

COMMONER RITUAL

AND IDEOLOGY IN

ANCIENT MESOAMERICA

edited by
NANCY GONLIN *and* JON C. LOHSE

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To our parents,
Sophie (Sue) and the late Henry Gonlin,
and Margie and Lloyd Elliott,
for providing a foundation of character.

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COMMONER RITUAL AT
TEOTIHUACAN, CENTRAL MEXICO

Methodological Considerations

LUIS BARBA, AGUSTÍN ORTIZ, AND LINDA MANZANILLA

INTRODUCTION

Prehispanic societies were integrated by different means. No one can doubt that ritual was one of the main integrative mechanisms, because it “links generations, unites men from different descent groups, unites women from different families, [and] connects the living to their ancestors” (Marcus 1998:1). As Marcus puts it, ritual is important in creating public spaces and structures but is also visible in the domestic domain. In village societies, women played an important role in domestic ritual (Marcus 1998), but in urban societies other participants were added to domestic ritual not only to communicate with the ancestors but also to offer special ceremonies and goods to the gods in ways that were sometimes dictated by the state (Manzanilla 2002).

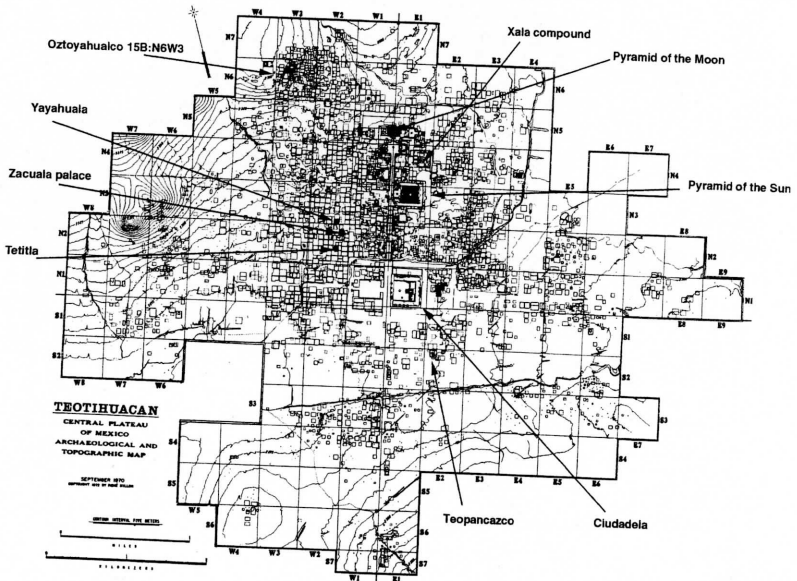
One of the most outstanding urban developments of Classic Mesoamerica was Teotihuacan, a huge, planned, multiethnic metropolis in

Central Mexico (Figures 0.1 and 0.2) (Millon 1973). The importance of religion in this city can be assessed in different scales: the state religion is evident in the huge plazas (squares) and temples in the city's center, in the processions of priests and other officers portrayed in the mural paintings, and in the representations of the deities (in sculpture, battlements, vases, mural paintings, etc.). There seem to have been *barrio* temples that integrated people of particular sectors of the city. And the last scale is the domestic realm, where altars and temples were set in ritual courtyards and where ceremonies for the ancestors and deities, as well as termination rituals, may be traced (Manzanilla 2002).

Joyce Marcus (1998:11) distinguishes three components in ritual: the *content* (the subject matter), the *locus* of performance (specific places where ancient rites were performed), and the *performers*. To assess the locus of performance and the objects involved in domestic ritual as well as other activity areas in Classic period apartment compounds at Teotihuacan, Mexico, we designed an interdisciplinary strategy that took into consideration chemical traces of activities preserved in plastered floors, as well as paleobiological macroremains, microscopic evidence (e.g., chemical compounds, pollen, phytoliths), architectural and funerary data, and distributions of artifacts and debris on floors of the Oztoyahualco (15B:N6W3) compound (Figure 3.1) (Barba et al. 1987; Manzanilla 1988–1989, 1993, 1996; Manzanilla and Barba 1990). Here, we consider ritual ceremonies as individual or group acts of a symbolic nature, which are repeated according to a set of rules. The same ritual ceremony may include prayers, sermons, taboos, games, immolations, sacrifices, magic, or mythical representations (Cazeneuve 1972). Such repeated activities leave their mark on the archaeological record.

Experience (Barba et al. 1997) has demonstrated that floors made with lime plaster preserve chemical residues, providing evidence that can reveal ancient human activities. The contaminating liquids (blood, sweat, food, etc.) that were repeatedly spilled on the floors during rituals allow us to chemically identify the areas where the activity took place and characterize the perishable materials used.

It is important to mention that most of our chemical analyses in archaeological sites have been oriented toward the study of domestic activities. The interpretations in these cases have been based on ethnographic analogies and ethnoarchaeological experiments in which food production, storage, and consumption activity areas, as well as rest and high traffic areas, have been determined (Barba 1986; Barba and Ortiz 1992; Barba et



3.1. Location of the Oztoyahualco compound in the Classic city of Teotihuacan, Mexico.

al. 1995). A few examples of the use of this method for the study of ancient ritual follow.

Research on ritual activities in archaeological sites was carried out on floors of the Satunsat building, at Oxkintok in Yucatán, Mexico, to study a non-domestic archaeological structure (Ortiz and Barba 1992). Its architecture and associated archaeological material revealed that this building was devoted to initiation rituals, star observation, and time measurement (Rivera and Ferrándiz 1989:72–75).

Its floors were systematically sampled and chemical results revealed very low phosphate values, totally different from the concentrations usually found in the household, confirming it was a non-domestic building (Ortiz and Barba 1992:124). Absence of phosphate precisely under Burial 1 at Room 6—in contrast with previous experiences with chemical residues in shaft tombs, where we found chemical residues produced by body decay (Barba, Linares et al. 1991; Ortiz 1996)—confirmed the hypothesis that it was a secondary burial, with bones exhumed from another place and carefully positioned on top of the floor, generating an event different from the original use of the structure (Ortiz and Barba 1992:124).

In 1987, a small ritual structure was excavated in downtown Mexico City. This structure was an Aztec altar used around A.D. 1440, during the first developmental stages of Tenochtitlan, the Aztec capital. Based on the results of the chemical analyses, it was concluded that this structure played a role in the installation ceremony rituals of the Moyotlan neighborhood, close to the Great Temple of Tenochtitlan, and was used for community rituals later in time.

The altar, or *momoztli*, at the corner of Palma and Venustiano Carranza streets in downtown Mexico City must be considered a sanctuary in the core of a cluster of domestic units where people once carried out daily ceremonies. Based on descriptions of ritual festivities and analytical chemical results, Fernando Getino and Agustín Ortiz (1997:128) suggested that evidence for a termination ritual marking the end of the structure's use was recovered; specifically two human burials, sacrificed birds, and pottery were interred just after the large flood during Ahuizotl's reign. They were contaminated by organic materials, primarily copal resins and blood spilled after the bird sacrifice. In addition, it was possible to recognize the difference between the sumptuous ceremonies performed at the Main Temple of Tenochtitlan and the modest rituals carried out by people in their own neighborhoods, both of which were part of an institutionalized religion (Getino and Ortiz 1997:134).

One of the most successful studies of ritual activities was performed at the Hall of the Eagles at the Great Temple of Mexico-Tenochtitlan. The chemical analysis of almost 500 samples of the splendidly preserved hall floor offered evidence to reconstruct some of the ritual activities. The distribution map of chemical residues showed that the floor areas close to the altars had high concentrations of residues, especially fatty acids. Unexpectedly, significant amounts of carbohydrates and protein residues were concentrated on the floors just in front of the doorways. There are clear differences between residues found at the altars and those found in front of the access, suggesting different materials were involved in rituals. Some of the fatty acid concentrations in front of the main altar were identified as copal residues by gas chromatography (Barba et al. 1996). This research put together archaeological, iconographic, and ethnohistorical data, permitting us to define the functions of this Mexica building, its religious significance, and some of the materials involved in the rituals performed on its surfaces, such as blood, pulque, and copal (Barba et al. 1997).

