Beater *a* is a surface artifact from the Plaza Central, while *b* and *c* are from Classic period deposits. Bark beaters and their distribution in Mesoamerica are well described most recently by Thomas A. Lee (1969: 129–131), and earlier by A. V. Kidder, Jesse Jennings, and Edwin M. Shook (1946: 143) and Paul Tolstoy (1963).

***Smoothing Stones* (Fig. 20.5)**

Flat Stone with Stub Handle *(1 specimen; Fig. 20.5a)*

Dimensions in cm: length, 13; width, 9; thickness, 5–6. The "handle" is ca. 4.5 cm in diameter and 6 cm long. It is located two-thirds of the way along the body of the stone.

This is a stone worked into a rectangular shape, with a projecting rounded "handle." The sides and base are shaped to flat surfaces, although the exterior is only slightly smoothed (rather than ground to a completely smooth finish).

Stones such as this could have been for flat grinding, and there is evidence that these may have been used as plastering trowels as well (Acosta 1964: 56). Although this type of handle is rare on these artifacts, odd-shaped handles do occur (Lee 1969: Fig. 83*a*; Tolstoy 1971b: Fig. 6*h*). As Tolstoy points out (1971b: 289), artifacts of this type begin as early as El Arbolillo I and may also occur at Tlatilco. They are not uncommon at Classic and Postclassic sites. The dating of the Chalcatzingo specimen is Cantera phase.

Flat Stone with Rectangular Handle *(1 specimen; Fig. 20.5b)*

Dimensions in cm: broken length, 6; width, 6.75; height including handle, 7.25.

Found on the surface of CT-1, this is a fragment of a flat-based rectangular stone, with the upper section sloping up into a vertical handle which runs almost the entire length of the artifact. The handle is slightly convex on both sides, allowing for gripping. This stone is more typical of smoothing stones than the artifact described above, and is like Tolstoy's "blotter variety" (Tolstoy 1971b: 289, Fig. 6f) which he states is most abundant at Classic sites, and like smoothing stones illustrated by Angel García Cook (1967: Pl. 33, nos. 1, 2).

Flat Stone with Perforated Handle *(1 specimen; Fig. 20.5c)*

Dimensions in cm: length, 7.75; handle length, 6.75; worn width, 5.75; estimated original width, ca. 7; height, 6.

This is a short rectangular smoother with a rectangular handle which is perforated through to form a rectangular loop. The handle is only 1 cm shorter than the body length. The sides of this artifact taper upward from the base at about 33°, but one side has been worn, apparently through use, into an opposite taper (inward toward the base) of ca. 40°.

This type of smoother is similar to Tolstoy's "flatiron type" (Tolstoy 1971b:

289, Fig. 6h) but not as well made. The wear pattern, if from use, suggests that the artifact was used for a grinding function rather than for smoothing plaster (a function normally attributed to these artifacts). This specimen is probably Classic period in date.

Flatiron Smoother *(1 specimen; Fig. 20.5*d)

Dimensions in cm: flat arm length, 5; width, 3.5; thickness, 1.5; rounded arm length, 4; diameter, 2.

This is an L-shaped fragment of stone with one arm wide and flat and the other arm rounded. The surface is generally smooth. It is similar in shape to "flatiron pestles" described from Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967: 85, Fig. 105). This specimen is a surface find and cannot be dated.

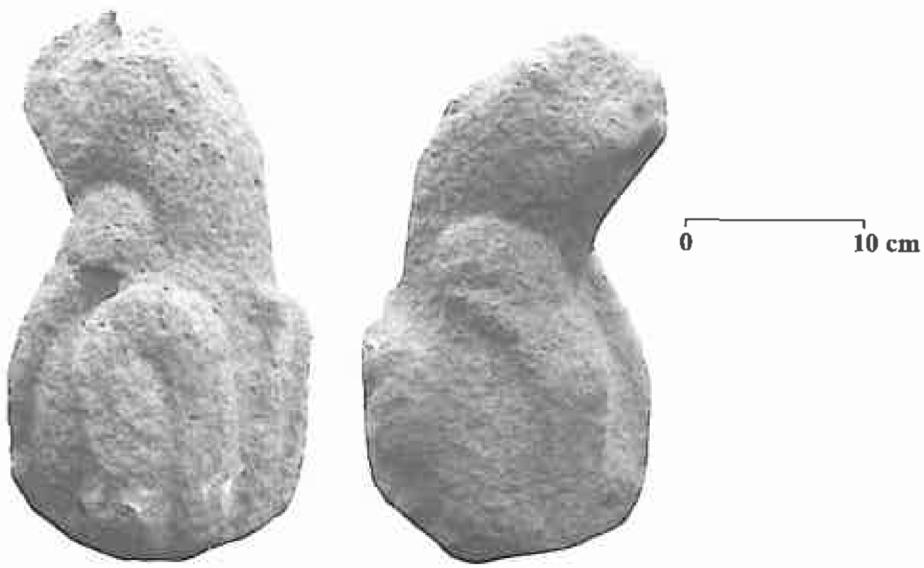

Figure 20.6. Animal sculpture, two views.

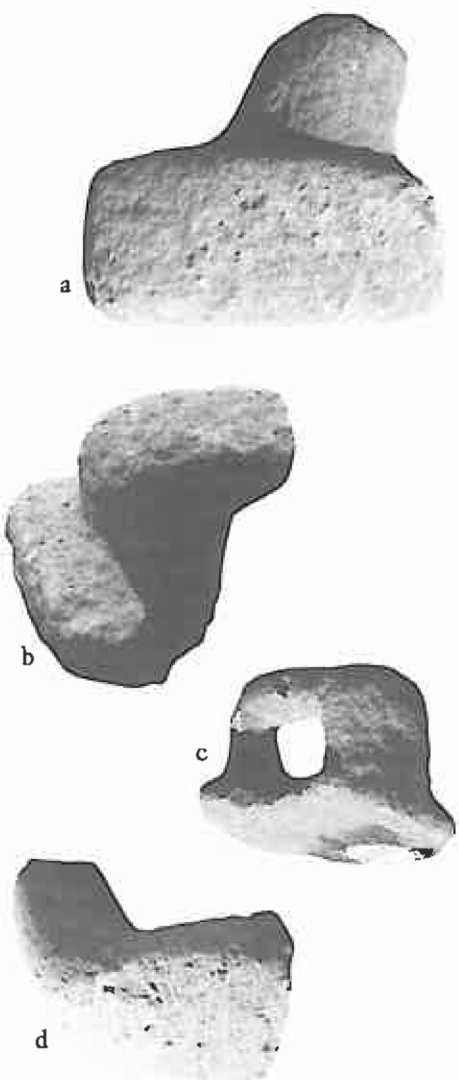

Figure 20.5. Smoothing stones. (Scale varies; see text for dimensions.)

