

Formal Architectural Complexes in South-Central Veracruz, Mexico: A Capital Zone?

Barbara L. Stark

Arizona State University
Tempe, Arizona

In the Gulf lowlands of Mesoamerica, there has been little study of the architectural patterns of centers, as few have been mapped in detail. Formal monumental architecture in the Mixtequilla region of south-central Veracruz, including Cerro de las Mesas, has been contour mapped and surface collected in a recent project so that categories of structures, layout characteristics, and relationships among groups can be evaluated. A chief problem concerns settlement hierarchy during the Classic period (A.C. 300–900). Formal groups are dispersed, as is residential occupation, in a manner that corresponds in several respects to lowland Maya settlement patterns. Dating, spacing among complexes, non-discreteness of monumental investments, and other evidence provide support for an interpretation of Cerro de las Mesas and its surrounding area as a “capital zone,” where continued investments in monumental construction were made. With this interpretation, secondary or tertiary centers are located beyond the survey zone in the surrounding territory.

Introduction

Recent settlement pattern research in south-central Veracruz, Mexico, reveals problems in the interpretation of settlement hierarchy and how sites can be conceptualized. The Mixtequilla region was a focus of Classic period (A.C. 300–900) Mesoamerican political and cultural developments that built upon antecedents in the Late and Terminal Preclassic periods (600–100 B.C. and 100 B.C.–A.C. 300). Prior to the Classic period, a strongly developed social hierarchy is registered in carved inscriptions, especially at La Mojarra (Justeson and Kaufman 1993), and by important burials at Cerro de las Mesas (Drucker 1943: 8–9). The Mixtequilla is not well delimited archaeologically, but the region overlaps parts of the *municipios* of Tlalixcoyan and Ignacio de la Llave on the western side of the lower Papaloapan basin where the Río Blanco bifurcates into the lower Blanco and de las Pozas channels and joins estuaries at the mouth of the Papaloapan River (FIG. 1).

The Proyecto Arqueológico La Mixtequilla (PALM) generated settlement pattern information within a study zone framed by the Blanco, its Pozas distributary, and the Limon estuary (FIG. 2). Previous PALM settlement pattern publications focused on broad patterns of change and their chronology (Curet, Stark, and Vásquez 1994; Stark and Curet 1994), the general environmental setting (Stark and

Showalter 1990), and residential remains (Hall 1994; Stark, ed. in press). In contrast, here I address the interpretation of Classic period complexes with major formal architecture; in particular, I consider kinds of structures, layout principles, and hierarchical relations. Although we have a new body of information in a region previously lacking published contour maps of centers and related settlement data, the data have generated new questions about the nature of settlements. I suggest, for example, that the study zone may present the remnants of a “capital zone,” a concept I discuss below in conjunction with a critical evaluation of the evidence for a settlement hierarchy. Lowland Mesoamerican urban centers typically display greater residential dispersion than the Mexican highlands. Even formal complexes may comprise dispersed subgroups. The “countryside” is often peppered with outlying habitations. Interpretation of settlement hierarchy in these circumstances is less straightforward than with highly aggregated settlements. I develop two contrastive models as a tool to guide interpretation of Mixtequilla settlement: 1) a disconnected model, in which formal complexes are largely sequential or independent; and 2) a connected model, in which there is greater temporal overlap among complexes in a core zone that forms a superordinate capital, with more distant secondary or tertiary settlements. From these

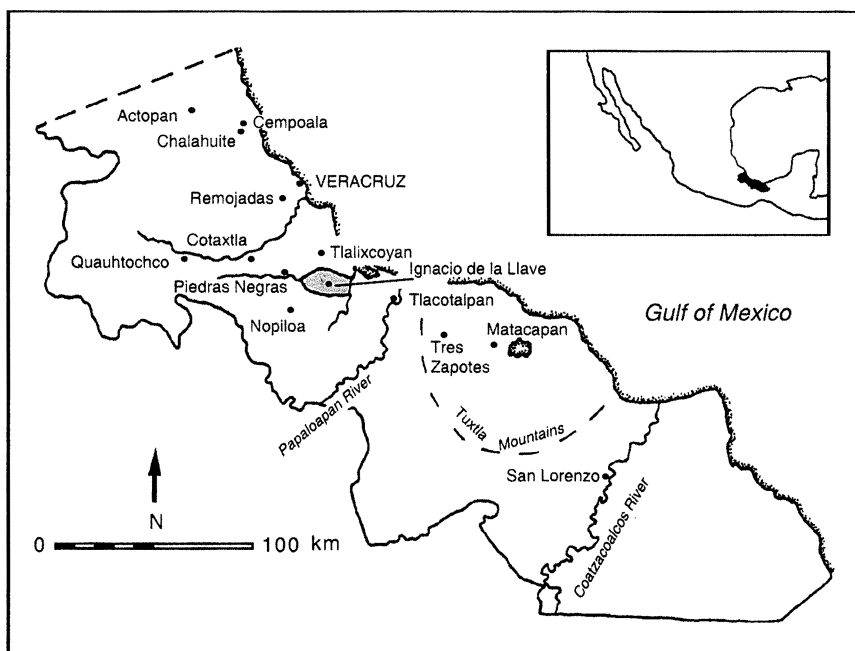


Figure 1. Central and southern Veracruz, with the study zone shaded and selected archaeological sites indicated.

models I elaborate five criteria to evaluate current Mixtequilla evidence; these criteria can be applied to outlying areas in the future to determine their roles vis à vis the Cerro de las Mesas area. In the text that follows, I refer to the formal monumental groups as complexes, reserving the term “center,” which usually connotes a separate “site,” for interpretations related to settlement hierarchies.

Settlement Pattern Research

Three seasons of fieldwork (1986–1988) yielded a thorough inventory of features through full-coverage survey, surface collection, and mapping that covered 40 sq km in a central block; 22 sq km in seven scattered blocks were examined in a related project in 1989 directed by Stuart Speaker (FIG. 2), who surveyed smaller blocks to address topographic and environmental variations and their effects on settlement. Formal complexes were contour mapped in both projects. Here I concentrate on data from the central block, but Speaker has shared information from his work, which has assisted my understanding of the central block.

The settlement record comprises what archaeologists would normally call “features” rather than easily delimited “sites,” and the survey procedures were geared to a form of “siteless” archaeology (e.g., Bintliff and Snodgrass 1988; Dunnell and Dancey 1983; Gallant 1986; Wilkinson 1982, 1989). Settlement is dispersed across the countryside, as is typical in the Maya lowlands. “Urban” centers lack dense, discrete areas of associated occupation. Instead,

low residential mounds and non-mound surface concentrations of household debris (mainly pottery) are scattered throughout most of the 62 sq km and drop off markedly where the survey reached lower-lying floodlands. The residential mounds differ from those in the Maya lowlands because on average they are the size of Maya *plazuela* groups (composed of two or more small structures around a central patio) (Ford 1986; Stark 1991: 45–46). Therefore, Mixtequilla residential mounds typically could have supported more than one perishable structure. The domestic mounds represent varying combinations of episodic artificial earthen platform construction and gradual wattle-and-daub melt and trash accumulations (Hall 1994; Stark, ed. in press). There was a marked tendency to reuse residential mounds, probably owing to seasonal rains and flood-prone, low-lying terrain (the highest area in the study zone is 16 m asl). Stone is not available locally, and monumental structures are of rammed earth, with plaster facing in some cases, and, very rarely, cobble facing (Drucker 1943: 12; Stark and Heller 1991a: 6; Torres 1972; Torres, Reyes, and Ortega 1975).

