7

Ceramic Production

In the preceding chapters, we started to outline multiple lines of evidence for ceramic production in a residential context at Ejutla. The amount of broken pottery we encountered during the excavations was overwhelming. Even without counting the many sherds that were no larger than a thumbnail, we collected 210,000 vessel fragments and other ceramic objects weighing approximately 3500 kg. This was the ceramic assemblage associated with one prehispanic house and associated exterior area, the composition of which was fairly standard utilitarian vessels that are typical of Classic period domestic contexts, including jars, bowls, comals, and other forms that we described in chapter 5. Yet we also recovered especially high quantities of some vessel forms. These include sahumadors and comals as well as quantities of figurines and ceramic spindle whorls that seemed anomalously large for one household. We also recovered molds for making various ceramic forms, especially figurines, and hundreds of pottery wasters and defective, misfired fragments that could not have served their intended use. Many varieties of ceramic wasters (Redmond 1979) were present in Ejutla, including misfired, misshaped, and spalled fragments. Among the pottery wasters were several hundred malformed, poorly fired, or unfinished figurines.

As we excavated and exposed the firing features, we encountered high quantities of fired clay concretions. These small amorphous and roughly formed fired-clay lumps with heavy concentrations of sand and grit were not potter's clay that was accidentally fired, nor were they obvious partially formed wasters. Rather, they appeared to be remnants of temporary earthen roofs placed over the firing pits (e.g., Stark 1985, 176). Roofs over the firing features would have been necessary to produce the reduced grayware vessels that were prevalent at Ejutla, including numerous gris wasters that we recovered in and near the excavated house.

In this chapter, we present the material evidence for ceramic production at Ejutla. We draw on comparisons with the ceramic assemblages from the other sites we excavated in the valley, as those findings are relevant for supporting our interpretation of high-intensity production (see Costin 1991) for exchange in a residential context at Ejutla (Feinman and Nicholas 2000, 2007b). We then provide an expanded discussion of the pit kilns, their contents, and an experimental study that was carried out at the University of Wisconsin to broaden the interpretive perspective for the archaeological firing features at Ejutla (Balkansky et al. 1997; Feinman and Balkansky 1997). We end the chapter with a discussion of the large figurine assemblage at Ejutla, describing both the production evidence and the range of figurine forms crafted at the site, and key differences between the Ejutla figurine assemblage and those from other Classic period sites in the Valley of Oaxaca (Feinman and Nicholas 2019b; see Appendix 4). Although we present and integrate a variety of evidential sources, the principal goals of this chapter are to document ceramic production, to situate those activities immediately proximate to the domestic unit under study, and to illustrate that some of the pottery products from this context, though mostly locally distributed, were consumed beyond the occupants of the house and the settlement in which it was situated.

7.1. Material Evidence for Ceramic Production at Ejutla

An early indicator for ceramic production in the excavated context at Ejutla was the unusual abundance of figurines in and around the exposed structure, associated with midden contexts, and in the firing features. Fired-clay figurines and whistles are common components of ceramic assemblages at Classic period sites in Oaxaca (Feinman and Nicholas 2019b), and they are often recovered in domestic contexts. Most of the figurines at Ejutla fit within typical classes of Late Classic period Zapotec figurines that include females wearing a range of garments and headdresses, and warriors wearing cotton armor and sporting staffs and shields (Appendix 4, see Figure 4.51). The routine recovery of these and other Oaxaca figurines in domestic contexts underpins the strong inference that they were used in household ritual (e.g., Marcus 1998). But the quantities at Ejutla were anomalous. In total, we recovered 2005 figurines and fragments from the excavations. Why was one household associated with so many figurines? There was great repetition in the represented imagery; the most common forms were molded, full-body warriors wearing a loincloth and females wearing a plain garment (Table A4.1; Feinman and Nicholas 2019b). The great majority were broken at the neck. The detached heads include warriors sporting a variety of headgear and women wearing braided headdresses. Less common were small, modeled human and animal forms, a few of which were complete (see fuller discussion in section 7.7).