PORTABLE SCULPTURE

A variety of artifacts have been placed within the category of portable sculpture. Most of them are stone heads or figurines. Several of the objects, such as the "plug," are more difficult to classify, and their inclusion within this category is highly subjective. To avoid confusion, Formative period sculptures are separated from Classic and Postclassic sculptures.

Formative Period Sculptures

Animal *(1 specimen; Fig. 20.6)*

Dimensions in cm: height, 30; width and thickness, 15–16.

This small carving depicts a seated animal, presumably a feline or canine. The facial area of the head is broken, but two rounded ears (or bulging eyes) occur near the rear of the head area. A medium-sized tail is depicted running up the animal's back. There are no other known Chalcatzingo carvings that resemble this animal, and no other similar carvings have been reported in the central highlands from this time period, but the known carving sample is small. La Venta Monument 41 (Clewlow and Corson 1968: 175, Pl. 11b) depicts a small carved "jaguar." This indicates that occasional small animal carvings were made on the Gulf Coast during this period. The La Venta piece is similar to the Chalcatzingo carving only superficially: both are stone, both represent animals, and both are in a seated position. The context of the Chalcatzingo specimen on T-25 suggests it is Cantera phase in date.

Cylinder, Carved *(1 specimen; Fig. 20.7)*

Dimensions in cm: length, 19; diameter, 12.5.

This stone cylinder has one broken end, indicating that it was part of a larger sculpture. A 7 cm wide shallow groove is carved across the unbroken end of this artifact. Such grooves also occur on several other sculptures described below. The circumference of the cylinder is carved with a pair of undulating lines which show similarities to "rattlesnake rattles" of stone carvings from later periods. Below the undulating lines is a line setting this area off from the remainder of the cylindrical shaft.

Figure 20.7. Carved cylindrical object.

Found near Monument 22 (the altar) on T-25, the artifact comes from a Cantera phase context which predates the altar.

Figure ***(1 specimen; Fig. 20.8a)***
Dimensions in cm: height, 8; maximum width, 7.25; maximum thickness, 6.

This small anthropomorphic figure is missing its head and arms. The body is fairly naturalistic and is executed in a squatting position. The surface is granular and semi-smoothed. Dating of this figure is uncertain since it occurred in a mixed Cantera phase–Classic period level on T-11.

Figurine ***(1 specimen; Fig. 20.8b)***
Dimensions in cm: broken height, 9; width at hips, 6.5; thickness, 3.

Unlike the other stone figurines described here, this figurine is very similar in its execution to the bodies of the Middle Formative ceramic figurines recovered during our excavations (see Chapter 14). This figurine is fragmentary, lacking the head and one arm. Its surface is granular and only partially smoothed.

Three-Section Figurines ***(3 specimens)***
(*a*) (Fig. 20.8*c*). Dimensions in cm: height, 10; width, 4; thickness, 6.

This is a crude, oval anthropomorphic figure. The surface is granular and unsmoothed. Two pecked grooves circle the body, delimiting the head, torso, and lower body area. No arms or legs are shown, but a very simple face is depicted primarily by a nose and shallow eyes.

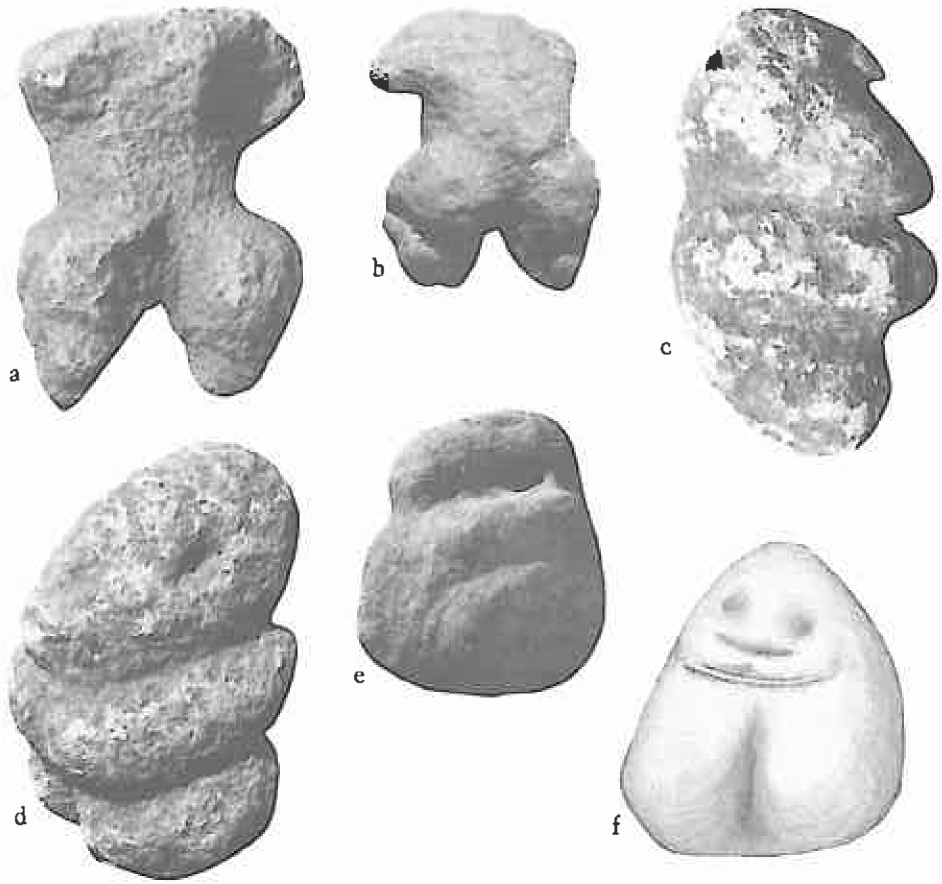

Figure 20.8. Carved figurines. (Scale varies; see text for dimensions.)

Although this particular figurine comes from a surface collection on T-4, it is very similar to figurine *b* (below) which was found in a good Cantera phase context. Thus figurine *a* is probably also a Cantera phase artifact.