Part of the survey involved theodolite mapping of monumental, formal complexes, consisting of plazas, ponds, and platforms for community buildings with ritual and administrative functions, along with platforms for elite or rulers’ residences for which public labor also was marshalled. Contour maps provide a basis to understand the layout principles of centers, possible functions of struc-

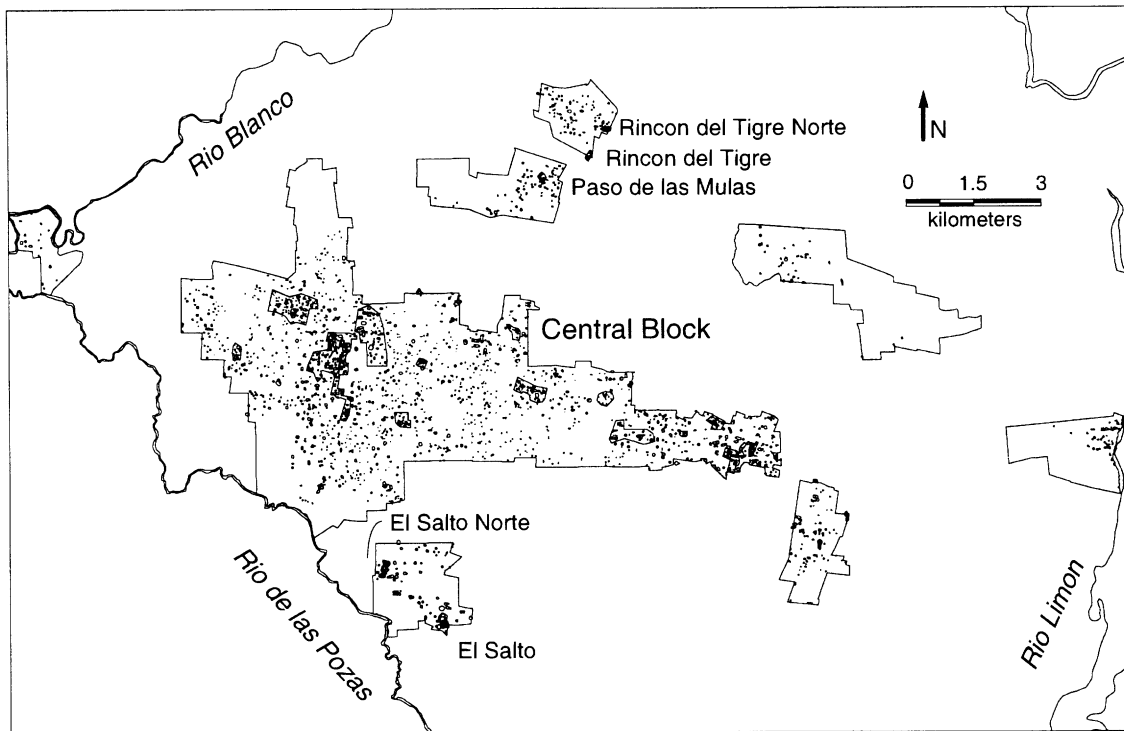


Figure 2. Survey areas in the study zone showing archaeological features. Formal complexes are outlined. The small "dots" are individual mounds or collection areas.

tures, and issues concerning the settlement hierarchy. Each planimetric map is accompanied by a schematic map indicating feature numbers, with features shown by an outline. On the schematics, when one (or more) measured collection area(s) was placed on a much larger feature, that collection square is also shown in outline and bears the number of the feature. (In the case of two collections from a feature, the lower number applies to the feature itself, except in the case of feature 91 at Cerro de las Mesas.)

The Mixtequilla Classic Period in Diachronic Perspective

The long-term history of the Mixtequilla and its changing economic and organizational patterns can scarcely be described as well known, but previous research establishes an outline. The earliest documented occupation dates to the latter part of the Middle Preclassic period, ca. 600–700 B.C. The area around Cerro de las Mesas is a focus of occupation (FIG. 3), and Cerro de las Mesas becomes a center in the Late and Terminal Preclassic periods on the basis of both the PALM survey and earlier excavations (Drucker 1943; Stark, ed. 1991; Stark and Curet 1994; Stirling 1943). A large Classic-period sculptural corpus from Cerro de las Mesas displays inscriptions and Long Count dates (Miller 1991; Stirling 1943); these dates appear to be in

the same system known from the Terminal Preclassic period from nearby La Mojarra Stela 1 and the Tuxtla Statuette (Justeson and Kaufman 1993, 1997; Méluzin 1992; Winfield 1988), for which preliminary decipherments have been offered based on a pre-proto-Zoquean language.

The PALM survey revealed a spread of occupation eastward from Cerro de las Mesas and population increase by the Classic period, with construction of additional formal complexes besides Cerro de las Mesas. Cerro de las Mesas forms a sprawling area of nearly 1.5 sq km of formal groups, including a southward extension, the Chivo group, and construction NE in the Ojochal area (FIGS. 3–9). Azules and Zapotal are both major complexes to the east that have Classic materials, and the smaller complexes with robust collections include considerable Classic ceramics except for the Middle Postclassic (A.C. 1200–1350) center of El Sauce. El Zapotal is a federal archaeological zone that was the subject of a previous project and was not included in PALM survey. The Mixtequilla appears to have retained greater independence from Teotihuacan than did Matacapán in the Tuxtla Mountains (Santley and Arnold 1996; Santley, Yarborough, and Hall 1987). Classic settlement patterns were markedly disrupted during the Postclassic period, including near abandonment of earlier formal complexes. El Sauce is a nucleated settlement with greatly re-

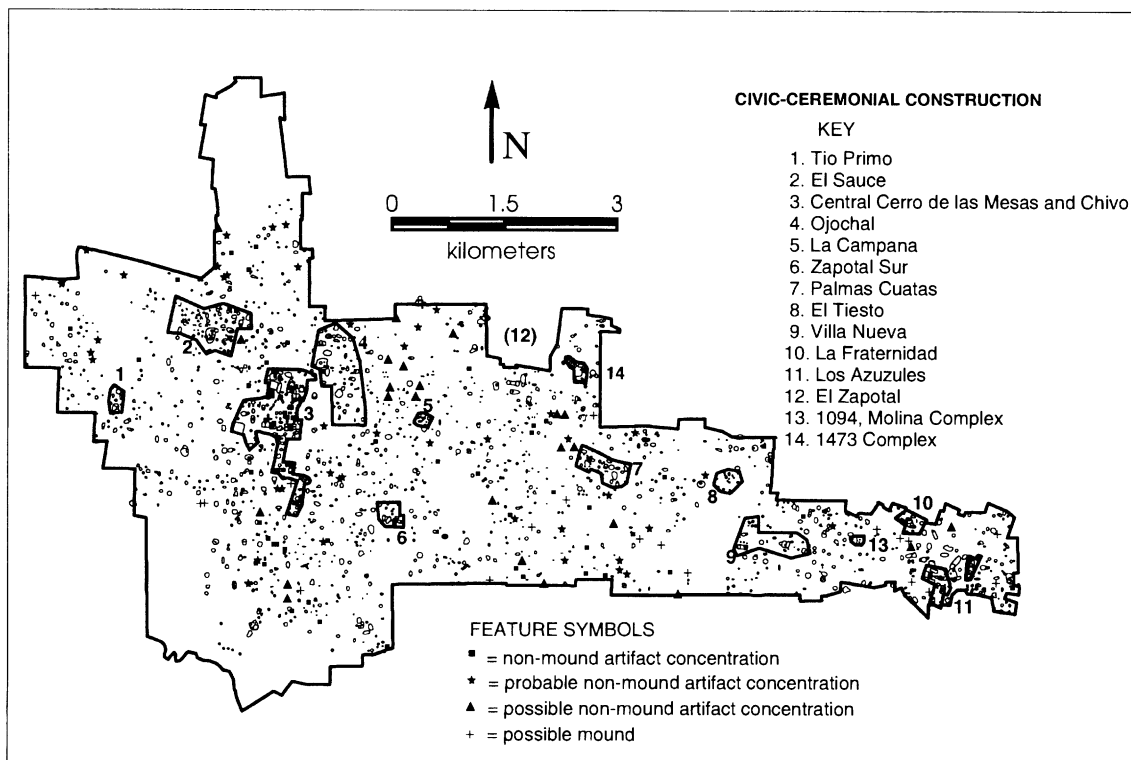


Figure 3. The PALM central block survey showing archaeological mounds, with other types of features indicated by symbols. Monumental archaeological complexes are delimited by a surrounding line and numbered.

duced monumental construction compared to earlier periods, but Postclassic habitation in the countryside is extensive throughout the survey area, indicating ruralization in the settlement pattern (Curet, Stark, and Vásquez 1994).

In addition to subsistence patterns (Stark, ed. in press), three industries in the Classic-period Mixtequilla economy have been studied diachronically: pottery, obsidian, and cotton. Each provides a slightly different economic perspective. Pottery production is not very concentrated, and only a few residential mounds have surface indications suggestive of specialized production (Stark 1992). The occasional discovery of kiln wall fragments, however, raises the possibility that excavation will reveal areas of more intensive specialized production. The evidence does not suggest a particular association of pottery production with the formal complexes.