Approximately 11% of the figurines were defective in one way or another, including misfired and misshaped fragments. Others had cracked or exploded during firing (Table 7.1, Figure 7.1). Another subset was poorly

Table 7.1. Figurine wasters in the ceramic assemblage at Ejutla.

Defect	Female #1 (braided headdress)	Female #2 (intricate headdress)	Indeterminate	Indeterminate anthropomorph	Male/ warrior	Miniature anthropomorph	Modeled animal	Whistle (globular)	Total
Firing error									
overfired	3	–	5	6	10	–	–	1	25
poorly fired/ misfired	7	–	9	16	10	–	2	2	46
exploded/ cracked	3	–	7	10	10	1	1	2	34
misshaped/ distorted	1	–	2	8	1	–	3	–	15
miscellaneous error	–	–	2	8	–	–	–	–	10
Production error									
poorly formed/ impressed	2	–	19	6	–	1	1	–	29
unfinished	–	1	24	18	4	1	1	1	50
large inclusion	1	–	2	3	–	–	–	–	6
Total	17	1	70	75	35	3	8	6	215

Figure 7.1. Sample of figurine head and torso wasters.

Figure 7.2. Poorly impressed (top) and burnt figurines (center and bottom).

formed or insufficiently impressed during production, or they may have accidentally been fired before they were finished (Figure 7.2). Many other usable figurines (~half of the assemblage) were not well fired and were eroded with indistinct imagery (Figure 7.3). In all, the defective figurines account for over 20% of all pottery wasters at Ejutla, a seemingly high percentage for a context of domestic production. The number of figurines, and especially the proportion of defective figurines, both seem highly anomalous if production was self-sufficient, geared only for consumption by household residents. Earlier models of craft production would have presumed (e.g., van der Leeuw 1977; Santley et al. 1989) that domestic production was not linked to specialization or exchange, but these findings were instrumental in challenging prior expectations.

The other 778 pottery wasters comprise a range of vessel forms, mostly utilitarian bowls and jars but also sahumadors, comals, effigy vessels, and associated appliques (Table 7.2). The proportions of pottery wasters by paste and form largely match the overall ceramic assemblage. Over half of the wasters are from gris vessels, and the majority of gris wasters identified to form are bowls. Approximately 30% of the wasters are café paste, mostly from jars. Wasters from comals and most of the sahumadors are also café paste. A small quantity (~2%) are from amarillo vessels, mostly bowls and cylinders, which generally ranged in surface color from tan to orange. Many wasters, though, were too malformed, twisted, or partial to identify the form. The defective pieces include a diverse array of misshaped/warped, misfired, and poorly finished vessels (Table 7.3, Figure 7.4, Figure 7.5), often with spalled or exploded surfaces or poorly attached appendages (Figure 7.6). Many vessels broke or cracked across large air bubbles or large inclusions, or were vitrified or honeycombed (Figure 7.7, Figure 7.8). In some instances, unfinished blocks or lumps of clay were fired (Figure 7.9); in others, fingerprints had not been smoothed out before firing and were still visible (Figure 7.10). In addition, a sizable proportion of ceramics at Ejutla, and particularly those deposited near the pit features, were fire-clouded, multitoned, or misfired (mostly oxidized graywares) but still usable (Figure 7.11). Without formal updraft kilns, the Ejutla artisans did not have precise control over the firing process (Feinman and Balkansky 1997, 136), and they produced higher quantities of lower-fired café paste vessels than did ceramic producers in the center of the valley (Feinman and Nicholas 2001b, 142). The Ejutla potters often produced certain vessels in café paste that typically were made in gris (e.g., large cooking jars) or crema paste (e.g., small bowls and jars with red paint washed on the surface or post-fire scratching) in more central locations in the valley (Figure 7.12).