(*b*) (Fig. 20.9*d*). Dimensions in cm: height, 10.5; maximum width, 7; maximum thickness, 7.5.

This is apparently a zoomorphic figurine, since the head appears as a long snout, with the eyes far back on the head. Nostrils and a small mouth are also shown. The surface is granular and unsmoothed. Two deeply pecked grooves circle the body, setting off the head, torso, and leg areas (as in figurine *a*). Small grooves on the figurine's front delimit fore and hind limbs.

This artifact was found within a layered Cantera phase trash deposit on T-21. A radiocarbon date from this deposit (N-1950) provided a date of 830 ± 85 BC, which is consistent with our other Cantera phase dates (see Chapter 5). Although only figurine *b* out of the three comes from a good archaeological deposit, figurines *a*, *b*, and *c* suggest that three-section oval or roundish crude stone figures may have been relatively common during the Cantera phase. No figurines of comparable antiquity are illustrated from other central Mexican sites.

(*c*) (Fig. 20.8*c*). Dimensions in cm: height, 7; maximum width, 6.75; maximum thickness, 5.5.

This oval figurine found on the surface of N-7 is shorter and wider than figurines *a* and *b*, but like them is divided by pecked grooves into three sections. The face has the eyes set well back, leaving a long, snout-like face. Legs are depicted by shallow grooves along the figurine's sides.

Pebble Figurine ***(1 specimen; Fig. 20.8f)***
Dimensions in cm: height, 5.5; maximum width, 6; maximum thickness, 5.

This figurine is simply a large pebble, only slightly reworked to create a crude zoomorph by adding a face and taking advantage of the natural contours of the pebble. The back of the stone appears broken, but it is difficult to tell if this break took place before or after the simple face was added. If this artifact had not occurred in a subfloor trash pit feature within the site's elite Cantera phase residence, PC Structure 1, it would be tempting to view it as a recently made "joke" due to its simplicity and crudeness.

This figurine, together with the three-section figurines, indicates that crude stone figures were present on the site during the Cantera phase in both elite and non-elite areas.

Handstone ***(1 specimen; Fig. 20.9)***
Dimensions in cm: length, 24.5; height, 19.5; width, 9.5.

The artifact is a three-quarter round stone circle with a carved-out handle offset to one side. The base of the carving is not flat but lightly undulating (shallow undulating grooves perpendicular to the object's long axis). The stone was found associated with Cantera phase PC Structure 2.

Objects of this type occur primarily along Mexico's Gulf Coast and in southern Mesoamerica. They are frequently described as ball game handstones, and are well discussed by Stephan F. de Borhegyi (1961; 1967). Although they generally occur in Late Classic period contexts, a Late Formative example is mentioned by Lee (1969:149); C. W. Weiant (1943:119) identifies "sling stones" with loop handles from the Ranchito zone of Tres Zapotes (undated context); and Borhegyi (1967: Fig. 2*a*, 2*b*) illustrates a circular stone ball with a loop handle from La Venta. This last is possibly a Middle Formative carving and thus contemporaneous with the Chalcatzingo example, although in form the two are not similar. In form the Chalcatzingo specimen is more similar to the Veracruz "padlock stones" illustrated by Miguel Covarrubias (1957: Fig. 72, second row) and to a more crudely made handstone from Kaminaljuyu, Guatemala (Borhegyi 1967: Fig. 7, no. 4).

The function of "padlock stones" is still unclear. That some objects of similar form may have been used in ball games in the Classic and Postclassic periods is clear from carvings and figurines (Borhegyi 1967), but, as others have pointed out, there are no data to suggest that heavier stone objects of the general form depicted as carried by ball players necessarily functioned in the same manner. This would be particularly true of Formative period examples. While some form of the rubber ball game was probably played on the Gulf Coast, possibly even in formal ball courts by the late Middle Formative (Coe 1970:29; Wyshak et al. 1971), there are no data to suggest that the Chalcatzingo handstone was necessarily connected to this.

Borhegyi (1967:215–216) has suggested that the "knuckle dusters" carried by individuals and some supernaturals in Olmec carvings may be similar in form and function to ball game handstones. Since they are carried at times by supernaturals, and since in form they are really dissimilar to known handstones, I see no validity to that argument based upon our present data. It should be mentioned that La Venta Monument 19 (P. Drucker, Heizer, and Squier 1959: 198) depicts a seated individual holding an object which is similar in general form to the La Venta handstone illustrated by Borhegyi (1967: Fig. 2*a*, 2*b*), although no function can be ascribed to the object except that by context it does not appear ball game related. Finally Weiant (1943:119) suggested that the Tres Zapotes "sling stones" functioned for "ironing" or smoothing. If such were the case for the Tres Zapotes artifacts, it does not appear to have been the function of the Chalcatzingo handstone because of its undulating base.

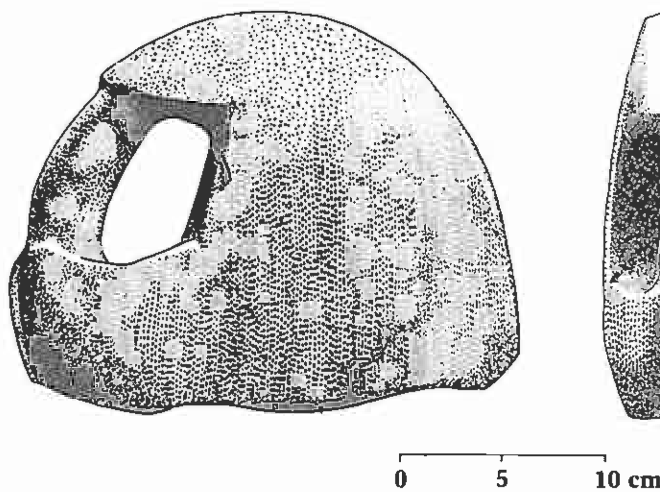

Figure 20.9. "Candado" handstone, two views.

Rectangular "Plug" ***(1 specimen; Fig. 20.10)***

Dimensions in cm: height, 32; maximum width of shaft, 16, tapering to 12. Base: length, 20; width, 20; thickness, 10.

This artifact is broken in two pieces. One end is a large square with rounded corners. A tapering rectangular shaft extends from this larger square section. The other, smaller end of the carving is flattish, but with a 7 cm wide shallow groove running across it.