Obsidian was imported, with a shift during the Late and Terminal Preclassic periods from considerable use of a flake technology to mainly prismatic blade production in the Classic period. The predominant sources of raw material changed as well (Stark et al. 1992). The Classic period shows a near-exclusive reliance on the Zaragoza-Oyameles source in Puebla. Although central Cerro de las Mesas-Chi-

vo and Azuzules had somewhat better access to and slightly more evidence of manufacture of prismatic blades during the Classic period, there is evidence for considerable production throughout the "countryside" as well (Heller and Stark 1998). Thus, there is a good possibility that formal complexes and associated elite personnel played a role in the importation and distribution of prismatic cores, but not necessarily in blade production itself.

In several respects, evidence concerning the cotton industry proved especially illuminating about Classic Mixtequilla. Settlement orientation to the fertile farmlands of the study zone points to an agrarian base for Mixtequilla society, and spindle whorls establish a strong case for cotton as one key crop by the Early Classic period (and possibly slightly earlier) (Hall 1997; Stark, Heller, and Ohnorsorgen 1997). There are also more depictions of textiles on Classic-period figurines than Preclassic ones. Given the growing importance of cotton as a regional product, Mixtequilla land-holding would have become exceptionally important as a basis for power and wealth. Cotton textiles likely served not only for local social displays but also for export to the highlands, where cotton could not be grown and major urban states like Teotihuacan would have pro-

vided potential trade partners. The cotton evidence, especially, but also obsidian and pottery, suggests either centralized control of a valuable product or a broad-based access to wealth and power through land-holdings. These two possibilities may have expressed themselves in two respective forms of settlement patterns, one with greater centralization and hierarchy and the other with less.

Two Models for Settlement Relations

Lowland Urban Centers

The nature of settlement hierarchy and its social and political implications can be situated in a general perspective concerning urbanism. Unfortunately, “urbanism” is one of the most protean of terms” (Wheatley 1972: 601) because anthropological and historical studies have shown considerable variety in the historical origins, functions, and morphologies of urban settlements. Here I use “urban” in a broad sense to designate a center strongly functionally differentiated from, supported by, and serving a hinterland (Blanton 1976). Mixtequilla centers are urban, but their particular form and scale require more than casual attention to determine relationships. The reason Mixtequilla centers are problematic is that dispersed occupation and dispersed major construction in the Mesoamerican lowlands make the limits of centers, viewed as settlements or sites, difficult to identify. As a consequence, the settlement hierarchy is thrown into question (Chase, Chase, and Haviland 1990; Folan 1990; Smith 1989).

Within Mesoamerica, centers show great variation in longevity, size, population density, and in the amount, arrangement, and diversity of constructions. Some of this variation is appropriately categorized through recognition of a settlement hierarchy involving discrete settlements (e.g., Blanton et al. 1982; Kowalewski et al. 1989; Sanders, Parsons, and Santley 1979). In these hierarchies lower-order settlements are thought to be administratively dependent on higher-order ones and to offer a narrower range of services. Shifts over time in the number of administrative levels in a region also contribute to the variety among centers (Marcus 1989). Other variation reflects the differing sizes of polities across Mesoamerica, and some variation relates to “primate” patterns (Kowalewski 1982). Overall, however, one of the most striking regional contrasts is between the Mexican highlands and the Maya lowlands (Drennan 1988). In the highlands several large, well-mapped cities, such as Monte Albán (Blanton 1978), Xochicalco (Hirth 1995), Teotihuacan (Millon 1973), and Tula (Yadeun 1974) show large aggregated populations as well as core construction areas with prominent public buildings.

In the Maya lowlands, centers typically have major public constructions but markedly less population aggregation than in the highlands, such as at Cobá (Folan, Kintz, and Fletcher 1983), Tikal (Carr and Hazard 1961; Puleston 1983), and Dzibilchaltún (Kurjack 1979); much occupation tends to be dispersed in the countryside (e.g., de Montmollin 1989; Fedick and Ford 1990; Ford 1986). Predominantly regal-ritual functions at Maya centers have been tied to Mesoamerican transport limitations, land use, and environmental differences compared to the highlands, as well as to political contexts (Drennan 1988; Freidel 1981; Sanders and Webster 1988; Stark and Heller 1991b); however, a blanket designation of lowland centers as “regal-ritual” risks over-simplification (Chase, Chase, and Haviland 1990; Folan 1990; Smith 1989).

Classic Maya centers display considerable variation in size, with some of the largest exhibiting a greater volume of construction, more construction groups, and sometimes formalized ties to subsidiary groups through connecting causeways; for example, Caracol is among the largest centers in areal extent on the basis of causeways (Chase and Chase 1996). Mixtequilla settlement (and that of much of the Gulf lowlands) resembles Maya patterns more than those of the Mexican highlands.

Although initially I attempted to interpret Classic Mixtequilla formal complexes in terms of a combination of a settlement hierarchy and a sequence of centers, certain facts could not be accommodated easily in this perspective. I developed an alternative concept of a “capital zone” that proposes a greater degree of hierarchy within what was still probably a highly pluralistic society. A capital zone is an extensive area with dispersed formal groups that, together, constituted an administrative and service core. The Mixtequilla capital zone would incorporate much of the PALM central survey block, i.e., Cerro de las Mesas, Zapotal, and Azuzules, with smaller subsidiary complexes and residential mounds as part of the zone. It will require additional fieldwork to determine the full extent of a capital zone. The Cerro de las Mesas capital zone could be thought of as an exaggerated case compared to the larger of the well-mapped Maya lowland centers. The capital zone concept is subsumed under one of the general interpretive models discussed next.

Relations among Formal Complexes: Two Models

I designed two contrasting interpretations of Mixtequilla formal complexes in a regional context: a disconnected versus a connected model. Neither is likely in an extreme form, but investigation of the degree to which these two perspectives are warranted is crucial for understanding Classic Mixtequilla society.

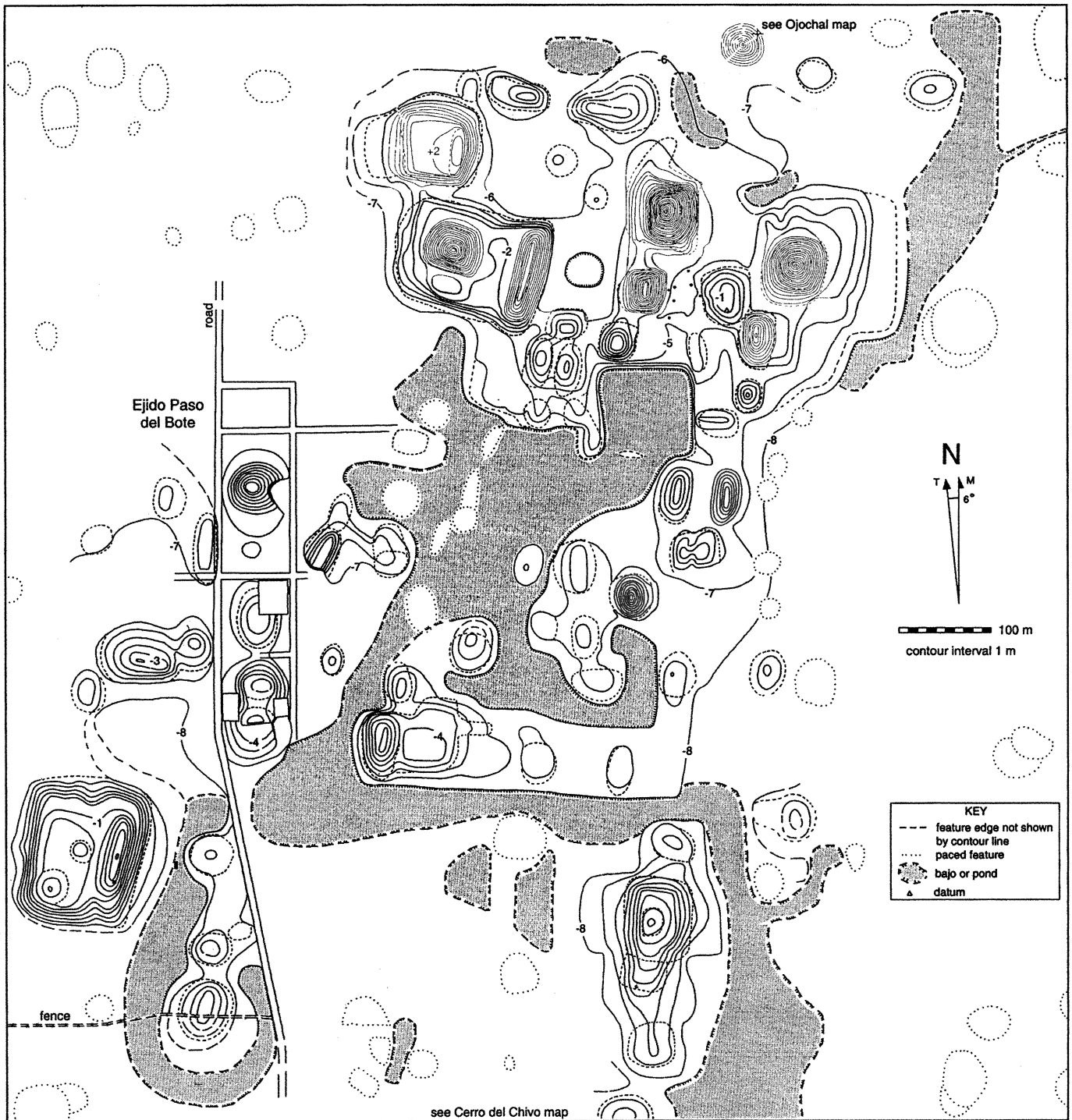


Figure 4. Contour map of central Cerro de las Mesas. Only a few of the modern buildings in the settlement of Paso del Bote are shown.