RITUAL SPACES IN APARTMENT COMPOUNDS

In Classic Teotihuacan, ritual areas in apartment compounds may be represented by ritual courtyards, shrines, rooms, and temples adjoining them. Each nuclear family may have had a ritual courtyard, but the family group as a whole may have gathered in the most important courtyard of the compound to share particular cult activities (Manzanilla 1993). Central shrines are often found in the main ritual courtyards, and portable temple models may be used as a substitute in secondary and tertiary ritual courtyards (see Manzanilla 1993:88, 175, 152, 163; Manzanilla and Ortiz 1991).

As a part of a comparative architectural study at the Tetitla, Zacuala, and Yayahuala apartment compounds, Laurette Séjourné classifies courtyard types according to shape of portico (square or rectangular) and number of sides (two, three, or four) (1966:31). One of the types she mentions is the temple courtyard surrounded by temple platforms. As an example she points out the central courtyard of Zacuala, which was entered through four porticoes. Similarly, in Tetitla the courtyard was reached using four small stairs, and in Yayahuala it was surrounded by platforms on three sides and was open to the east with some wide steps. Her classification system includes a courtyard type with an angled portico. She also notes exceptions, such as Zacuala's porticoes without an inner room or Yayahuala's lack of porticoes. In addition, she identifies the gallery courtyard with atrium at Zacuala and Tetitla, where the open space has a central pillar with columns that supported the roof (Séjourné 1966:33).

Jorge Angulo's criteria for courtyard and open space classification are based primarily on their size and position in the apartment compound and function as meeting places, distribution and transit areas, and illumination and open areas adjoining porticoes and rooms. Following Angulo's classification, the largest courtyards might be regarded as central plazas, the medium-size courtyards can be classified as distribution courtyards, whereas the smallest should be considered as water mirrors or impluvia. The last category includes isolated open areas, considered to be backyards (Angulo 1987:280).

Séjourné mentioned that Zacuala contained thirteen courtyards with 843 m² of open spaces, with 1,200 m² of interior rooms and 1773 m² of intermediate spaces with columns supporting roofs. The main courtyard at Zacuala measured 19 by 18 m. Tetitla boasted thirty courtyards, five of which were true open spaces for lighting.

Finally, Yayahuala had one entrance courtyard plus twenty-two more, sixteen of which were grouped in just half of the total surface. This

arrangement led Séjourné to suggest that the complex grew up without prior planning. The main courtyard measured 16 by 19 m and was surrounded by three temples, the largest being the one to the west. After analyzing the location, size, and architecture of the courtyards, she concludes that Tetitla was associated with mid-status individuals, whereas Zacuala and Yahualala are identified with high- and utilitarian-status individuals, respectively (Séjourné 1966:31).

NON-ROOFED AREA COMPARISON

Among the excavated apartment compounds at Teotihuacan, at least four compounds might be considered *barrio* centers. All of them have features—their large courtyard sizes, altars, and temples—that distinguish them from the rest of the domestic units. Instead of the previously mentioned criteria, we found that the non-roofed area percentage may be a better indicator of the ritual significance. We calculated the ratio between courtyard area and total area and came up with the following order: La Ventilla (92–94 Front A) 33 percent, Zacuala 18.5 percent, Xolalpan 17 percent, Teopanazco 17.2 percent, Oztoyahualco (15B:N6W3) 11.7 percent, Tetitla 10 percent, Yahualala 8.4 percent, and Tlamimilolpa 2 percent.

The four apartment compounds with the lowest non-roofed area percentages display more domestic traits. Oztoyahualco has only four courtyards, two of which are 27 m², and the smallest is only 6 m². The average size is almost 20 m², and the non-roofed area is barely 79 m². Tetitla's largest courtyard is 125 m², the smallest is only 17 m², and the average of its seven courtyards is 55 m². In this group of domestic compounds, Yahualala has only six courtyards, the largest of which is 168 m², the smallest of which is 10 m², and the average size is 45 m². The total non-roofed area is 269 m². Finally, the Tlamimilolpa apartment compound includes fourteen courtyards, but the largest is only 7 m² and the smallest is roughly 2 m², with an average size of 4 m². This apartment compound is very large, but it seems to have more light cubes than courtyards, since the total open area is only 59 m².

When we focus on the surface of the main courtyards, it is clear that the main courtyard (C41) at Oztoyahualco (15B:N6W3) is average size and has almost the same dimensions as another courtyard in the compound (C25). Nevertheless, it has been identified as the most prominent courtyard because it has mural paintings, an altar, and a centralized chemical enrichment pattern.

ALTARS

The courtyards with buildings resting on the platforms always have a central small-scale temple (Séjourné 1966:159). In addition to the altar in the main courtyard, Yayahuala has another one with stairs and set in a small courtyard to the west, where two burials with rich offerings were found (see McCafferty, Chapter 8, for a discussion of altars at Cholula).

Two altars were found at La Ventilla (92-94 Front A), one made of stone, with circles sculpted on the *tablero* frame with a red panel resembling that of Yayahuala. The second altar has a big hole in the upper part, suggesting that an element of the altar is missing (Séjourné 1966:168).

Tetitla exhibits three altars: one in the main courtyard, another made of stone to the north of the compound, and finally a brazier-altar in the western courtyard that is a 1 x 1 m stone box sunk 60 cm into the floor (Séjourné 1966:167). The altar at the main courtyard covered another in a better conservation state. Its excavation provided information about the small wall that surrounds the upper part of this ceremonial table, which mimics something like a box and resembles the previously mentioned stone box at Tetitla and another at Atetelco (Séjourné 1966:168).

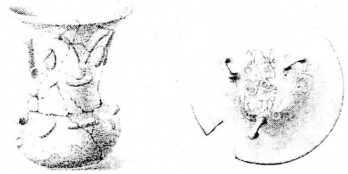
Surprisingly, the main courtyard at Zacuala does not have a floor or altar and none of the twelve courtyards has an altar or stairs. In another building to the south, however, an almost complete altar was uncovered (Séjourné 1966:167).

At Ozttoyahualco 15B:N6W3, we found one fixed altar in C41a, but in this compound the use of small-scale model altars in the courtyards was the norm. Most of them were recovered during excavation (see discussion below).

THE OZTOYAHUALCO COMPOUND

Each one of the families living at Ozttoyahualco seems to have chosen a particular god as its patron (Figure 3.2). These deities range from the state god Tlaloc, to middle-range gods (such as the Fire God [Huehuetotl] or the Butterfly God), to patron gods (such as the rabbit) (Manzanilla 1993:164, 524). These gods are represented in a variety of ways, including small sculptures, pottery vessels, incised or modeled decorations on pottery, and figurines. Spatial patterning seems to have been established for the disposition of functional sectors, which extended beyond the framework of nuclear families (Ortiz 1990). Thus, in general, storage zones were found to the west, with those for refuse to the south, and funerary areas

3.2. Patron family gods related to the domestic hierarchy at Teotihuacan: Tlaloc in the upper registers, Huehueoteotl and the Butterfly God in the middle, and a rabbit in the lower register.