Mixed with the domestic trash were 70 ceramic *moldes* (or flat plates) that were used to turn or revolve clay vessels while forming them in the absence of a potter's wheel (Figure 7.13) and 74 ceramic molds. Domestic potters in Oaxaca still employ moldes or revolving platters (Thieme 2009, 22) to fabricate clay vessels. The molds were utilized to make a variety of ceramic forms (Figure 7.14). Some of the clearest molds (17) were for figurines, and another six appear to have been used to make appliques to append to effigy vessels, including feathered headdresses (Figure 7.15), a technology that had not been employed prior to the Classic period. Most of the molds were broken and fragmentary, but several molds match figurine forms common in the Ejutla figurine assemblage. One large mold for a figurine head was intact and closely matches several heads with braided headdresses in our collections (Figure 7.16). One complete mold for a small figurine also matches a figurine recovered on site (Figure 7.17). A small figurine we made with the mold is a close match for the prehispanic object.

Like the figurines, the Ejutla potters appear to have crafted ceramic spindle whorls. The spindle whorls were fabricated in two basic ways, by modeling and firing the clay objects or by abrading repurposed vessel fragments

Figure 7.3. Heavily eroded figurine fragments.

Table 7.2. Other ceramic wasters by general form and paste.

Form*	Amarillo	Café	Gris	Unidentified	Total
bowl	1	38	166	13	218
comal	–	6	–	–	6
jar	3	80	109	32	224
plate	–	2	–	–	2
sahumador	1	28	6	–	35
support	2	6	22	10	40
tecomate	1	2	11	–	14
unknown	6	77	104	30	217
urn	–	2	18	2	22
total	14	241	436	87	778

* see Table 7.1 for figurine wasters.

Table 7.3. Firing and production errors observed in the ceramic assemblage at Ejutla.

Firing error	Quantity
bubbled, cracked	29
exploded	61
misfired	142
misshaped	219
pock marks	25
spawled	42
vitrified	2
unclear	44
Production error	
large inclusion	17
poorly attached	61
poorly finished	135
Total	**778**

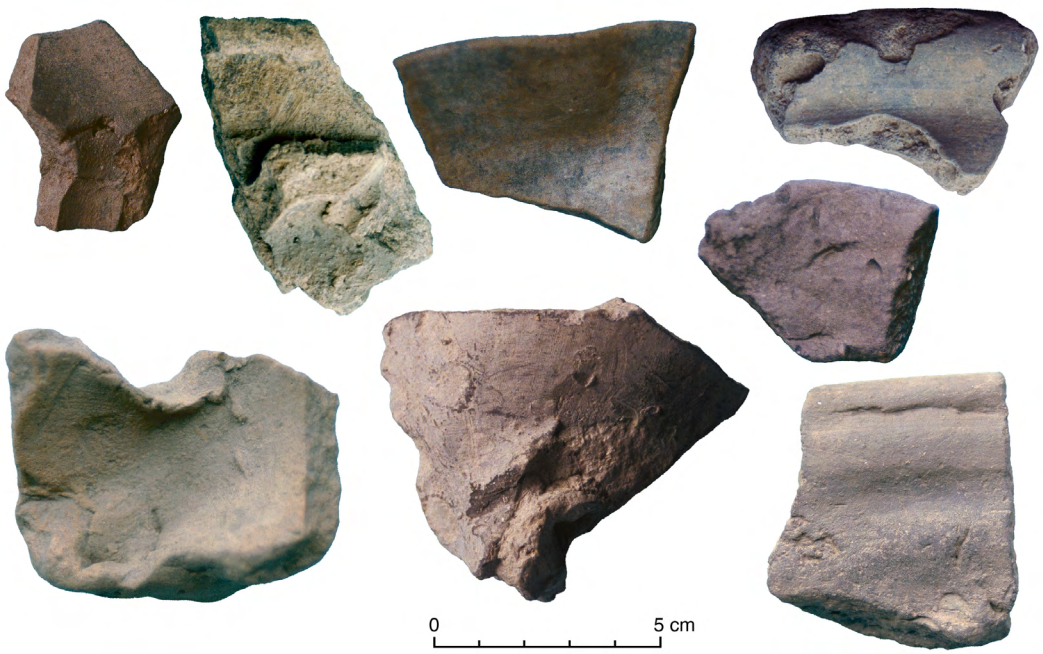

Figure 7.4. Misshaped and warped ceramic wasters.