A disconnected interpretation of Mixtequilla complexes views them as largely sequential or independent centers, with individual complexes varying in size according to the social and economic assets of different rulers or elite families. Longevity of power, with a series of successions in a

dynastic line, would tend to favor accumulation of construction at a particular center. Smaller centers could be the result of failures to augment or retain power and resources or separate foci of wealth and authority for landed elites. Segmentation of construction complexes at major centers

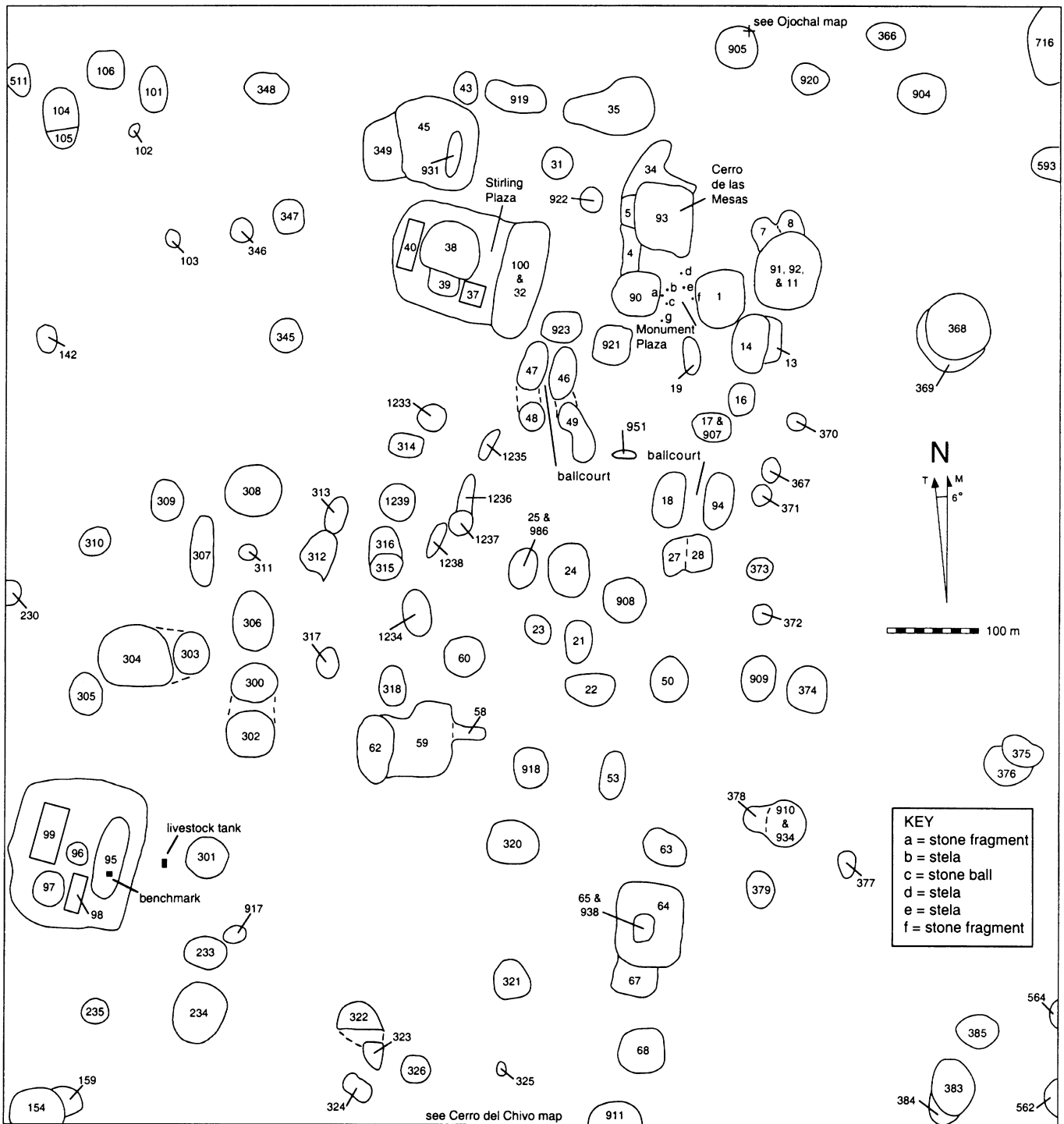


Figure 5. Feature numbers for central Cerro de las Mesas.

may indicate sequential additions tied to political successions. A settlement hierarchy will be weakly developed if centers are disconnected. High variability in architectural characteristics and layout also would be a sign of weak centralization, signaling diverse social allegiances and factions.

The connected model is one in which a core zone or center dominates a settlement hierarchy consisting of outlying smaller centers and their territories. The capital zone idea is a variant of the connected model. In the capital zone model, new complexes were built across the central block,