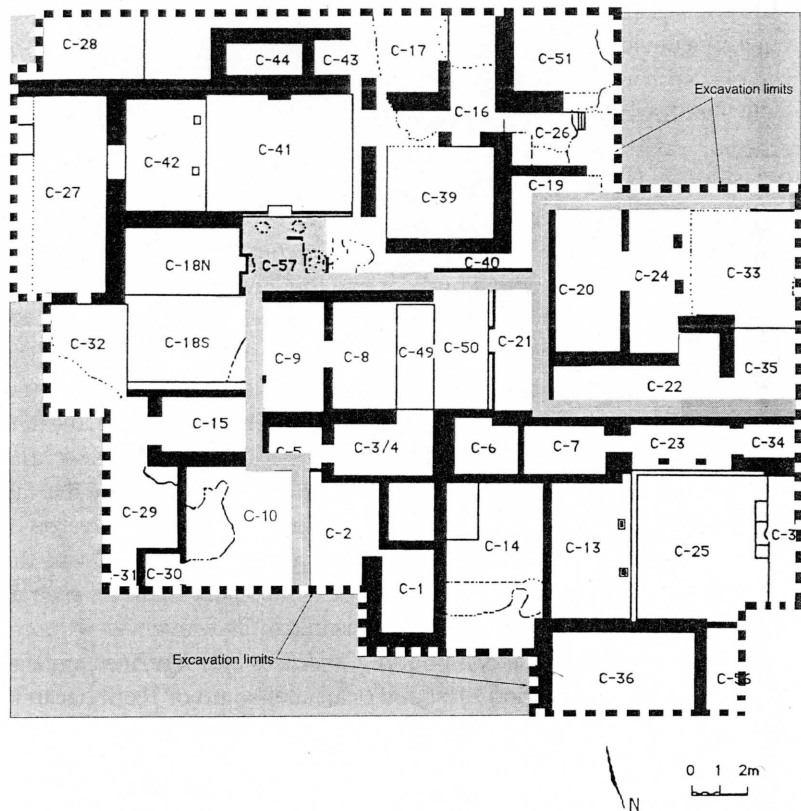


were concentrated in the middle of the eastern sector (although exceptions exist), with neonate burials located primarily on a north-south band in the eastern third of the compound.

Individual household sectors within the compound could be isolated by taking into consideration the circulation alleys or access points (Sanders 1994:19 et seq.) and mapping the different food preparation and consumption loci for each nuclear household. The Oztoyahualco 15B:N6W3 compound had three loci that we suggest were related to three households (Manzanilla

1996; Ortiz 1990; Ortiz and Barba 1993). Each apartment included a zone for food preparation and consumption, sleeping quarters, storage areas, sectors for refuse, courtyards for cult activities, and funerary areas (Figure 3.3). Additionally, there were zones in which the entire family group or compound group (i.e., all the households in an apartment compound; see Sempowski 1994:9–10) gathered to share activities, particularly those related to ritual and perhaps those related to raising domestic animals.

We suspect that members of different household units participated in specialized activities related to the larger urban setting. In the compound we studied, the whole compound group probably specialized in the stucco plastering of neighboring three temple plazas and perhaps other structures at Oztoyahualco. Some stucco mixtures with polishers had been left in rooms where burial pits were going to be covered again and may be evidence of rapid abandonment. Other evidence shows concentrations of obsidian blades that are associated with stone hammers, large pottery



3.3. Three household sectors within the Oztoyahualco compound, Teotihuacan, Mexico.

plates, metates, and mortars on top of floors. Three north-south-aligned magnetic dipoles, carbonate, and high pH spots were found some meters to the west of the compound (Barba and Ortiz 1993; Lizárraga and Ortiz 1993; Manzanilla 1993; Ortiz 1990). Other compound groups in the city seem to have been similarly devoted to specific industries, such as ceramic crafting of certain wares, textile manufacture, obsidian or lapidary working, or even painting.

ARCHAEOLOGICAL INDICATORS OF DOMESTIC RITUAL

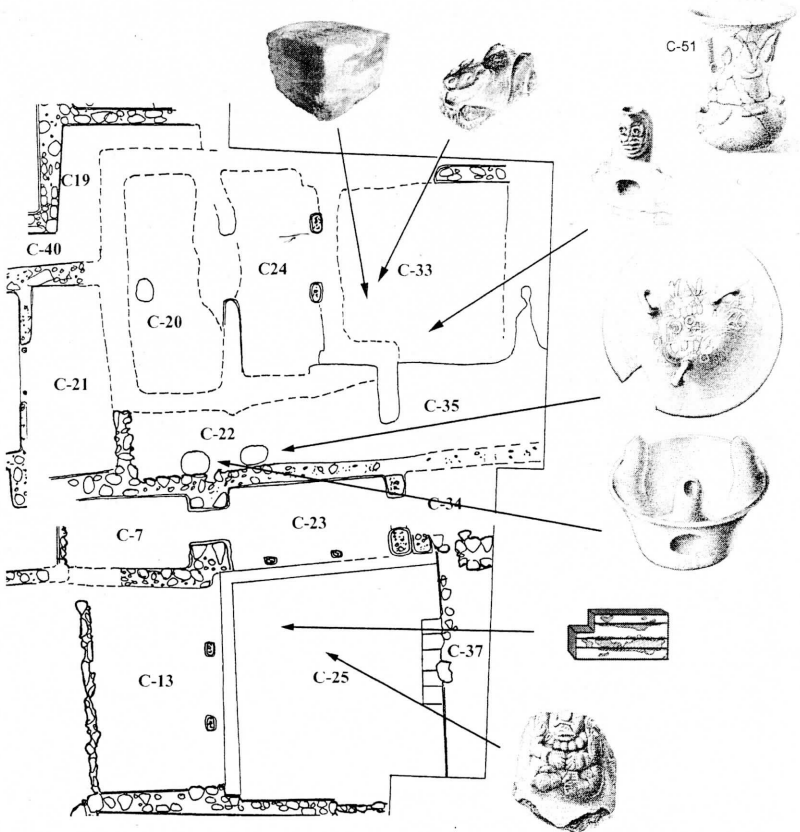
Domestic cult at Teotihuacan may be divided into three main categories: domestic ritual in courtyards, funerary cults, and abandonment rites

(Manzanilla 2002). We should envision domestic cult as the main low-level integrative device that the state used to integrate progressively larger social units, such as household groups, barrios, districts, and the city itself.

In Teotihuacan, domestic ritual is related particularly to ritual courtyards for each household in each apartment compound (Manzanilla 1993; Sanders 1966), which may comprise a central altar, a small temple or sanctuary, and connecting rooms. Zacuala, Yahualala, and Tepantitla had their temples set to the east of the main courtyard. At Zacuala, the temple was substantial, with a portico, two inner rooms, and a roof decorated with merlons (Séjourné 1966:118–126). At Yahualala, the temple was large enough to be interpreted as a likely neighborhood temple (Séjourné 1966:213). Elements related to domestic ritual—such as Tlaloc vases (related to burials or to abandonment rites), Huehuetotl sculptures, theater-type censers, *talud-tablero* temple models, *candeleros*, puppet figurines, and other artifacts—disappear from the archaeological record after the fall of the city (Cowgill 1997). They normally appear in ritual courtyards or the connecting rooms. Household 3 at Ozttoyahualco 15B:N6W3 was the richest in burials and was related to Tlaloc symbolism. Artifacts such as Tlaloc vases, figurines, and representations in handled covers were found throughout this part of the compound. *Candeleros* and figurines are also found at other Classic period Mesoamerican sites south of Teotihuacan in the Maya region, such as Copán (Gonlin, Chapter 4) and the Naco Valley, Honduras (Douglass, Chapter 5).

At the ritual courtyard C25, a set of objects common to other ritual courtyards was recovered, including a sectional temple model (Manzanilla and Ortiz 1991), theater-type censer plaques (Manzanilla 2000a), three portrait figurines, two puppet figurines, *candeleros*, stone balls and hemispheres, a stucco polisher, as well as portable stoves and indications of fire burning (Figure 3.4) (Manzanilla 1993:140–152). This courtyard had a sanctuary to the east (C37), which had fragments of puppet figurines as well.