This artifact was found during exploratory trenching of the T-15 earthen water control dam in a context which suggests that it postdates the dam construction. Dating is therefore uncertain, but it is probably Formative period. A similar stone "plug" found on the site is in the possession of a Chalcatzingo villager. La Venta Monument 43 (Clewlow and Corson 1968:175, Pl. 11c), while cylindrical, has a similar form.

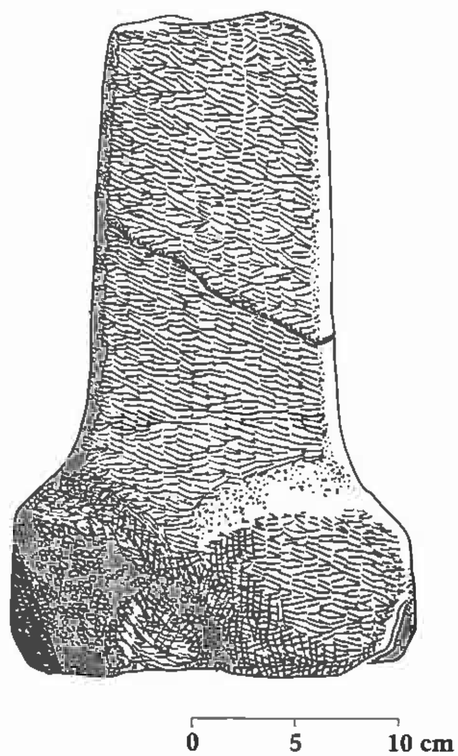

Figure 20.10. Rectangular "plug."

"Yuguito" Fragment ***(1 specimen; Fig. 20.11a)***

Dimensions in cm: external diameter, ca. 15; internal diameter, ca. 8.4; width, 12.5; external circumference of broken section, 16.5.

This fragment appears similar in shape to Formative period stone "yuguitos"

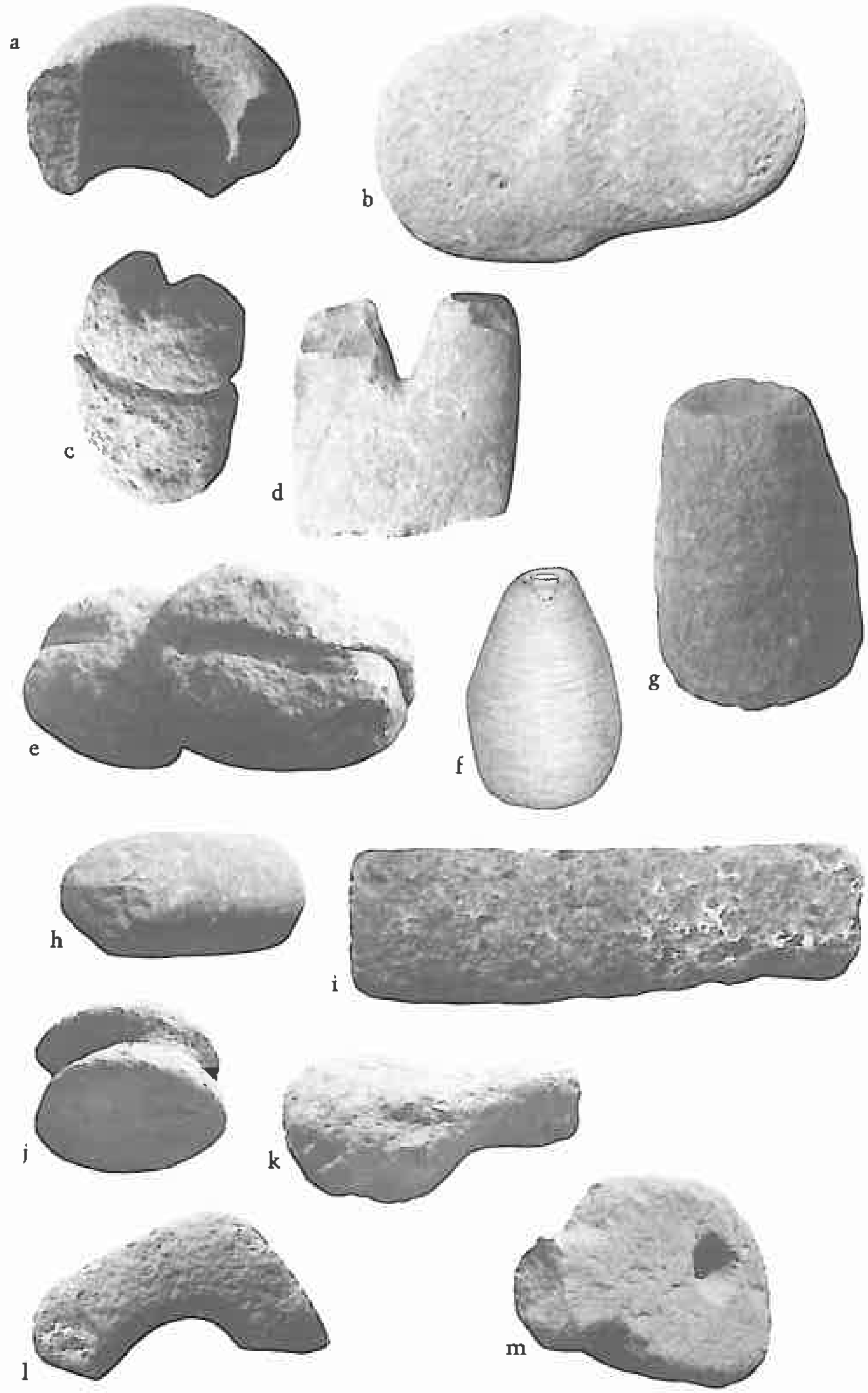

Figure 20.11. Miscellaneous stone objects: *a*, "yuguito"; *b*, T-shaped "axe"; *c*, V-notched stone; *d*, fragmentary V-notched stone; *e*, bi-lobed grooved stone; *f–g*, conical stones with perforated tops; *h–i*, cylindrical rods; *j*, disc; *k*, hammer stone; *l*, rectangular perforated stone fragment; *m*, unidentified stone object with ground depression. (Scale varies; see text for dimensions.)

(small yokes). It is undecorated but very well executed. The surface has been ground smooth. For purely descriptive reasons, it can be said that if the fragment were continuous, it would have formed a stone cylinder or "bead" with an outer diameter of ca. 15 cm and an inner diameter of ca. 8.4 cm. In transverse section the outer surface of the stone is slightly rounded from end to end, while the surface is relatively flat. There are no data to suggest the original complete form of this artifact. Both ends are broken. It is Cantera phase in data and was associated with PC Structure 2.