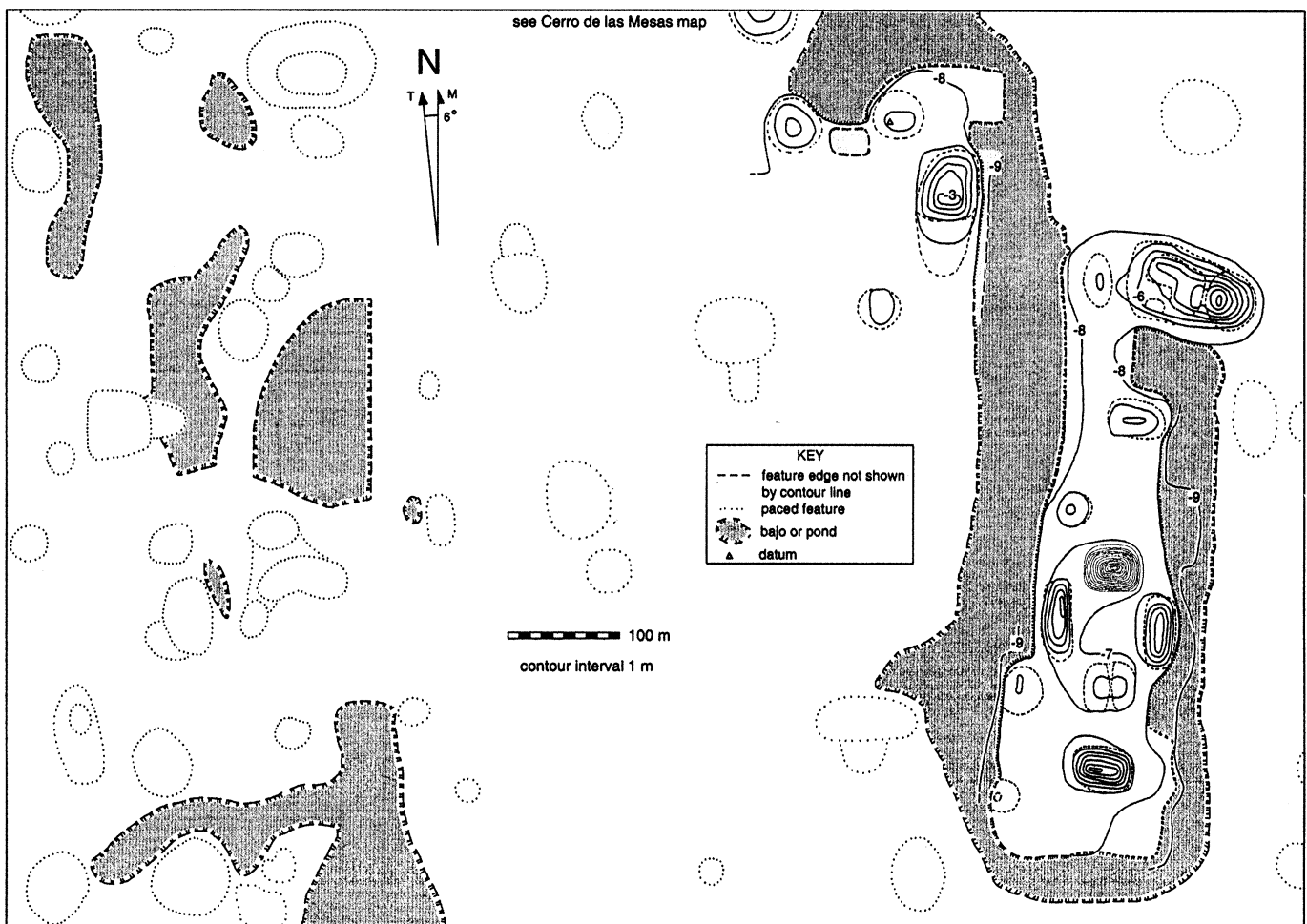


Figure 6. Contour map of the Chivo complex in south Cerro de las Mesas (adjoins the central Cerro de las Mesas map to the north).

likely in part reflecting a process of succession in rulership. Although new complexes may have eclipsed older ones as active foci of power, this shift did not imply the abandonment or disregard of previous constructions; nevertheless, the functions of buildings may have changed or rebuildings and enlargements may have declined, perhaps reflecting cadet lines tied to ruling families or the locations of important elites. Within a capital zone, small separated complexes form outlying portions of the civic-ceremonial construction, perhaps in some cases reflecting investments of important elite groups in addition to the ruler(s). Considerable contemporaneity among complexes is accommodated by the capital zone concept.

The two models for relations among Mixtequilla centers imply significant contrasts concerning the character of Mixtequilla society, especially its political system. In general, the number of levels in a settlement hierarchy provides insight into the scale and complexity of society (Johnson

1973), even if it is not the sole criterion that may be used to assess political organization. In the disconnected model, the degree of urbanism is reduced, and central authority is weak and unstable. In the connected model, a strong center is tied to a large outlying support zone, reaching beyond the previously defined study area. In particular, a capital zone implies a persistent focus of authority owing to the accumulation of monumental structures. The extent to which a dominant center controlled economic resources requires separate investigation, but a capital zone would imply a strong basis for tribute demands and greater central control of long-distance trade and foreign affairs.

Although I consider the connected model more promising at present, it is crucial to develop additional evidence that will either support or challenge the idea of a capital zone. A modified disconnected pattern might encompass a sequence among major centers, but overlap in time between some minor complexes and major ones. As can be

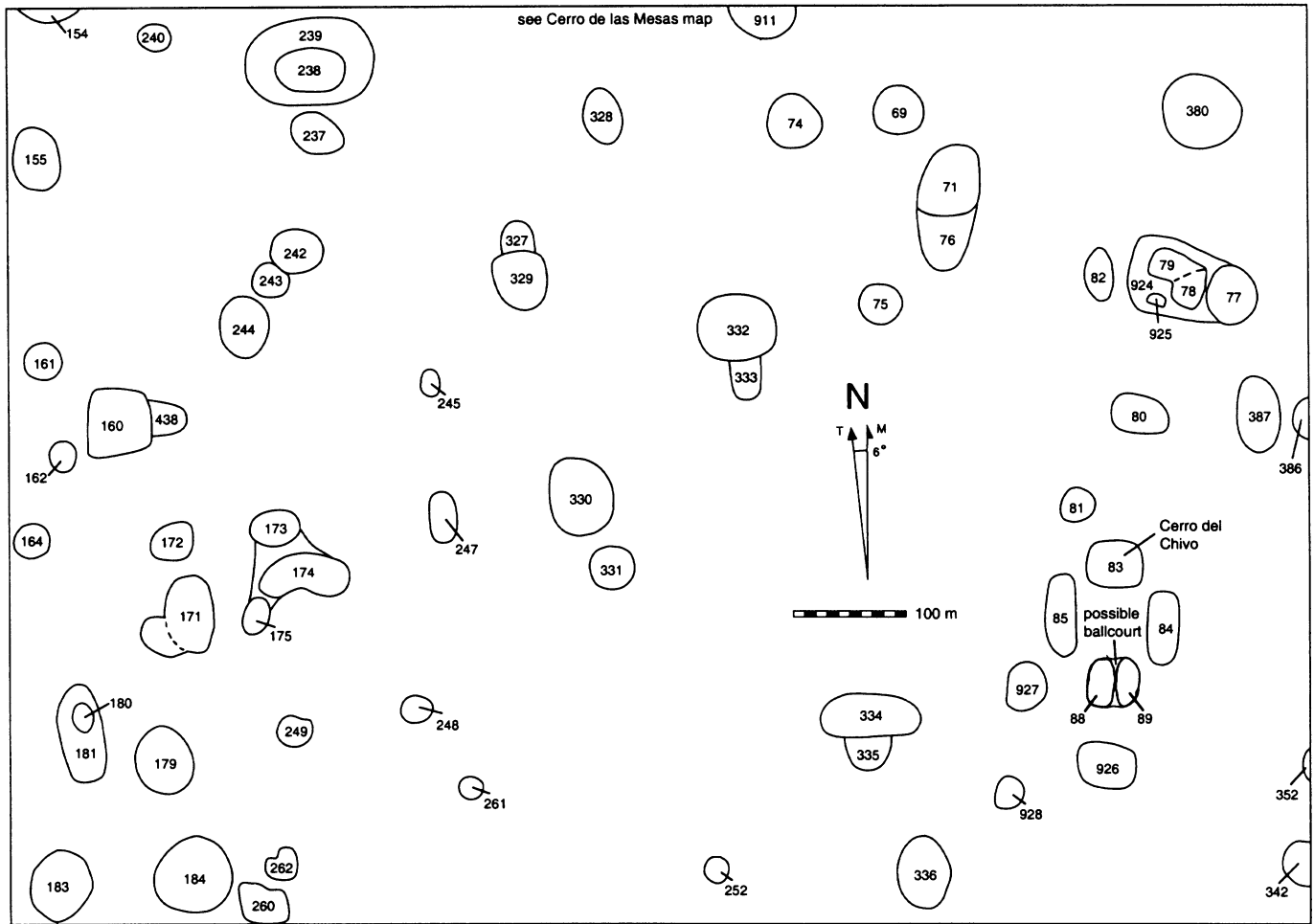


Figure 7. Feature numbers for Chivo in south Cerro de las Mesas.

seen from the survey map (FIG. 2), we lack adequate coverage of the environs of Zapotal and Azuzules, and therefore I cannot evaluate possible drop-offs in construction or settlement around them that would help identify them as separate centers from Cerro de las Mesas. Because of the regional political and economic prominence of a capital zone, outlying provincial "capitals" or "head towns" are not likely to match the sprawl of the capital zone in regard to the extent of construction, the tendency for sub-complexes to be present at a center, and for outlying small complexes to occur in the vicinity. Subsidiary outlying centers may have shorter histories and are likely to show less access to construction labor. Kurjack (1979: 13) points out that a crucial step for analyzing settlement relationships is determining the quantity of monumental construction at various sites. Even though evaluation of Mixtequilla secondary and tertiary centers in an administrative hierarchy will require more extensive survey, there are additional indications of the potential validity of the capital zone con-

cept. Five categories of evidence are evaluated with current data following presentation of the types of structures and layouts in Mixtequilla formal complexes.

Formal Complexes in the Mixtequilla

Formal complexes are defined as monumental architecture with associated smaller constructions that form one or more groups arranged in an orderly fashion that suggests a planned layout, e.g., around a plaza. Major constructions with a formal arrangement have been mapped at 1 m contour intervals, with one exception.¹ As with the full-coverage survey in the countryside, each feature was assigned a unique number that also was applied to any surface collection from it. Collections were systematic (all artifacts from

1. A small group (the 1473 complex) was mapped by pacing and Abney level as an interim measure because no mapping crew could be assigned at the time. Tio Primo was not contour mapped in 1988 because a prolonged vehicle breakdown made it infeasible, but the map was completed in 1998 under the auspices of a later project.