The second ritual courtyard (C33) had a complete portable basalt temple model with a rabbit sculpture, two puppet figurines, two *candeleros*, and two stucco polishers. In the southwest corner near the temple model, fire burning was indicated by the presence of blackened stucco and three-pronged portable stoves (Manzanilla 1993:163–164). Near this courtyard, Portico 24 and Room 20 had high pH values, indicating some ritual use of this space as well (Ortiz and Barba 1993:637). Fire burning related to blackened floors and theater-type censers was also noted by Séjourné (1966:165)



3.4. Ritual elements found in and around ritual courtyards C33 and C25 of the Oztoyahualco compound, Teotihuacan, Mexico.

in ritual courtyards at Zacuala, Yahualala, and Tetitla. William Sanders (1966:138) has suggested that rooms bordering ritual courtyards with altars at Maquixco, Mexico, may have served to store religious paraphernalia. We propose that some of the preparations for ritual activities actually took place in similar rooms (C20 and C24) at Oztoyahualco 15B:N6W3. It is usual that altars in ritual courtyards may house important burials containing jadeite, slate, marine shells, miniature vases, *floreros*, and other objects (Sánchez Alaniz 2000).

Some activity areas related to ritual preparation were detected around Oztoyahualco's main ritual courtyard (C41). A small temple model was

found in C44, and in the corner of C9 (just to the south of the sanctuary) a concentration of fifty-eight obsidian fragments, a basalt hammer, and a limestone half sphere (with radial cutting marks probably made by the continuous cutting of rabbit and hare legs) were found (Hernández 1993; Manzanilla 1993). There were also numerous funerary (for newborn babies) and offering pits, often with flowers or grasses, particularly in the eastern half of the compound. The northeastern household (n. 3) had most of the burials and also the greatest amount of foreign fauna (a jaguar's fang, a bear's paw, and other remains) (Manzanilla 1996:242).

Huehuetotl sculptures are often found in ritual courtyards (Linné 1934:48) or the eastern rooms of apartment compounds (Manzanilla 1993). At Oztoyalco 15B:N6W3, we found fragments of the brazier in the eastern sector. At Teopancazco, a complete sculpture of the Fire God was found in a western inner room (C17) and had been thrown from its pedestal and was lying facedown on the floor (Manzanilla 2002).

Theater-type censers (Manzanilla 2000a) were used profusely at the Xolalpan apartment compound, where they were found in the altar and in a western courtyard (Linné 1934:48), and at the Tlamimilolpa compound, where they were gathered around Burial 4 and kept dismantled in caches, ready for ritual use (Linné 1942:141). In the Oztoyalco compound, a remarkable dismantled theater-type censer was found in Burial 8 (Manzanilla and Carreón 1991). Decorated tripods, which are common at Xolalpan and Tlamimilolpa, are very rare, but still present, at Oztoyalco 15B:N6W3. Such tripods were recently found in the remains of a termination ritual (Late Tlamimilolpa/Early Xolalpan) at Teopancazco (Manzanilla 2000b, 2003).

Lineage gods were patrons of particular families, and above them probably stood neighborhood and occupational deities, the gods of specific priestly groups, and state deities, such as Tlaloc, as patron of the city (López Austin 1989; Manzanilla 1993). Tlaloc vases are often found in domestic cult and are associated with burials (i.e., Oztoyalco 15B:N6W3, Xolalpan, Tetitla, Zacuala Patios, La Ventilla [Linné 1934:70; Manzanilla 1993; Sempowski 1987:126]) or abandonment rites (i.e., Teopancazco [Manzanilla 2002]).

In sum, ritual courtyards in apartment compounds seem to have been gathering places for one or all of the households in the compound, particularly those groups centered on patron gods. Ritual was one of the main integrating activities inside the compounds, promoting group cohesion and solidarity.

METHODOLOGY AND ASSUMPTIONS

Several types of floors can be observed in Mesoamerica. Of this assortment, the stuccoed floors are the most suitable for the study of activity areas because of the way they were constructed. For this research, it is essential to assume that the floor had a homogeneous composition from the moment of its construction. Thus, human activities modify such homogeneity by leaving specific chemical residues (Lazos 1997).

In the Oztoyahualco (15B:N6W3) apartment compound, samples were taken from plastered floors using an electric drill with a concrete point to produce dust from a hole 2 cm in diameter and 2 cm in depth. The samples were bagged and labeled, registering the sampling point on a map of the unit. Chemical analyses were carried out at the UNAM's Archaeological Prospecting Laboratory to determine carbonate, phosphate, fatty acid, and protein residue content in addition to pH values, following the procedures established in the *Manual de técnicas microquímicas de campo para la arqueología* (Barba, Rodríguez et al. 1991).

The use of chemical indicators for the study of activity areas is based on the following assumptions (Barba and Lazos 2000):

- (1) When an activity takes place, some liquid residues may be spilled on the surface and, sometimes, depending on the characteristics (porosity) of this surface, the residues could be absorbed. For that reason, a differential enrichment of the floor could be observed depending on the distribution and diversity of the activities that took place in a particular room.
- (2) Once the compounds that are by-products of human activities have been incorporated into the ground, they are subject to chemical laws controlled by factors such as pH, EH, ion concentration in solutions, the speed and direction of water movement in the profiles, and the time of abandonment. All these factors determine the possibility of chemical indicators to survive over long periods of time, and this result is more apparent in lime plaster floors than in earth floors and soils.
- (3) By chemical analyses of floor samples, it is possible to identify and evaluate the presence and the spatial distribution of several indicators. Some residues were produced by specific activities. Thus, by their characterization, it could be possible to identify the function of the place.
- (4) The comparative study of materials in ancient domestic units, as well as previous studies of modern households, offers the possibility of interpretation in archaeological terms.

The differential chemical enrichment of floors depends on the following four criteria (Ortiz 1990). First, the type of activity (e.g., production, use-consumption, storage, or waste) will leave particular signatures. Second, the continuity, intensity, and duration of the activity will affect the chemical signature. Third, changes in the spatial distribution of the activity will determine the strength of the signature and the distribution of it. And fourth, differential use of the same area (both contemporary and after) will affect the signature.

With respect to the chemical enrichment of lime plastered floors, it must be considered that instead of dealing with soils and sediments, we are dealing with a stucco floor, which is a porous archaeological material. In this case, there are no soil processes such as lixiviation, oxidation, depletion, and migration. This artificial surface was prepared with overlapping layers of mud mixed with gravel, a base of lime mixed with sand, and finally a thin layer of a lime-enriched finish coat. This arrangement of layers prevents the vertical movement of water, and the way lime is produced—by burning limestone fragments—ensures the removal of most organic remains, producing a “clean” surface from the chemical point of view.

The systematic grid sampling of the floors and the chemical analysis provide information about the concentration of residues found in the floor, enabling the reconstruction of the enrichment patterns. These patterns have been interpreted as revealing human activities through the comparison with recognizable patterns found in previous ethnoarchaeological studies.

It is impossible to identify for sure any human activity just by analyzing some chemical residues in floors, since it has to be considered that different activities can produce the same chemical concentration of one chemical compound or element. Nevertheless, our laboratory has chosen an integrative approach to optimize the interpretation opportunities; thus, the spatial association of different chemical residues and diagnostic archaeological materials provides a better probability of interpreting the actual activities that produced the chemical enrichment.

The analytical techniques employed and the goals of these studies do not attempt to interpret small differences in concentrations. Our approach focuses on large concentrations of chemical residues since they reveal activities that must have been important because they were carried out on a daily basis for a long time or once involved large amounts of material residues. In addition, we deal with chemical enrichment patterns compris-

ing not just a few samples but hundreds of samples surveying the whole occupation surface.

The analysis of chemical residues provides information concerning the places where some human activities were carried out and, as a consequence, about the way the spaces were used in ancient times. It is well-known that most of the archaeological materials are not found in primary contexts. On the other hand, the concentration of chemical residues does not undergo displacement; thus, there is a high probability that the place where a high chemical concentration is found was where a given activity produced signatures on a particular section of the floor. The risk, therefore, is not that the residue will be wrongly associated with a given place but that the residue will be misinterpreted as signifying a different activity, and this problem is especially true in courtyards, which are likely to be areas with multiple uses and many overlapping patterns.