"Winged Phallus" ***(1 specimen; Fig. 20.12)***

Dimensions in cm: height, 32; maximum diameter, 22. The cap tapers in thickness from 6 to 4 cm.

This unusual artifact, somewhat reminiscent of Guatemalan mushroom stones, has a slightly tapering vertical body which ends in a truncated conical cap (tapering horizontally from front to back). The cap is lightly grooved on one side, lending a phallic appearance to the cap and the carving as a whole. The top of the cap is flattish and has a smoothed surface, indicating that the cap was purposely carved and not broken into the truncated form. The unusual feature of the carving is a pair of raised wing-like elements on the body. The base of the carving has a wide, rounded, shallow groove running from front to back. Such shallow basal grooves are a feature on several other specimens discussed in this chapter.

Aside from some vague similarities to mushroom stones, no similar carvings in this form are known from Formative period Gulf Coast, Chiapas, or central Mexican highlands. The wing-like elements and the flattish cap suggest that the carving is not a mushroom stone, nor is it a reworked mushroom stone. There is no evidence to suggest that this carving is in anything other than its original form. The carving was found at the base of a trash pit which occurred in a subfloor level of PC Structure 1, which dates to the Cantera phase.

Classic Period Sculptures

"Flower" ***(1 specimen; Fig. 20.13a)***

Dimensions in cm: maximum diameter, 21; thickness, 6.5; diameter of central hole, ca. 5.

This sculpture is in the form of two concentric circles from which emanate four petal-like lobes. The overall form is circular. The "flower's" center is a hole which passes through the carving. Each "petal" has a raised edge. This limestone artifact was found broken within a Late Classic trash pit intruded into the T-6 platform structure.

Tlaloc Head *(1 specimen; Fig. 20.13*b*)*
Dimensions in cm: height, 15; width, 13; thickness, 10.

This is a crude, oval, coarse-surfaced stone Tlaloc head. The eyes are crudely executed depressions ringed by engraved circles. The nose is bulbous and protruding. The upper vertical line of the mouth extends almost completely across the lower section of the face, while below it seven vertical lines extend to the base of the stone. All lines are crudely engraved. A circular depression is pecked into the central area of the vertical lines, and perhaps once could have held a small greenstone inset. The bottom of the head is slightly flattened.

This head was found in association with the site's Late Classic circular pyramid. Such pyramids are normally considered to be affiliated with the wind god, and thus the Tlaloc association can be considered unusual. It is likewise unusual to find a Tlaloc head with a concavity apparently for the inset of a greenstone.

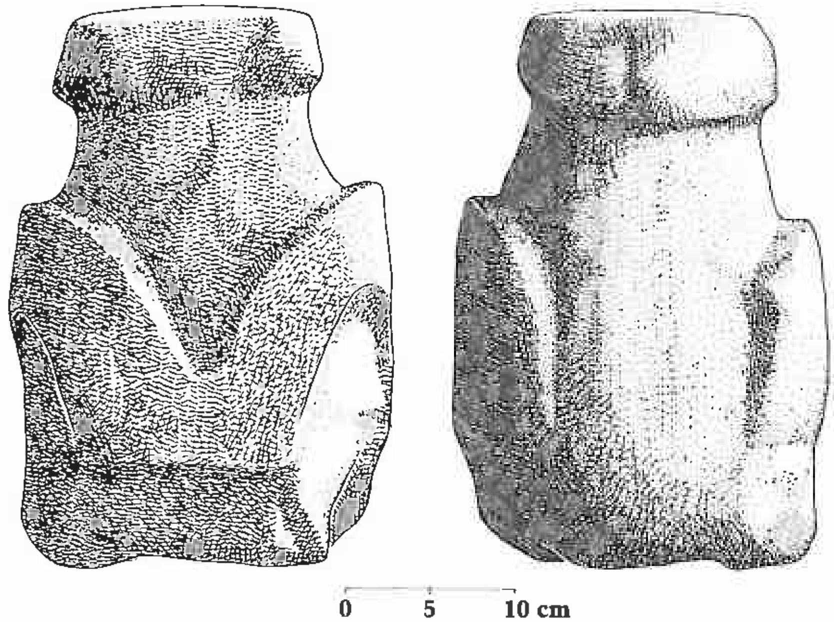

Figure 20.12. "Winged phallus," two views.