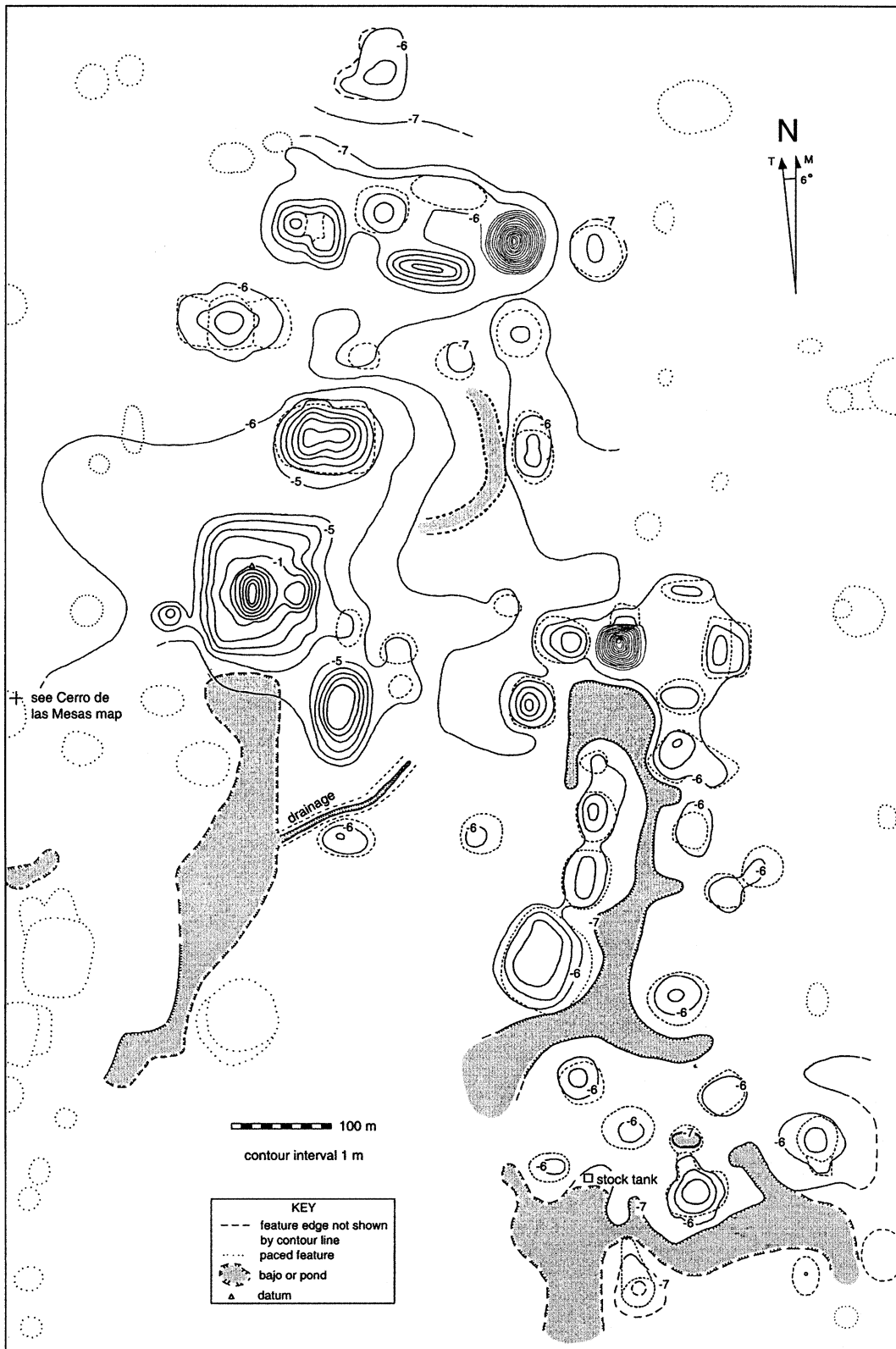


Figure 8. Contour map of the Ojochal complex in NE Cerro de las Mesas (overlaps the central Cerro de las Mesas map in the sw corner).

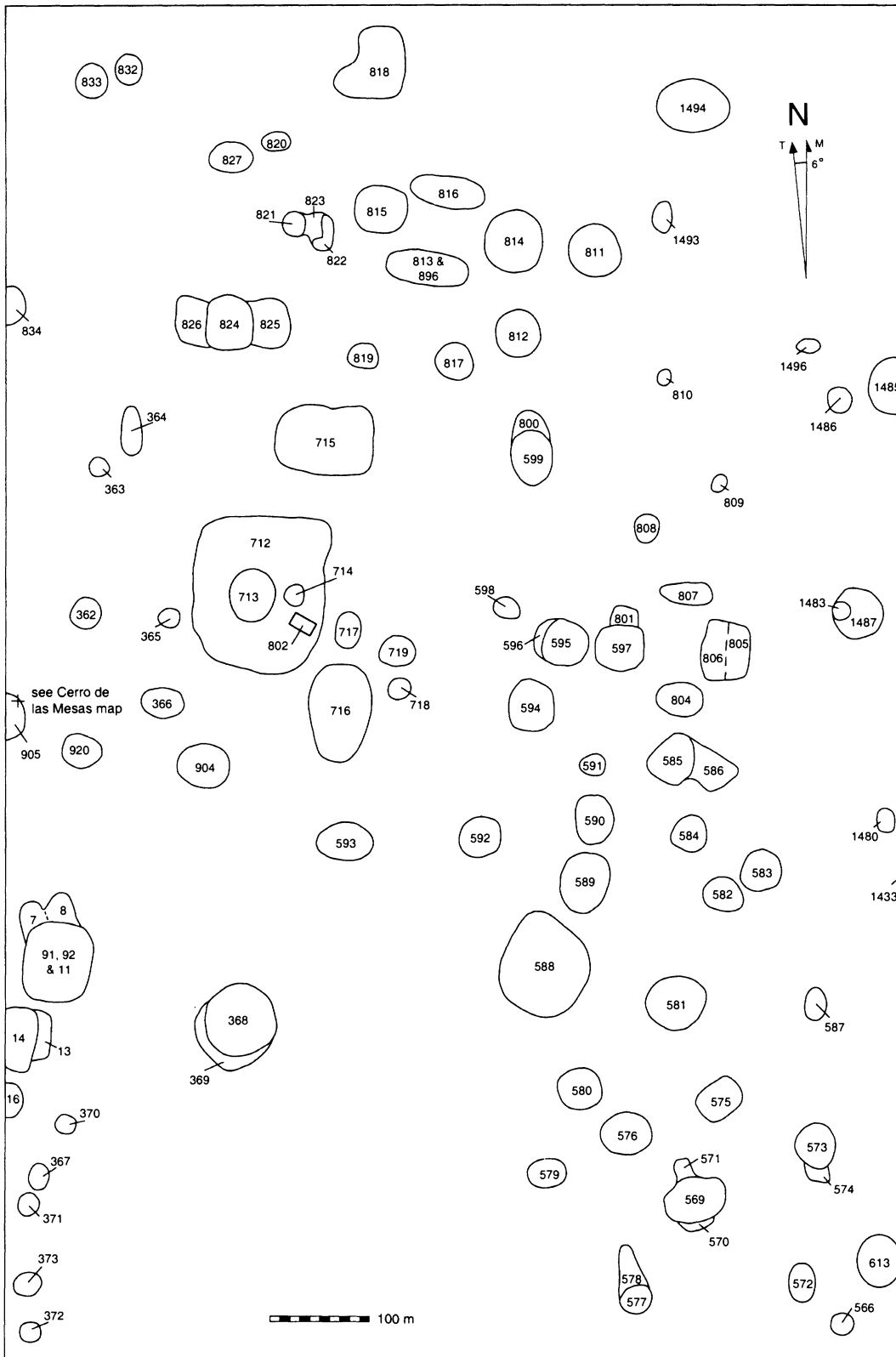


Figure 9. Feature numbers for Ojochal.