RESULTS

During the 1970s and 1980s, inorganic analyses of floor samples were undertaken (Ortiz 1990), but the organic analyses presented here are more recent. The distribution map of these chemical indicators furnishes information concerning the enrichment patterns on the floor surface. The interpretation of these patterns in terms of ritual activities and their relationship to other archaeological evidence is one of the goals of this research. Results of the analysis of the Oztoyahualco compound are presented here.

Because most of the architectural surfaces are covered by lime plaster in Teotihuacan, the low concentration of carbonates in floors suggests either intense surface wear without later renovation or poor construction quality. At Oztoyahualco 15B:N6W3, high concentrations of carbonates have been associated with polishers and ready-to-use plaster on top of the floors. We observed that the central part of the domestic compound shows better flooring, which has been interpreted as higher construction quality or perhaps flooring repaired after long-term use. Rooms in the periphery tend to have lower carbonate values.

The high content of sodium and potassium hydroxides in ash produces a sizable increase in pH values in some parts of the floors. As a consequence, the pH level may be an indirect indicator of burning areas. At Oztoyahualco, the high values of pH suggest the disposal of ashes on their surface. Some of them resulted from food preparation, but others,

especially in patios, seem to be related to ritual activities. Phosphates are frequently related to food preparation and consumption. In this case, some high concentrations are also found in courtyards and it is possible that they are more related to ritual activities.

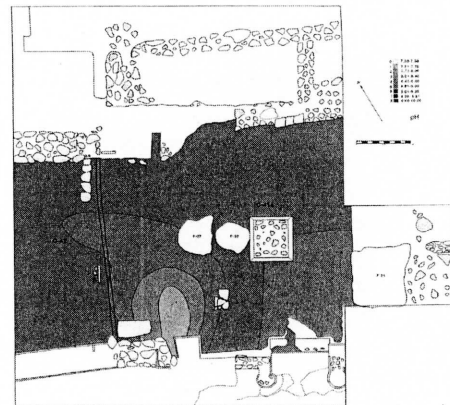
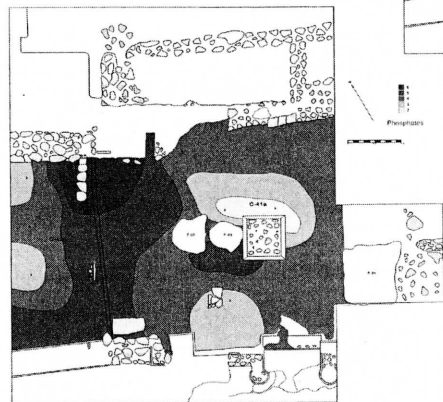
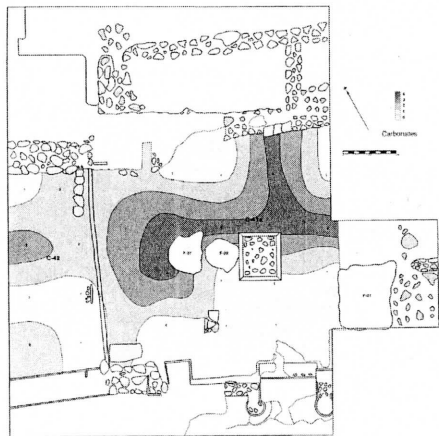
Food preparation and consumption areas have a higher content of protein residues than do other areas, but specific areas of the courtyards also show higher concentrations of protein residues. Fatty acids related to protein residues are produced by the decay of resins, fats, and oils and are often associated with areas of food preparation and consumption. More important for our goals, however, are the concentrations of these acids in some courtyards close to the places where braziers were found. This protein residue may be from the ritual use of copal, a substance with high concentrations of fatty acids.

COURTYARD C41A

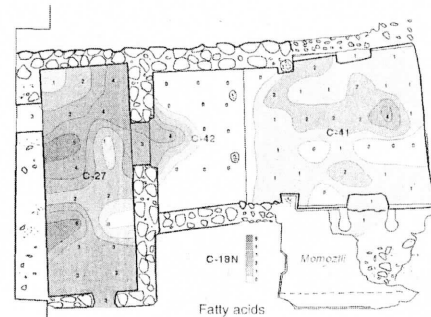
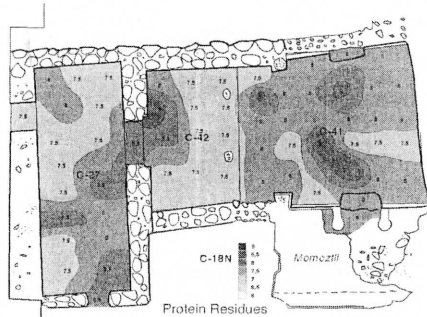
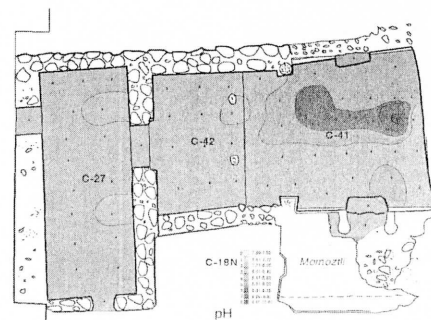
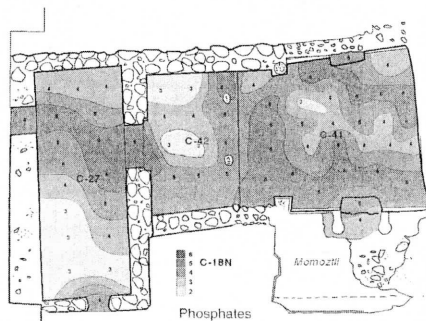
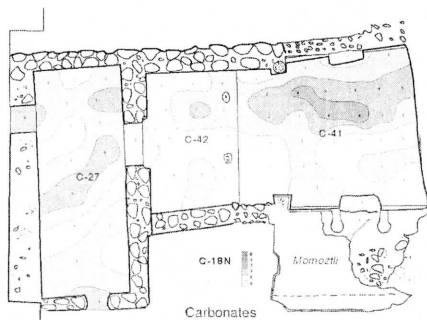
This courtyard is special since it was the only one with a permanent centered altar. Unfortunately the Xolalpan floor was damaged and during excavation it was removed to expose the floor C41. Nevertheless, it was sampled and analyzed like the others. The results showed a band of higher values to the north of the altar. Approximately in the same place, we found low phosphate values, whereas higher values were found at the southwestern corner of the altar. Pattern distribution of chemical indicators suggests that the southern part of the altar was used more intensively than the northern part (Figure 3.5).

COURTYARD C41

The central distribution of high carbonate values in this red courtyard, along with the high phosphate concentrations surrounding the low values in the central portion of the courtyard (also enriched with fatty acids and residues derived from ancient proteins placed in both sides—north and south—of the central area), suggests the setting of ritual activities was a mobile altar at the center of the patio (Figure 3.6). In this case, domestic activities are not represented in the distribution of chemical residues. There are interesting correspondences among phosphates, protein residues, and fatty acids just in the doorway between C27 and C42. Because C27 has been defined as a storage room, this area could be considered a possible preparation area for the rituals carried out at the courtyard.