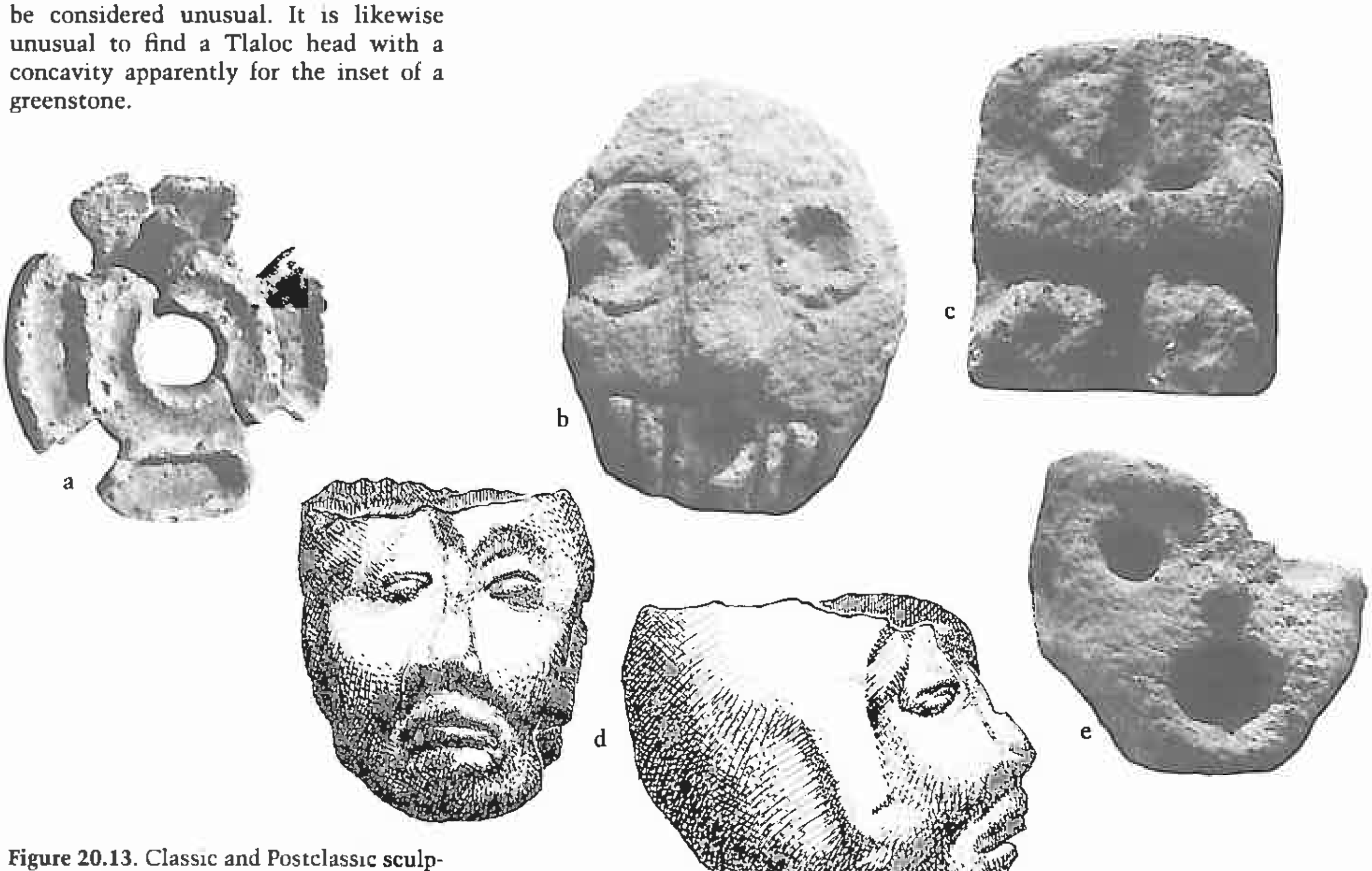

Figure 20.13. Classic and Postclassic sculptures: *a*, "flower"; *b*, Tlaloc head; *c*, broken figurine; *d*, lava head (two views); *e*, stone head. (Scale varies; see text for dimensions.)

Postclassic Period Sculptures

Figure ***(1 specimen; Fig. 20.13c)***

Dimensions in cm: height (broken), 23; width, 19; thickness, ca. 9.

This blocky, rectangular, headless female statue has a rough surface, unsmoothed. Two breasts, simple arms held across the midsection, and two blocky legs are depicted. This sculpture is similar stylistically to Postclassic carvings from central Mexico.

Heads ***(2 specimens)***

(*a*) (Fig. 20.13*d*). Dimensions in cm: height (broken), 10; width, 10; depth, 12.

This head of dark igneous stone is a single carving and not originally part of a statue. No neck area is represented. The forehead and top are broken and missing, but this break has the same color and weathering as the majority of the carving and thus is probably quite old. However, a relatively fresh break has destroyed a section of the right rear side of the head. The head is long and relatively narrow; the features are sharply defined. The ear area is covered by hair or a helmet. Stylistically this carving is Postclassic. H. B. Nicholson (personal communication) has noted similarities of this sculpture to representations of the Aztec deity Xochipilli.

No other carvings of this sophistication and style have been reported (or seen by us in villagers' collections) from the site. The carving was found on the surface while we were preparing to photograph the newly uncovered Monument 12. Much of the surrounding fill had Postclassic sherds, again suggesting that this head, if originally part of the slope wash in that area, is Postclassic.

(*b*) (Fig. 20.13*e*). Dimensions in cm: height (broken), 21; maximum width, 23; thickness, 16. Facial features: mouth diameter, 7; eye diameters, 5–6.

This broken simple sculpture of a human head is relatively flat. The eyes and mouth are deep ground depressions, giving the face the vacant stare of Xipe representations. The nose protrudes slightly. A raised eyebrow area occurs over the right eye. The entire forehead and part of the left eye have been broken off. Low relief carved ears occur on both sides of the head. A large carving with similar eye and mouth treatment was in the possession of a Chalcatzingo villager.

This carving was found on the surface of a small mound at the summit of the Cerro Delgado. Although this mound was not test-excavated, surface collections and test excavations of other areas of the upper Cerro Delgado indicate Middle Postclassic activities in that site area. It is therefore probable that this head is Middle Postclassic in date.

MISCELLANEOUS ARTIFACTS

Artifacts placed within this miscellaneous category are of unknown or dubious function. Unless otherwise noted, all artifacts are manufactured from igneous rock. Most of these objects date to the Formative period.

"Awl" ***(1 specimen)***

Dimensions in cm: length, 7.5; width, 2; thickness, ca. 0.5.

This artifact, from a Cantera phase level on T-24, is flat and thin with a tapering rounded point. Its rounded tip may be wear-related. It is similar in general shape to chipped stone "perforators" (e.g., García Cook 1967: Pl. 30), although this is ground stone. The thinness of the artifact indicates that it could not have been used with great pressure.

"Axe, T-Shaped" ***(1 specimen; Fig. 20.11b)***

Dimensions in cm: length, 24.5; body width, 12.5; maximum width of rounded flaring head, 14.5; maximum thickness, 7.5.

This is a large, well-made stone artifact whose surface has been ground relatively smooth. The artifact has an oval shape which slightly flares to a rounded T shape at one end. In cross-section both length- and widthwise, the artifact is an elongated oval.

The function of this piece is unknown. No clear wear marks occur. Its context on T-23, near a fragmentary wall line and adjacent to Cantera phase house walls, does not help indicate function but does date this object to the Cantera phase. The artifact has a smoother surface than most stone artifacts discussed.

Axe-like, V-Notched Stone ***(2 specimens)***

(*a*) Complete axe-like stone (Fig. 20.11*c*). Dimensions in cm: length, 5.25; maximum width, 3.2; maximum thickness, 2.4; maximum notch depth, 0.5.

This small stone artifact is similar in general shape to "Olmec" axes in that one end is notched by a V-shaped groove. The object, in frontal view, tapers slightly from the wide, notched end. However, in side view there is little taper, and in this regard it is dissimilar to Olmec celts and axes. The surface is granular and only slightly smoothed. A groove runs across both sides and the front of the object 1.75 cm from the notched end, exactly one-third of the way from that end to the other. The notched end is flat, and the stone can stand upright when placed on it, while the opposite end is rounded.