Figure 7.5. Poorly finished vessel fragments.

(Carpenter et al. 2012). Approximately 70% of the Ejutla whorls were modeled and perforated while the clay was still wet. These modeled whorls have two basic forms, small spherical (bead-like) whorls (e.g., Kent 1957; O'Neale 1945) and flatter, disk-like whorls (e.g., Brewington 2000). The latter have a characteristic lip around the central perforation (Figure 7.18). The other 30% of the whorls were made by abrading a broken sherd into a disk, most often a jar body, and drilling a hole (usually biconical) in the center of the fragment (Figure 7.19). These abraded whorls are generally slightly concave and often referred to as a centrally perforated sherd disk (Halperin 2008, 115).

The presence of several failed spindle whorls (one spherical and two modeled disk whorls) and ceramic disks that appear to be prepared but unperforated whorls links the Ejutla potters to the crafting of the modeled whorls (Figure 7.20). Most of the spindle whorls that we collected at sites near Ejutla during the earlier regional survey also are modeled, both spherical whorls and disk-like whorls, like those at Ejutla (Table 7.4). Although the whorls have

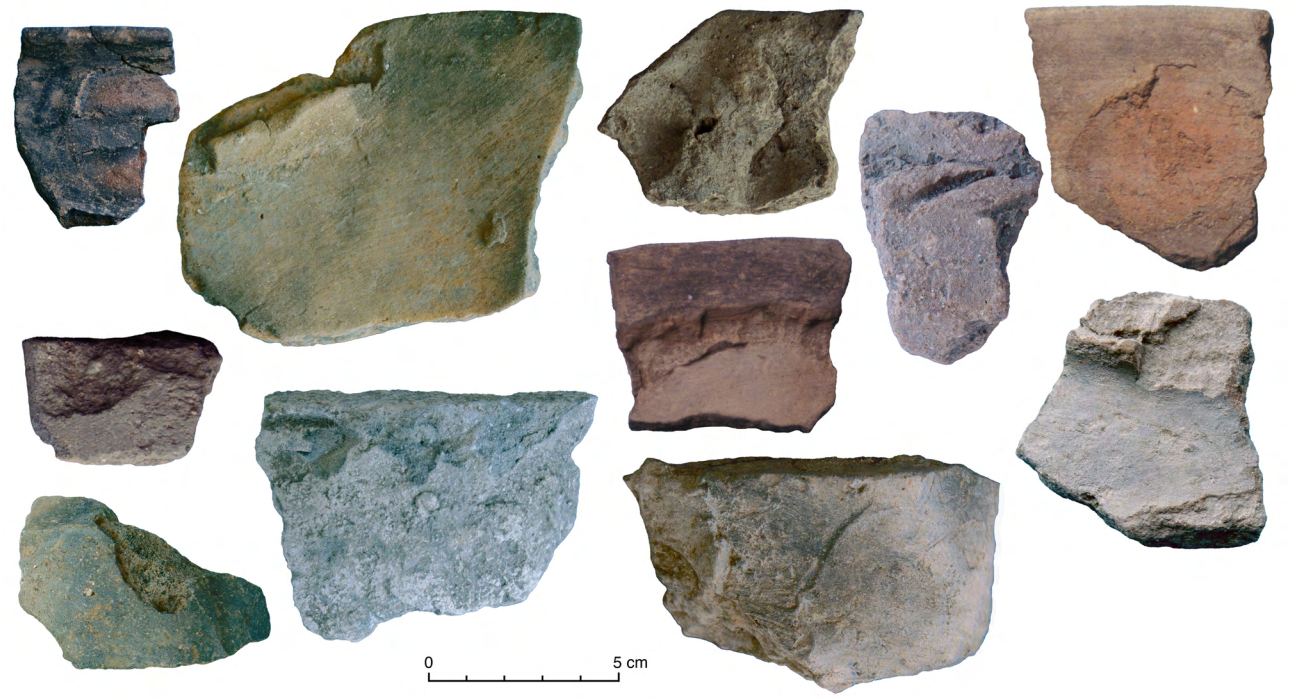