3.5. Chemical residues at Xolalpan floor C41a, Oztoyahualco, Teotihuacan, Mexico.



3.6. Chemical residues at courtyard C41, Oztoyahualco, Teotihuacan, Mexico.

COURTYARD 25

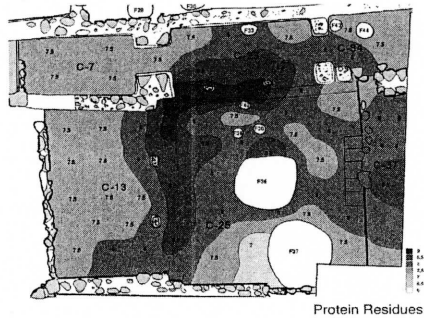
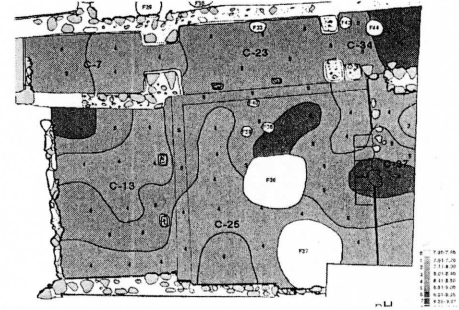
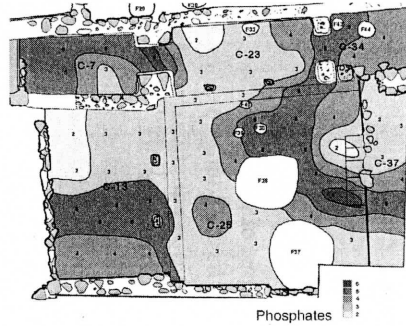
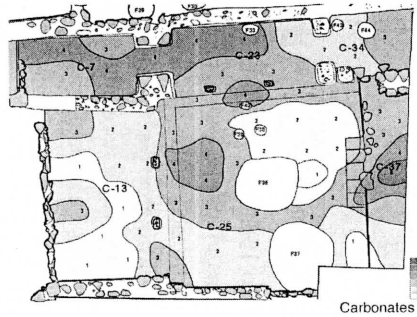
At this courtyard, the maximum carbonate values are located in the northern and western parts, just in the place where a theater-type censer was found. Meanwhile, the maximum pH values are just overlapping, with a concentration low in carbonates and high values of phosphate, protein residues, and fatty acids. The enrichment pattern suggests that some activities—perhaps rituals—were carried out at the central part, possibly close to a mobile altar placed on top of F36. Some other high phosphate values are at the northwestern sector at room C7 and in the southern part of C13. The northern and western limits of the courtyard have the highest values of protein residues and fatty acids, displaying markedly similar patterns, suggesting the use of the double step to execute some specific activities while seated (Figure 3.7).

COURTYARD 33

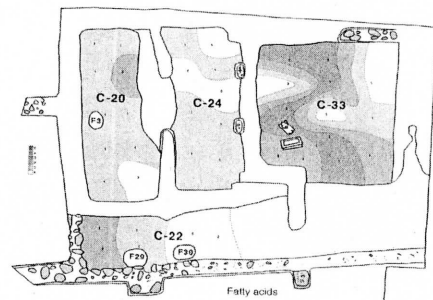
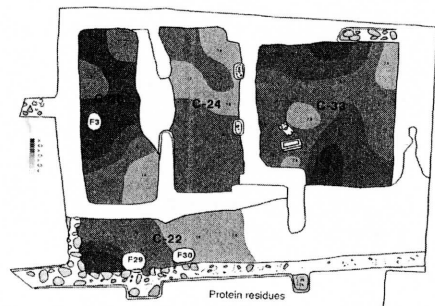
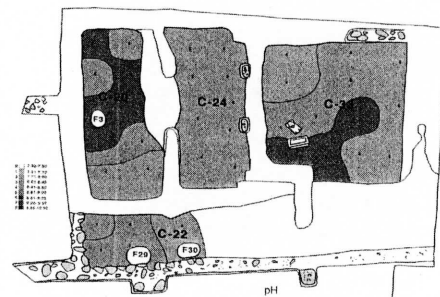
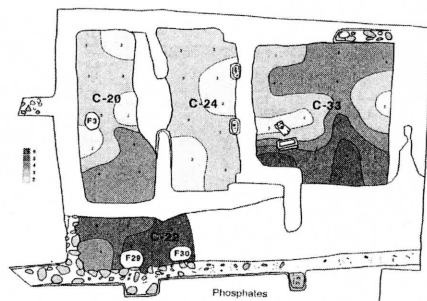
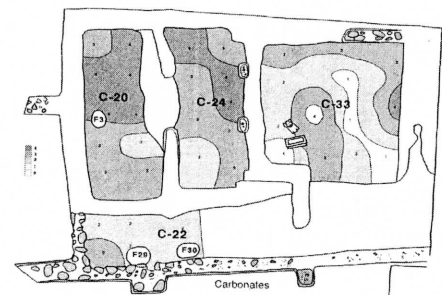
Some low carbonate values suggest the more intense use of the courtyard area. Maximum pH values can be found at the center and southwestern corner beside most of the surface of C20. Highest phosphate concentrations were found in the southern portion of the courtyard. Room C20's pH and protein residue patterns are remarkably similar, suggesting important activities occurred here, too. High values of fatty acids overlap with high concentrations of phosphates and protein residues in the southern and northern limits of the courtyard. In this case the central enrichment is absent and the high residue enrichment found at room C22 suggests the presence of a food preparation area. In this case, the patterns are mixed and it is more feasible that both domestic and ritual activities are represented (Figure 3.8).

SUMMARY AND CONCLUSIONS

In and around the courtyards of Ozttoyahualco 15B:N6W3, activity areas related to ritual preparation may be present, as identified by several archaeological indicators. Some courtyards have burned incense in theater-type censers or sectional temple models. Radial cutting marks on limestone half spheres suggest that the activity of cutting rabbit and hare limbs may have taken place (Hernández 1993; Manzanilla 1993). The use of fire and the throwing of ashes may be indicated by chemical signatures, and the use and consumption of organic materials took place as well (Manzanilla 1993).



3.7. Chemical residues at courtyard C25, Oztoyahualco, Teotihuacan, Mexico.



3.8. Chemical residues at courtyard C33, Oztoyahualco, Teotihuacan, Mexico.

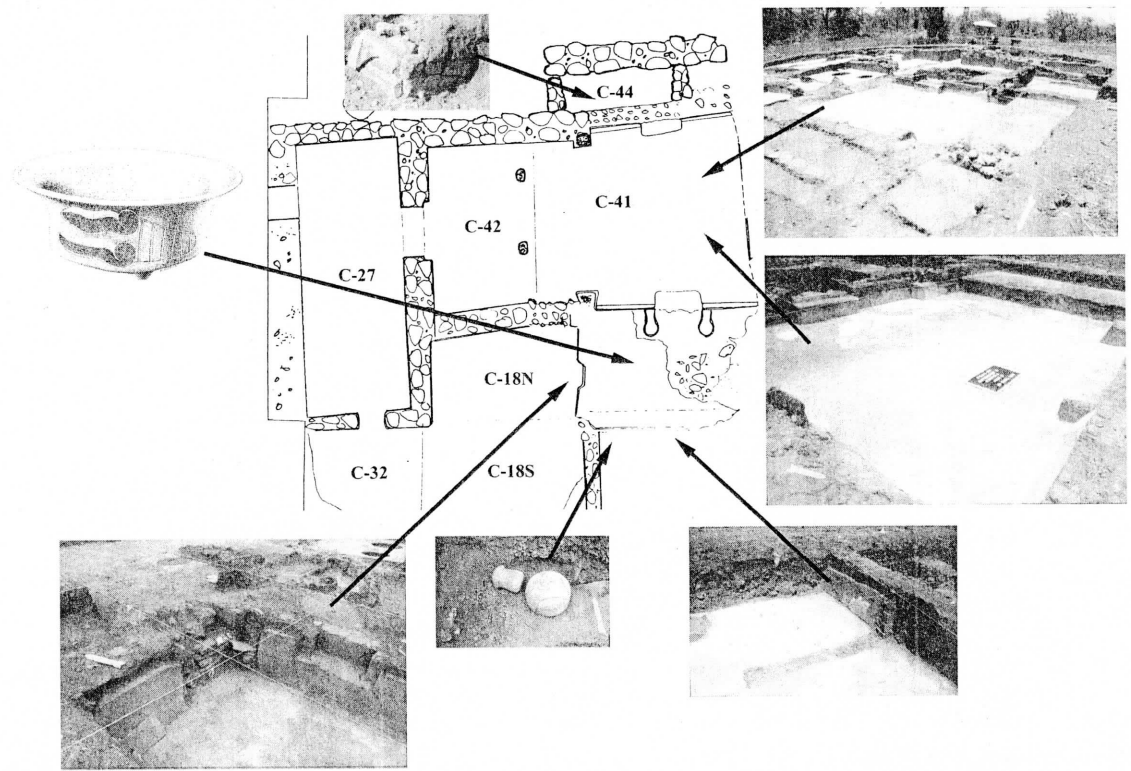
Courtyard C25 was identified as the ritual space of Family Unit 2. During the excavation of this courtyard, a portable altar was found, and the surrounding area has high concentrations of chemical residues. Other important rituals were performed in rooms C20, C24, and C33, which are part of the Family Unit 3 apartment. All of them display well-preserved floors. Room C20 shows high pH values and protein residues and has been interpreted as an area of ritual preparation for the ceremonies performed at courtyard C33. On the floor of courtyard C33, a portable altar and a zoomorphic representation of a rabbit directly corresponded to high concentrations of all chemical indicators.