No similar artifacts other than notched "celts" and "axes" are published for the Middle Formative. It may be that this artifact had a symbolic function. The notched celts may be symbolically similar to the notched fangs which emerge from the mouths of various Olmec supernaturals. A similar motif, a group of three notched elements, appears at the tip of the tail of the lower jaguar on Chalcatzingo Monument 4 (see Chapter 9). This specimen was recovered from the T-24 Cantera phase structure.

(*b*) Fragmentary notched stone (Fig. 20.11*d*). Dimensions in cm: broken length, 6.5; width, 6; thickness, 2.

This artifact is a fragment of an axe-like stone, found on the surface of T-9. It has a deep (2 cm deep, 2 cm wide) V-shaped notch at the unbroken end. The sides of the artifact are tapered (unlike artifact *a* described above), and the surface has been ground smooth. It is much better made than artifact *a*. While it is similar to Olmec celts, no engraving occurs on this piece. It is possible that the notch had some type of functional use, for the base of the notch is U-shaped and appears to have been ground or worn into this shape. But this wear may be related to the manner in which the notch was cut and the entire artifact smoothed rather than to artifact function. Possible symbolism of the notched axe is briefly discussed with artifact *a* (above).

Balls ***(56 specimens)***

Dimensions in cm: diameters, 2.5–5.

These small stone balls do not have any differential grinding or smoothing on one surface to indicate that they may have functioned in grinding. The majority are made from vesicular basalt.

The distribution of stone balls at Chalcatzingo is interesting. Most occur in Cantera phase contexts but range from the Barranca to the Postclassic. Over half were found in association with Cantera phase structures on the Plaza Central, the ceremonial area of the site. Eleven balls come from excavations in the high caves on the Cerro Delgado and are primarily Early Postclassic in date.

Similar stone balls are found at many Formative period sites, including Middle and Late period Zacatenco, Period II and Late period El Arbolillo, and all periods at Ticoman (Vaillant 1930: Pl. 45, Table I;

1931:305, Pl. 89; 1935:243, Table 21), and equivalent phases at Zohapilco (Niederberger 1976:78, Pls. 29, no. 8, 31, no. 13).

Bi-lobed Grooved Stone *(1 specimen; Fig. 20.11e)*

Dimensions in cm: length, 21; width, 11; thickness, 9.

This unusual artifact is from a Cantera phase context on PC Structure 4. It is a very crudely shaped oval bi-lobed stone. Its surface is irregular, but some smoothing has been carried out. When viewed from the front, the artifact's general shape is that of a bi-lobed axe. However, the side view shows the stone to be thick, with little tapering toward the edges.

The unusual feature of this stone is a flat, shallow, ca. 1 cm wide groove which completely circles the stone's lateral edge, essentially bisecting the artifact. This groove follows slight undulating concavities in the stone's surface, indicating that the groove was cut purposely and is not the result of functional wear. The bi-lobed effect is caused by a wide, deep pecked and ground groove running at right angles to the artifact's long axis. This groove passes through the shallow flat groove, and therefore was cut following the engraving of the shallow groove.

Conical Stones with Perforated Tops *(2 specimens)*

(*a*) (Fig. 20.11*f*). Dimensions in cm: length, 6.25; diameter, 4; hole diameter, 1; hole depth, 1.

This small, egg-shaped stone with a shallow hole drilled into its narrow end was found in the T-9B Barranca phase house structure. Its surface is relatively rough.

(*b*) (Fig. 20.11g). Dimensions in cm: height, 20; maximum diameter, 14; minimum diameter, 10; concavity diameter, 9; depth, 1.5.

This granodiorite artifact is a tapering cylinder with a concave depression ground into the narrow end; the wide end is flat. The surface is smoothed. Dating is uncertain because the artifact comes from a mixed Middle Formative–Classic period deposit on T-24.

Artifacts *a* and *b* are similar in form but not in size nor apparently in function. The upper hole in *a* is small and appears to have been drilled. The upper concavity of *b* appears to have been made by grinding. The form of artifact *b* is similar to that of certain pestles, but there are no data to suggest it served such a function.

Cylindrical Rods *(2 specimens)*

(*a*) (Fig. 20.17*h*). Dimensions in cm: length, 16; diameter, 5.5–6.5.

This artifact is a cylindrical rod with one rounded and one flat end. The side surfaces are ground very smooth. Its context on T-4 is mixed Middle Formative–Classic period. Somewhat similar cylinders are shown from the Francesa phase at Chiapa de Corzo (Lee 1969:Figs. 103*d*, *e*, 104*c*), and described as "manos" at Tehuacan (MacNeish, Nelken-Terner, and Johnson 1967:Fig. 93, top and center) and La Nopalera (García Cook 1967:Pl. 38, no. 3). The rounded tip of the Chalcatzingo artifact is battered, suggesting that it was used at one time for pecking or hammering.

(*b*) (Fig. 20.11*i*). Dimensions in cm: length, 35; diameter, 9.5.

A relatively cylindrical rod with a slight taper and generally flat ends, this artifact has a rough surface. The roughened surface indicates that the object did not function as a grinding implement. It was found in the excavations of PC Structure 1 and is Cantera phase in date.

Discs *(4 specimens)*

(*a*) (Fig. 20.11*j*). Dimensions in cm: diameter, 6.75; thickness, 4.5; encircling groove width, 2.

This circular stone disc with slightly convex top and bottom is fully grooved around its diameter. It resembles a stone yo-yo. Its surface is fairly smooth. In general shape this artifact is similar to stone mauls or hammers (García Cook 1967: Pl. 41, nos. 2, 3; MacNeish, Nelken-Terner, and Johnson 1967:Fig. 109). MacNeish, Nelken-Terner, and Johnson (1967:130) mention that Tolstoy recovered a maul of this shape from El Arbolillo 2. The Chalcatzingo example shows no wear marks from pounding or grinding and is considerably thinner and flatter than the described examples. It was found on T-23 in a Cantera phase context.

(*b*) Dimensions in cm: diameter, 10.5; thickness, 3.5.