Figure 7.6. Spalled and exploded wasters.

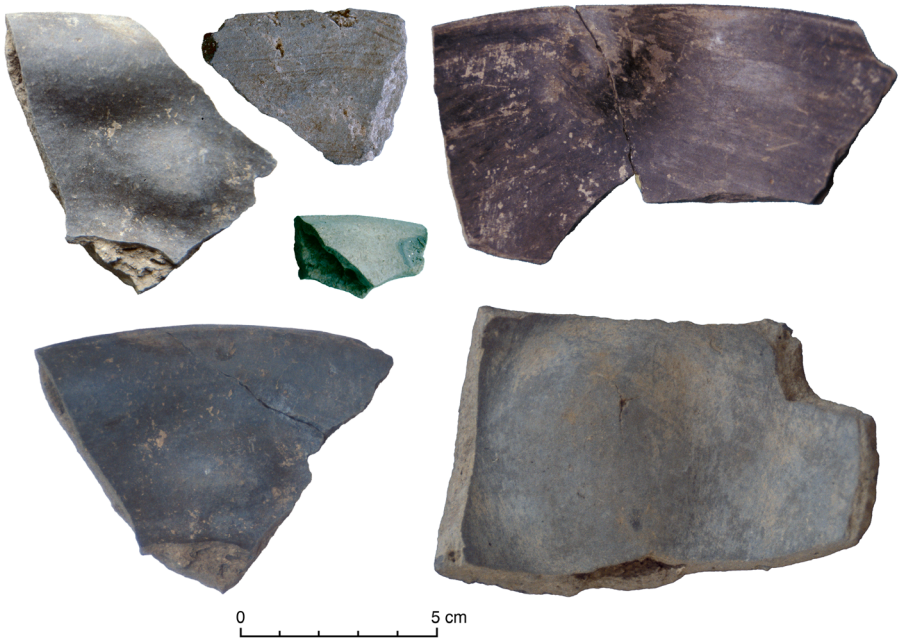

Figure 7.7. Ceramic wasters with large air bubbles and cracks.

not been chemically analyzed, it seems probable that they were made in Ejutla for exchange. Yet the Ejutla potters made some for their own use and repurposed broken vessels into abraded disk whorls as well.

In addition to the material evidence, ceramic production at Ejutla is indicated by compositional analyses of local clays that link them to archaeological vessels from the site. Petrographic analyses of raw clays taken from the current site surface and a sample of figurines and other coarse-paste vessels recovered from the excavations, including jars, bowls, molds, sahumadors, and comals, revealed the raw clays to be qualitatively (mineralogically) similar to the pastes of the archaeological vessels (Carpenter and Feinman 1999). Because the coarse-paste vessels require minimal processing, their petrographic signatures were similar to those of the raw clays. In contrast to the figurines and other coarse-paste vessels, which often have large inclusions, some locally produced ceramic bowls from Ejutla were made with processed clays that are significantly finer