Table 1. Chronological patterns for Mixtequilla formal complexes.

| Complex | No. of coll. | Total rims | Diagnostics | | | | | | | |
|--|--------------|------------|-------------|----|------------|----|---------|----|-------------|----|
| | | | Total | | Preclassic | | Classic | | Postclassic | |
| | | | Count | % | Count | % | Count | % | Count | % |
| Central Cerro de las Mesas-Chivo-Ojochal | 167 | 12309 | 3755 | 31 | 1859 | 49 | 823 | 22 | 1073 | 28 |
| Azuzules | 31 | 1647 | 199 | 12 | 2 | 1 | 153 | 77 | 44 | 22 |
| Tio Primo | 4 | 116 | 32* | 28 | 17* | 53 | 5* | 16 | 10* | 31 |
| Palmas Cuatas | 20 | 1360 | 339 | 25 | 169 | 50 | 102 | 30 | 68 | 20 |
| La Campana | 5 | 493 | 119 | 24 | 24 | 20 | 15 | 13 | 80 | 67 |
| Zapotlan South | 11 | 818 | 238 | 29 | 60 | 25 | 25 | 10 | 153 | 64 |
| Villa Nueva | 7 | 618 | 111 | 18 | 4 | 4 | 66 | 59 | 41 | 37 |
| 1094 (Molina) | 1 | 2 | 2* | – | 0* | – | 2* | – | 0* | – |
| El Tiesto | 2 | 99 | 20* | 20 | 6* | – | 10* | – | 4* | – |
| La Fraternidad | 7 | 614 | 74 | 12 | 1 | 1 | 50 | 68 | 23 | 31 |
| 1473 Complex | 6 | 574 | 91 | 16 | 3 | 3 | 60 | 66 | 28 | 31 |
| El Sauce | 48 | 3970 | 1635 | 41 | 48 | 3 | 59 | 4 | 1528 | 93 |

*Collections with low, unreliable count.

certain categories were collected, e.g., rim sherds and ob- sidian) over a measured area if possible. Not uncommonly, however, farmers leave large, steep-sided structures covered by grass and brush because they cannot be plowed. This vegetation makes for spotty systematic surface collections in the formal complexes. Sometimes non-systematic collections could be made in exposed areas of structures. We discovered, especially during mapping at Azuzules, that some complexes have many buildings constructed with relatively clean fill, indicating that nearby borrow pits and the constructions themselves were located where prior occupation was scant or absent. This situation contrasts with Cerro de las Mesas and other complexes in the western area, where fill seems to have regularly incorporated considerable trash from Preclassic periods. Certainly a more intensive surface study and excavations of the complexes would be useful in future to make chronological assessments more precise, but PALM collections date the complexes by major periods. Here, assessments of chronology at formal complexes emphasize periods rather than phases because chronology in the central Gulf lowlands is not yet as finely divided as in better-studied parts of Mesoamerica, radiometric dates are few, and, with surface collections, distinctions among major periods are more reliable than phase assignments.

To summarize the chronological data, collections at each complex were pooled to calculate the relative amounts of ceramic diagnostics from different periods (TABLE 1). These diagnostics are not discussed here for reason of space, but they are addressed in other publications (Curet, Stark, and Vásquez 1994; Stark and Curet 1994; Stark and Hall 1993; Stark, ed. in press). Note that the periods are *not* comparable in the frequency of diagnostics, as may be de-

tected in the variation among complexes in the percentage of total diagnostic sherds in relation to the relative contribution from a particular period. The Postclassic is particularly rich in diagnostic ceramics, with the Preclassic next. The Classic period is the skimpiest in diagnostics.

Comparisons of period(s) that predominate in ceramics at complexes along with examination of chronological patterns from surrounding residential areas permit two observations, which are briefly noted. Preclassic ceramics from formal complexes in part represent fill garnered for construction. Postclassic ceramics sometimes are present in complexes from a process of settlement disruption and re-occupation (Curet, Stark, and Vásquez 1994). Summary chronologies for the formal complexes serve to make one important point: most have evidence of use during the Classic period, although three have collections too meager to be reliable for period assignment (El Tiesto, Tio Primo, and Platform 1094).

Categories of Structures

Building types can be recognized by morphology and inferred functions. Below I present selected building categories and then offer observations concerning layouts and formal planning.

TEMPLE PLATFORMS

These structures are steep-sided, relatively high mounds that today usually have a conical shape. They likely supported perishable temples that functioned in rituals as sacred spaces. A few such platforms still retain a tapering quadrilateral shape instead of a more amorphous conical form; they may display a relatively flat, rectangular area at the top. Some structures have what appears to be a ramp

that likely was originally an access stair. Some conical mounds were placed on large, rectangular platforms.

Only three large temple platforms have been excavated in the Mixtequilla: mounds 1 and 921 in the NE sector of central Cerro de las Mesas (Drucker 1943; Stirling, Rainey, and Stirling 1960) (FIGS. 4, 5) and one mound at Zapotal (Torres 1972; Torres, Reyes, and Ortega 1975). Mound 1 at central Cerro de las Mesas had a plastered stair that descended to an enclosure with numerous stelae at the base of the mound. Large, broken, anthropomorphic ceramic incense burners had been cached on the stair when the mound was enlarged. Several possibly sacrificial burials were found within the mound fill. There was no evidence of any perishable structure atop the mound. Much less can be said concerning mound 921, which yielded a row of urn burials. A small mound near the Monument Plaza at central Cerro de las Mesas also was excavated, revealing a Terminal Preclassic central burial with rich grave goods and subsequent additional burials (Drucker 1943: 8); it may have been a small temple platform (possibly 7).

Only preliminary reports have been published about the presumed temple platform excavated at Zapotal. Large anthropomorphic ceramic sculptures of women were interred as an offering, and inhumations with elaborate offerings were placed in front of a life-sized, unbaked, painted clay sculpture interpreted as the lord of the underworld seated in his temple, also constructed of unbaked clay (Gutiérrez and Hamilton 1977; Medellín 1983: 136–137). This Zapotal mound suggests a link between major platforms and temples because an effigy temple was buried by the rebuilding.

Unfortunately, we cannot determine the size variation among temple platforms. The excavated ones are sizable but not the highest (e.g., 93, 90, 91 are higher at central Cerro de las Mesas, and Cerro del Gallo is higher at Zapotal). There likely are many smaller temple substructures, but we do not yet know the extent to which they intergrade with large platforms that supported residences or buildings with other functions.

PALACES

I use “palace” to refer to an unusually elaborate residence. Smaller temple platforms might be confused with palace platforms, but there is reason to think that at least some putative palaces had a different morphology. Massive rectangular platforms at Mixtequilla are possible substructures for palaces on the basis of a variety of evidence. Some of these broad platforms support elongated, low mounds, sometimes in an “L” configuration or as part of a patio group on the platform (e.g., 95-96-97 on 98, FIGS. 4, 5 or 78-79 on 924, FIGS. 6, 7). On the basis of analogy with the

Maya lowlands, these long, range-like structures may be elite residences. Perhaps some were additionally (or instead) administrative buildings, however.

In the Maya lowlands, where masonry architecture and a long history of archaeological work provide a considerable background about buildings, palaces are often recognized as gallery-type or multichamber structures that were “long, rectangular...including L shapes and U shapes” (Andrews 1975: 43). A key trait is the elongated form, which de Montmollin (1995: 66) uses to identify elite dwellings in the Maya area. Low, elongated platforms in the Mixtequilla are recognizable mainly on sizable platforms or, in one case at Azuzules, in a secluded patio group (1188-1189-1191-1192; FIGS. 10, 11). All other occurrences of elongated mounds are quite distinct. A pair of long mounds flanks some formal plazas with a conical mound positioned at one end. These flanking mounds cannot be assumed to have been residential. Instead, they may have supported administrative or corporate group activities. Likewise, the elongated mounds that frame ballcourt alleys are distinct.

There are some analogies between Maya and Mixtequilla “palace” data, but also differences because of the great size of the rectangular Mixtequilla platforms, which perhaps have their closest parallel in published literature with some of the “acropolis” units observed in the southern Gulf lowlands (e.g., Gomez 1996: 88, 101, 107) and with “acropolis platforms” in the Maya area (de Montmollin 1995: 70). The Platform 98 group at central Cerro de las Mesas has an estimated volume of 110,131 cu m (Michael Ohnsergen, personal communication 1996); this is 38% of the volume of the Pyramid of the Moon at Teotihuacan and three times the volume of the Feathered Serpent Pyramid. These volumetric comparisons give a notion of the magnitude of the largest of the Mixtequilla platforms. Maya palaces are not necessarily associated with such large-scale platforms. In the floodprone Mixtequilla, however, elevation counts for a great deal and may have led to high positions for palaces.

The significance of palaces lies in the diversion of labor from public projects to the residences of rulers or other elite families. Lavish palaces are sometimes used as one of the material traits that suggest state societies (Sanders 1974).