A circular stone disc, this artifact has flat ground surfaces and lightly rounded edges. A shallow, small hole has been pecked into the center of the disc on each side. A similar disc with pecked central holes is reported from Zohapilco's Ayotla and Manantial phases (Niederberger 1976:Pl. 30, no. 4). Niederberger (1976:75) suggests that these discoidal stones may have served as both grinding stones and anvil stones, but I am not convinced that the Chalcatzingo artifact functioned in that manner. Because it was found during the T-27 excavations in a Cantera phase area with Late Formative intrusions, this artifact is probably Cantera phase, although the possibility exists that it might be Late Formative.

(*c*) Dimensions in cm: diameter, 12.5; thickness, 4.5; maximum diameter of tapered perforation, 6; diameter of hole, 2.

This fragment is half of a circular stone disc with tapered perforations on each side. The tapered perforations meet to form a hole ca. 2 cm in diameter. The edges of the disc are rounded.

The function of this artifact is difficult to determine. It is similar in form to stone "rings" illustrated from Tres Zapotes (Weiant 1943:Figs. 2–3, 5–7) and to the Classic period "club head" from Teotihuacan illustrated by Tolstoy (1971b:Fig. 105). Stones of this form could also have functioned as digging stick weights. This artifact was found on the surface of T-9B, and thus the dating is uncertain. Surface artifacts from T-9 are primarily Barranca and Cantera phase. Barranca phase artifacts are generally from the northern (B) area of the terrace.

(*d*) Fragment. The curvature of the finished (serrated) edge suggests that if this were part of a disc, the diameter would have been ca. 17 cm.

This Barranca phase artifact was found in the PC trench excavation and is a small fragment of what appears to have been a stone disc with a thinner, serrated (notched) edge.

Hammer Stone *(1 specimen; Fig. 20.11k)*

Dimensions in cm: length, 13; width (diameter of circular area), 7.5; thickness, 4.

In front view, the artifact appears circular with a long tapering "handle," but it is nearly flat in side view. The surface is unsmoothed. Its shape and battered edges indicate that it may have functioned as a hammer stone. Uncovered in the PC Structure 5 excavations, it is Cantera phase in date.

Oblong, Polished Stones *(5 specimens; Fig. 20.14)*

Dimensions in cm: length, 1.9–5.1; width, 1.9–2.4; thickness, 0.7–1.6.

These are small, oblong stones with highly polished surfaces. Most of them are oval in cross-section. They may be similar to the *bruñidores* (polishing stones) from Formative period contexts at Zohapilco (Niederberger 1976:77–78, Pl. 31, no. 12) and to those described by Lee (1969:152, Fig. 108*a*) from Guanacaste-Horcones phase levels at Chiapa de Corzo. However, there are a variety of ways in which the surface of these small stones could have become polished.

One stone is from a Barranca phase context, three are from Cantera phase contexts, and the fifth is from a possible Classic context.

Rectangular Perforated Stone *(1 specimen; Fig. 20.11l)*

Dimensions in cm: length of complete side of rectangle, corner to corner, 11.75; interior to exterior dimension, 4.5; thickness, 4.5.

A fragment of a rectangular stone with slightly rounded sides, this artifact's center area has been ground out to a diameter of ca. 5–6 cm, leaving a hollow rectangle. It could have functioned as a rectangular handle for some implement, including a "ball game handstone" object. In form it is similar to "flat-iron pestles" described from the Tehuacan Formative (MacNeish, Nelken-Terner, and Johnson 1967: 105), although it does not have a wide smoothing area.

The dating of this artifact is uncertain. It was found on the surface of PC Structure 4, the large Middle Formative platform mound. Thus, it could be Cantera phase in date. However, it is also near the Classic period pyramid and a Classic period pavement.

Unidentified Stone *(1 specimen; Fig. 20.11m)*

Dimensions in cm: length, 10.5; width, 9; thickness, 4.5; length of broken "handle," 2.5; diameter of handle, 3.

This is a flat, relatively rectangular stone slab, with a short (broken) handle at one end. Ground into the surface of the slab is a circular depression, ca. 2.5 cm in diameter and ca. 2 cm deep. The surface of the slab has been ground relatively flat. The sides are crudely pecked and ground to a rough convex shape. There are other stone artifacts (and sherds) with shallow depressions. A possible functional use for some of these is as a bearing for some type of rotating implement. In this instance the stone slab could be held by the handle over (or under) the rotating shaft. If this interpretation is correct, this "bearing stone" may be part of an artisan's tool kit. This artifact is from a mixed Formative-Classic context.

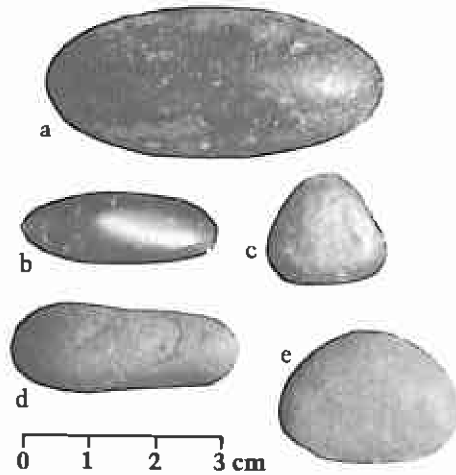

Figure 20.14. Small polished oblong stones.

RESUMEN DEL CAPÍTULO 20

Los artefactos de piedra corriente recobrados en Chalcatzingo se clasificaron en tres categorías con propósito descriptivo: utilitarios, misceláneos (i.e., función no identificable), y escultura. La categoría utilitaria incluye manos, metates, raspadores, y pulidores. Aun cuando algunos patrones temporales o espaciales lograron ser revelados mediante el análisis de estos artefactos y sus distribuciones, resulta interesante notar que más del 50 por ciento de las manos estaban rotas, quizá a propósito, y el 23 por ciento de todas las manos provienen de PC Str. 2, una estructura en la cual parecen estar ausentes otras indicaciones de haber existido actividades domésticas. La mayoría de las herramientas para la preparación de alimentos se hicieron de piedra graneada fina proveniente de la barranca, en tanto que las esculturas son fundamentalmente de granodiorita proveniente de los cerros.

La categoría escultura portátil es muy diversa e incluye ejemplos tanto de orden representativo como del no representativo. Los objetos se fechan desde el Formativo hasta el Postclásico. Entre los grabados sobresalientes del Formativo se encuentra un animal (felino o canino), una piedra de mano semejante a las asociadas con el juego de pelota mesoamericano, un "yuguito," y un "falo-alado" semejante a los hongos de piedra. La escultura Clásica y Postclásica incluye varias cabezas, entre las que se encuentra una con los atributos de Tlaloc.