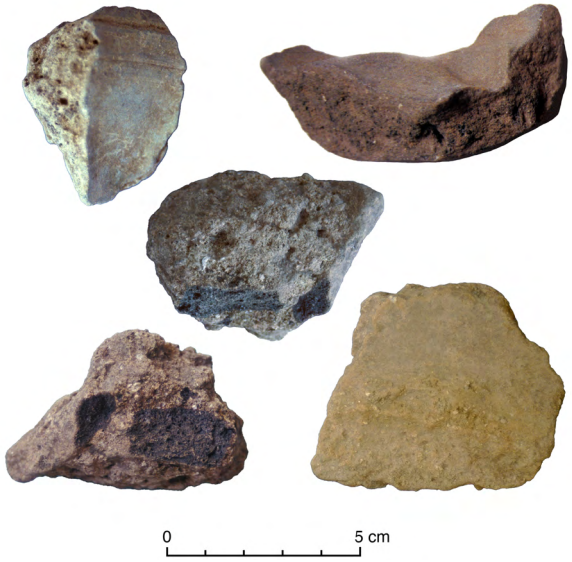

Figure 7.8. Vitrified and honeycombed wasters.

Figure 7.10. Pottery wasters with finger impressions.

than the available raw clays. To test whether those vessels were made from the same local clays, Andrea Carpenter (Carpenter and Feinman 1999) experimentally beat and levigated the raw Ejutla clays, fired test tiles made from the resultant finer pastes, and then chemically (using inductively coupled plasma mass spectrometry, or ICPMS) analyzed the test tiles and a sample of archaeological vessels. The chemical composition of both reduced fine-paste bowls and oxidized coarse-paste jars from Ejutla were found to be within the range of variation of the test

Figure 7.9. Fired clay blocks and lumps.

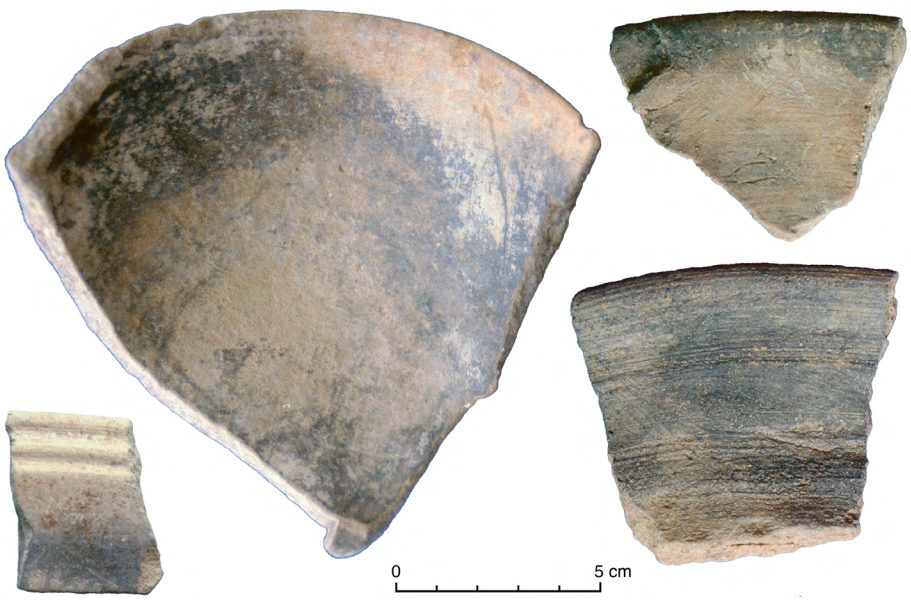

Figure 7.11. Fire-clouded bowl rim fragments.

Figure 7.12. Café paste sherds with post-fire scratching that is more typically found on crema vessels.

Figure 7.13. Ceramic *moldes*.

tiles. The experimental specimens bracketed the ancient sherds, strongly indicating that all of the latter were made using the local Ejutla clay.