In regard to the study of ritual activities, chemical evidence in the courtyards of the domestic compounds was recovered. The most significant was the Red Courtyard (C41) with relicts of mural painting in the eastern wall. This courtyard is connected to the sanctuary to the south, forming a significant ritual complex. During the excavation process, in the upper layer of the same courtyard (C41a), a Late Xolalpan central altar was found. Taking into consideration that some portable altars have been excavated in other patios, it is possible that one of these altars was at the center of the Red Courtyard during the Late Tlamimilolpa phase, and the activities performed around it produced chemical distribution patterns in its center (Figure 3.9).

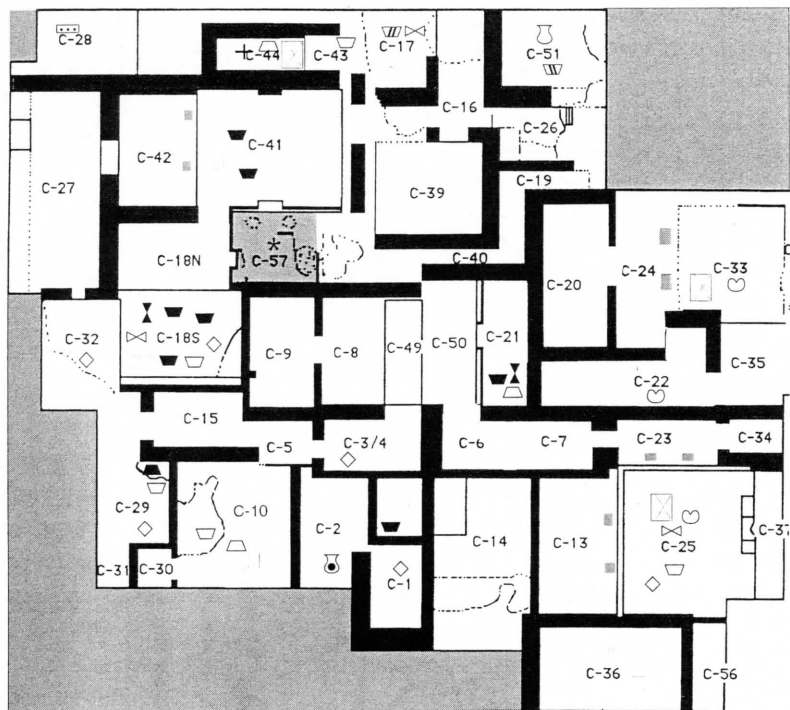
A large concentration of ritual materials in the western portion of the Oztoyahualco compound (specifically in C18) is particularly interesting (Figure 3.10). This room may be interpreted as a storeroom because ritual elements (censer plaques, *candeleros*, figurines, Copa Ware vessels) as well as foreign materials (Thin Orange pottery) were found. It is located directly in contact with the sanctuary (C57) and the Red Courtyard (C41), through a passage closed in Late Xolalpan times. This storage sector may be interpreted as the place where ritual paraphernalia was stored.

After carefully reviewing the relationship among architecture, chemical residues, and archaeological materials found in courtyards, we can be certain that ritual activities were performed in the courtyards, sometimes at the center and sometimes at one of the sides, leaving archaeological traces and chemical residues as evidence of the type of activities performed. There also is a clear indication, however, that other domestic activities were mainly carried out in courtyards C33 and C25.

It is interesting to note that the hierarchical organization of the households within this apartment compound is also seen in ritual: the largest ritual courtyard is related to the household bearing Tlaloc (the state god)



3.9. Ritual elements in and around main ritual courtyard C41 in the Oztoyahualco compound, Teotihuacan, Mexico.



- | | |
|-------------------------------|---------------------------------|
| ☒ Temple models | ◡ Thin orange |
| □ Puppets figures | ▀ Handled cover |
| ◇ Portrait figures | ▢ Flute |
| ▴ Copra ware | ✱ Polished incised red on brown |
| □ Candelero | ⊕ Oaxaca gray ware |
| 🏺 Tlaloc jar | ▨ Cloisonné |
| ▾ Theater-type censer | ▨ Champleve |
| ▾ Theater-type censer plaques | □ Amamalacoti |
| ☺ Three-pronged stove | 🏺 Negative jar |
| ◡ Miniatures | |

3.10. Ritual elements in the Oztotyahualco compound, Teotihuacan, Mexico.

symbols, as well as to the largest amount of foreign materials, whereas the other courtyards show rituals related to the rabbit and other domestic gods.

REFERENCES CITED

Angulo Villaseñor, Jorge

- 1987 Nuevas consideraciones sobre Tetitla y los llamados conjuntos departamentales. In *Teotihuacan: Nuevos datos, nuevas síntesis, nuevos problemas*, edited by Emily McClung and Evelyn Rattray, pp. 275–315. Universidad Nacional Autónoma de México, México.

Barba, Luis

- 1986 La química en el estudio de áreas de actividad. In *Unidades habitacionales mesoamericanas y sus áreas de actividad*, edited by Linda Manzanilla, pp. 21–39. Universidad Nacional Autónoma de México, México.

Barba, Luis, and Luz Lazos

- 2000 Chemical Analysis of Floors for the Identification of Activity Areas: A Review. *Antropología y Técnica* 6:59–70.

Barba, Luis, Luz Lazos, Agustín Ortiz, Karl Link, and Leonardo López Luján

- 1997 La arquitectura sagrada y sus dioses: Estudio geofísico y químico de la Casa de las Águilas, Tenochtitlan, Mexico. *Revista de Arqueología Española*. Año XVIII (October):44–53.

Barba, Luis, Eliseo Linares, and Guillermo Pérez

- 1991 Estudio químico de tumbas saqueadas. *Revista Mexicana de Estudios Antropológicos* 36:9–24.

Barba, Luis, Beatriz Ludlow, Linda Manzanilla, and Raúl Valadez

- 1987 La vida doméstica en Teotihuacán: Un estudio interdisciplinario. *Ciencia y Desarrollo* 77:21–32.

Barba, Luis, and Agustín Ortiz

- 1992 Análisis químico de pisos de ocupación: Un caso etnográfico en Tlaxcala, México. *Latin American Antiquity* 3:63–82.
- 1993 Capítulo XII. Superficie-excavación: Evaluación del sector estudiado a través de los restos excavados. In *Anatomía de un conjunto residencial teotihuacano en Oztoyahualco*, Volume 2, *Los estudios específicos*, edited by Linda Manzanilla, pp. 595–616. Universidad Nacional Autónoma de México, Mexico City.