Together, the petrographic, chemical (ICPMS), and experimental analyses confirm that the prehispanic potters of Ejutla had the knowledge to refine and process locally available clays to make a diverse assortment of ceramics. In this domestic context, they produced a range of oxidized coarse-paste vessels and figurines as well as reduced fine-paste bowls (see also Feinman et al. 1989). Petrographic analysis also helped address the question of why we found so many figurines during the excavations. Some proportion of them were produced for exchange. Nearly identical figurine forms were noted in surface collections that we made at several sites within 10 km of the Ejutla site during the earlier Ejutla Valley settlement pattern survey (Figure 7.21). Through petrographic analysis, one of those figurines was found to be a compositional match to the identical figurine forms recovered during our excavations (Feinman 1999, 92; Feinman and Nicholas 2001b, 140). Another figurine in *Urnas de Oaxaca* (Caso and Bernal 1952, figure 453c) that is attributed no more specifically than to Ejutla is a near match for the most complete mold that we found in the excavations almost 40 years later (see Figure 7.16).

Figure 7.14. Ceramic molds.

Figure 7.15. Ceramic molds for making figurines (warrior torso and head) and urn appliques, including feathers.

Several ceramic vessel forms that were rare at Ejutla nonetheless also may have been made at the site. Two forms appear to be distinct to Ejutla (or to sites in the southern part of the Valley of Oaxaca) as they were not present at any of the archaeological contexts we excavated in Tlacolula, nor were they represented in the collections reported from Monte Albán (Caso et al. 1967). These vessel forms include café bowls (sahumadors or braziers) with large medallion appliques and rope appliques on the rim, for which we also recovered several possible molds (Figure 7.22**,** see also Figure 5.28). Another uncommon form was an amarillo cylinder with a depressed band below the exterior rim; on some vessels an applique band is situated above the linear depression (Figure 7.23).

We found small numbers of amarillo vessel fragments with exterior carving, mostly associated with contexts early in the occupational sequence. For the most part, these particular bowl and cylinder fragments were made in small quantities, a finding supported by the presence of amarillo vessel wasters in the domestic ceramic complex of this house. One cylindrical vessel has an incised band of small slanted ovals on a bolstered rim; another cylinder has a band of deep crosshatching below the exterior rim (Figure 7.24). A third, thin-walled cylinder with crude geometric carving is heavily fire-clouded and may have been a waster. One amarillo bowl that was broken into many fragments, but almost complete, has deep curvilinear carving (Figure 7.25).

Other rare vessels include spouted jars like those we found in the high-status residences at El Palmillo, so the Ejutla residence would not appear to be low status. All the jars at El Palmillo were made in gris paste, while both gris and amarillo spouted jars were present at Ejutla (Figure 7.26). It is not clear whether the Ejutla potters made these jars mostly for exchange and that is why they were rare on site, or whether they obtained them through exchange. Another rare form are sahumadors with an animal effigy (possibly a feline) on the rim of the bowl (Figure 7.27 top), similar to one example at Monte Albán (Caso et al. 1967, figure 334b); in another example the effigy is on the end of the handle.

Although we found few brazier supports (Figure 7.27 bottom left), we suspect these utilitarian implements were also made locally; two elongated supports appear to be from the same brazier, while one broader and shorter brazier support is the same form as a rare single object from the excavations at Miahuatlán (Markman 1981, plate 17). An unusual support in the form of an animal's head looks like a mouse (Figure 7.27 bottom center). A final rare ceramic object is shaped like a phallus (Figure 7.27 bottom right; see Joralemon 1974, 65, figure 11); the piece is not broken, so it is not clearly a handle or support, and its use is unclear.

7.2. Comparison with Excavated Classic Period Sites

Compared to the other Classic period contexts we excavated in the Valley of Oaxaca, Ejutla stands out in terms of the overall volume of ceramics and the various indicators of ceramic production detailed in section 7.1 (Table 7.5). Only on the lower terraces at El Palmillo did we find a possible firing feature (it was much smaller than those at Ejutla) (Feinman and Nicholas 2004a, 176, 2007d; Haines et al. 2004). We did not excavate any firing features during our investigations at Lambityeco (Feinman et al. 2016), but given wasters and other ceramic evidence of production that we recovered in the excavations, ceramic