Barba, Luis, Agustín Ortiz, Karl F. Link, Leonardo López Luján, and Luz Lazos

- 1996 The Chemical Analysis of Residues in Floors and the Reconstruction of Ritual Activities at the Templo Mayor, Mexico. In *Archaeological Chemistry: Organic, Inorganic and Biochemical Analysis*, edited by Mary Virginia Orna, pp. 139–156. Chemical Society of America, Washington, D.C.

Barba, Luis, Fabienne Pierrebouirgh, Claudia Trejo, Agustín Ortiz, and Karl Link

- 1995 Activités humaines reflétées dans les sols d'unités d'habitation contemporaine et préhispanique du Yucatan (Mexique): Études chimiques

- 1996 Corporate Groups and Domestic Activities at Teotihuacan. *Latin American Antiquity* 7:228-246.
- 2000a Fuego y regeneración: Los incensarios teotihuacanos y su simbolismo. *Revista Precolombart* 3:21-33.
- 2000b Noticias. Hallazgo de dos vasijas policromas en Teopancazco, Teotihuacan. *Arqueología Mexicana* VIII:80.
- 2002 Living with the Ancestors and Offering to the Gods: Domestic Ritual at Teotihuacan. In *Domestic Ritual in Ancient Mesoamerica*, edited by Patricia Plunket, pp. 43-52. Monograph 46, Cotsen Institute of Archaeology, University of California, Los Angeles.
- 2003 Teopancazco: Un conjunto residencial teotihuacano. *Arqueología Mexicana*. *Teotihuacan: Ciudad de misterios*, XI (64):50-53
- Manzanilla Linda (editor)
 1993 *Anatomía de un conjunto residencial teotihuacano en Oztotlahualco*, Volume 1, *Las excavaciones*. Universidad Nacional Autónoma de México, Mexico City.
- Manzanilla, Linda, and Luis Barba
 1990 The Study of Activities in Classic Households. Two Case Studies from Coba and Teotihuacan. *Ancient Mesoamerica* 2:299-307.
- Manzanilla, Linda, and Emille Carreón
 1991 A Teotihuacan Censer in a Residential Context: An Interpretation. *Ancient Mesoamerica* 2:299-307.
- Manzanilla, Linda, and Agustín Ortiz
 1991 Los altares domésticos en Teotihuacan, hallazgo de dos fragmentos de maqueta. *Cuadernos de Arquitectura Mesoamericana* 13:11-13.
- Marcus, Joyce
 1998 *Women's Ritual in Formative Oaxaca: Figurine-Making, Divination, Death and the Ancestors*. Memoirs of the Museum of Anthropology No. 33, University of Michigan, Ann Arbor.
- Millon, René
 1973 *Urbanization at Teotihuacan, Mexico*, Volume 1, *The Teotihuacan Map Text*. University of Texas Press, Austin.
- Ortiz, Agustín
 1990 Oztotlahualco: Estudio químico de los pisos estucados de un conjunto residencial teotihuacano para determinar áreas de actividad. Thesis in Archaeology, Escuela Nacional de Antropología e Historia, Mexico City.
- 1996 Estudio químico del piso de la tumba tres de Bolaños. Paper presented in the IV Coloquio de Occidentalistas. Instituto Cultural Cabañas, Guadalaajara, Mexico.

- ethnoarchéologiques et archéologiques. *Revue d'Archéométrie* 19:79-95.
- Barba, Luis, Roberto Rodríguez, and Jose Luis Córdova
 1991 *Manual de técnicas microquímicas de campo para la arqueología*. Universidad Nacional Autónoma de México, México City.
- Cazeneuve, Jean
 1972 *Sociología del rito*. Amorrortu, Buenos Aires.
- Cowgill, George L.
 1997 State and Society at Teotihuacan, Mexico. *Annual Review of Anthropology* 26:129-161.
- Getno, Fernando, and Agustín Ortiz
 1997 La actividad ritual a nivel de barrio: El momoztli de Palma y Venusstano Carranza. *Arqueología* 18, segunda época (July-December):119-138.
- Hernández, Cynthia
 1993 Capítulo VII. La litica. In *Anatomía de un conjunto residencial teotihuacano en Oztotlahualco*, Volume 1, *Las Excavaciones*, edited by Linda Manzanilla, pp. 388-467. Universidad Nacional Autónoma de México, México.
- Lazos, Luz
 1997 Estudio para el análisis químico sistemático de pisos arqueológicos: Master's thesis in Chemical Sciences, Facultad de Química, Universidad Nacional Autónoma de México, México City.
- Liné, Sigvald
 1934 *Archaeological Researches at Teotihuacan, Mexico*. Publication 1, Ethnographic Museum of Sweden, Stockholm.
- 1942 *Mexican Highland Cultures: Archaeological Researches at Teotihuacan, Calpulpan and Chalchicomula in 1934-35*. Publication 7, Ethnographical Museum of Sweden, Stockholm.
- Lizárraga, Yara, and Agustín Ortiz
 1993 Capítulo VIII. Hacia una reinterpretación de los pulidores de estuco. In *Anatomía de un conjunto residencial teotihuacano en Oztotlahualco*, Volume 1, *Las excavaciones*, edited by Linda Manzanilla, pp. 468-493. Universidad Nacional Autónoma de México, México City.
- López Austin, Alfredo
 1989 La historia de Teotihuacan. In *Teotihuacan*, pp. 13-35. El Equilibrista, Círculo/Citibank, Mexico.
- Manzanilla, Linda
 1988-1989 The Study of Room Function in a Residential Compound at Teotihuacan, Mexico. In *Origini, Giornate in onore di Salvatore Maria Puglisi* 14:175-186.

Ortiz, Agustín, and Luis Barba

- 1992 Estudio químico de los pisos del Satunsat, en Oxkintok, Yucatán. *Oxkintok* 4:119-126.
- 1993 Capítulo XII. La química en el estudio de áreas de actividad. In *Anatomía de un conjunto residencial teotihuacano en Oztotyahualco*, Volume 1, *Las excavaciones*, edited by Linda Manzanilla, pp. 617-660. Universidad Nacional Autónoma de México, Mexico City.

Rivera, Miguel, and Francisco Ferrándiz

- 1989 Excavaciones en el Satunsat. *Oxkintok* 2:63-75.

Sánchez Alaniz, José Ignacio

- 2000 *Las unidades habitacionales en Teotihuacan: El caso de Bidasoa*. Serie Arqueología, Colección Científica 421. Instituto Nacional de Antropología e Historia, Mexico.

Sanders, William T.

- 1966 Life in a Classic Village. In *Teotihuacan: XI Mesa Redonda*, pp. 123-143. Sociedad Mexicana de Antropología, Mexico City.
- 1994 *The Teotihuacan Valley Project: Final Report*. Volume 3, *The Teotihuacan Occupation of the Valley*. Part 1. *The Excavations*. Occasional Papers in Anthropology 19. Matson Museum of Anthropology, Pennsylvania State University, University Park.

Séjourné, Laurette

- 1966 *Arquitectura y pintura en Teotihuacán*. Siglo XXI, Mexico City.

Sempowski, Martha L.

- 1987 Differential Mortuary Treatment: Its Implications for Social Status at Three Residential Compounds in Teotihuacan, Mexico. In *Teotihuacan: Nuevos datos, nuevas síntesis, nuevos problemas*, edited by Emily McClung de Tapia and Evelyn Childs Rattray, pp. 115-131. Universidad Nacional Autónoma de México, Mexico City.
- 1994 Part I. Mortuary Practices at Teotihuacan. In *Mortuary Practices and Skeletal Remains at Teotihuacan*, by Martha Sempowski and Michael W. Spence, pp. 1-311. Urbanization at Teotihuacan, Mexico, Volume 3, edited by René Millon. University of Utah Press, Salt Lake City.