BALLCOURTS

Two elongated parallel structures sharing a narrow “alley” form ballcourts on the basis of analogy to Mesoamerican examples elsewhere. These structures are much more closely spaced than the long platforms that frame a large plaza in conjunction with a high temple mound—a com-

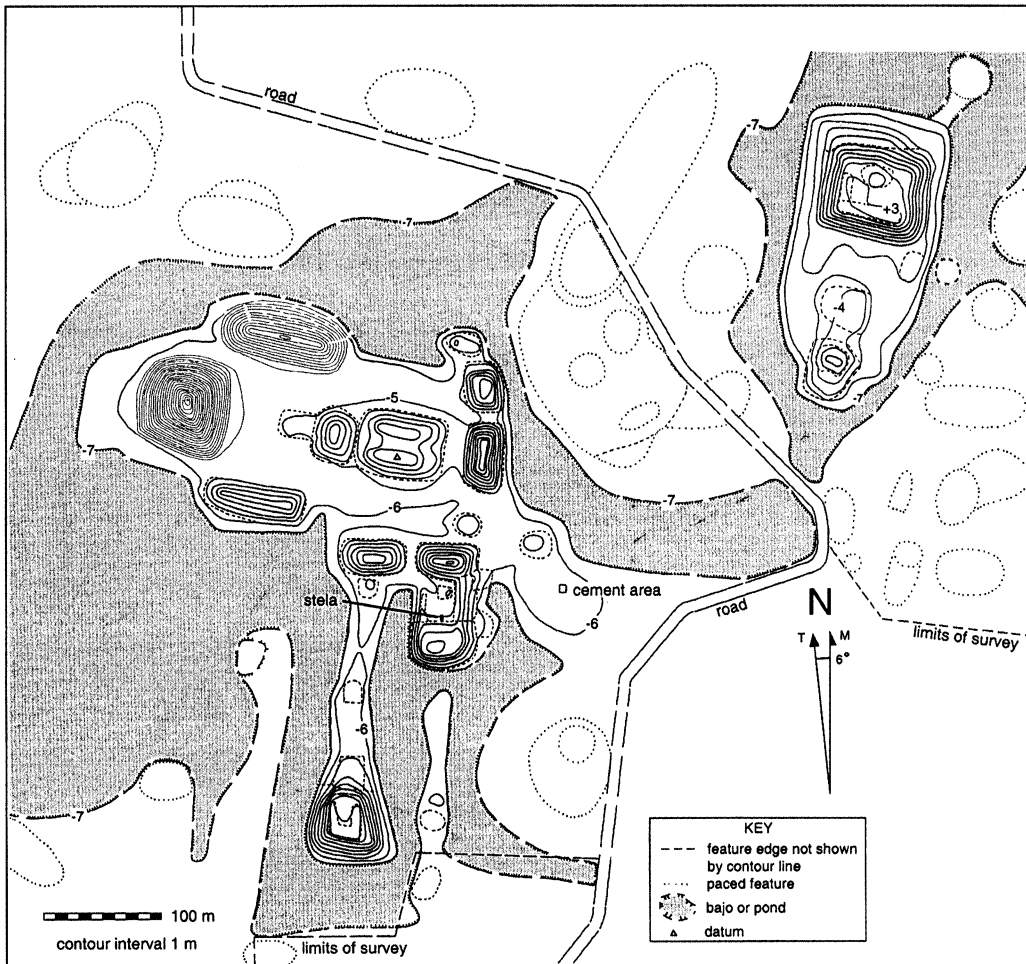


Figure 10. Contour map of the Los Azules complex.

mon layout in south-central Veracruz. Los Azules shows a ballcourt located east of such flanking platforms and provides a convenient visual comparison (FIGS. 10, 11).

FORMAL PONDS

These ponds are an unusual feature of Mixtequilla architecture compared to contemporary regions of Mesoamerica. The earthen Mixtequilla construction implies borrow pits from which fill was mined. Artificial ponds at formal complexes might be interpreted as by-products of mound building that had the added benefit of providing a reservoir of potable water. The deficiencies of this solely utilitarian interpretation are indicated by the integration of ponds in formal planning (e.g., the NE part of the central Cerro de las Mesas pond; FIG. 4). Also, not all the ponds are large enough to have served effectively for borrow pits. For example, at the north base of mounds 569 and 571 in Ojochal (SE corner; FIG. 8, 9) is a pond too small to have provided much fill, and this pond seems likely to form a small body of ritually important water.

Two arrangements involving ponds can be identified among the site maps. Structures may surround a pond, "sharing" it in a fashion analogous to buildings that front a plaza. A simpler version of this arrangement is placement of a small pond axially at the base of a structure, as remarked above for mounds 569 and 571 in Ojochal. In a second arrangement the pond surrounds the formal construction, controlling access. Usually a single land bridge is evident. This second arrangement could have symbolic importance as a cosmogram, placing sacred buildings on land surrounded by water. On a more mundane level, the controlled access provided a more defensible perimeter. The incorporation of bodies of water formally as part of the layout can be linked to planning at earlier centers in the trans-Isthmian lowlands, such as Izapa and Bálamo (Stark 1999). The effort to associate centers with ritually significant water may have its roots in Olmec times in the Gulf lowlands (Cyphers 1997; Krotser 1973; Rodríguez and Ortíz 1997).

Chronological shifts may have occurred in architectural

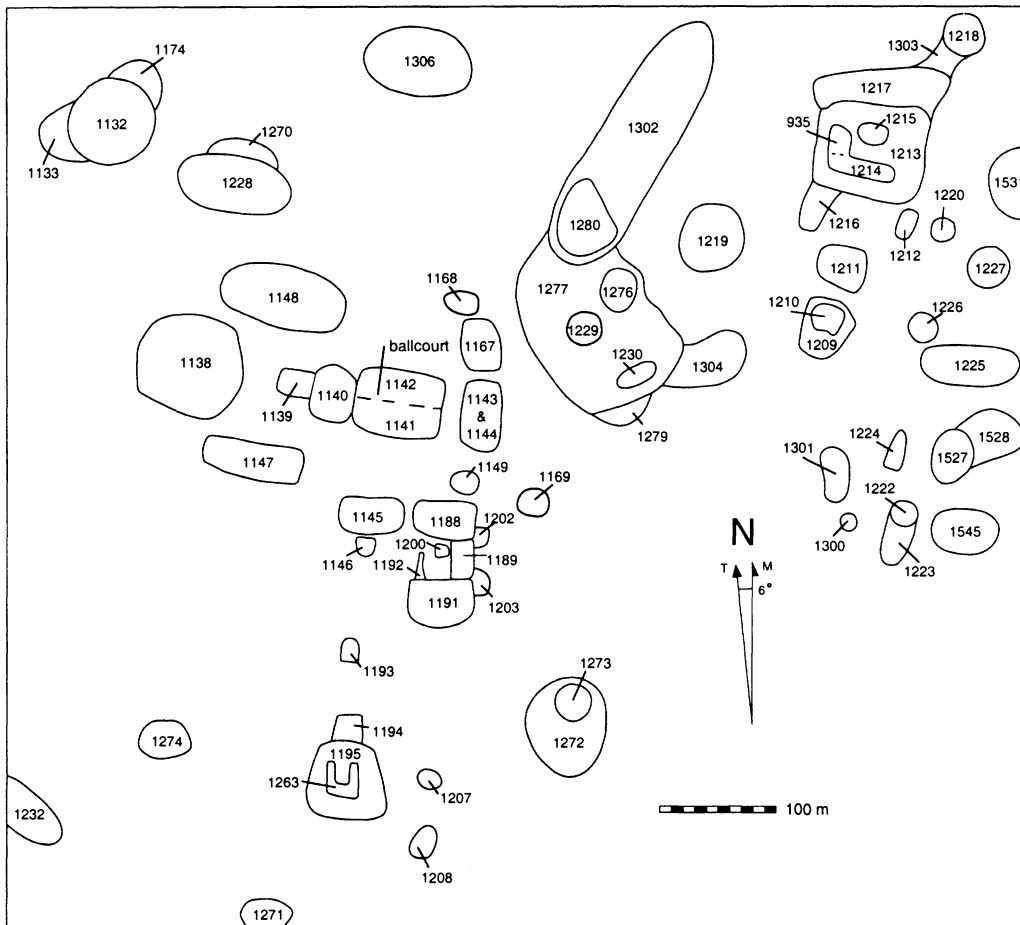


Figure 11. Feature numbers for Los Azules.

patterns involving ponds; artificial ponds may have shifted from the midst of formal complexes to the periphery, where they controlled access. Both the northern part of central Cerro de las Mesas and the western part of Palmas Cuatas have structures encircling an artificial reservoir (FIGS. 4, 16), and associated ceramics suggest a possible Preclassic inception of the arrangement.

In contrast, the complexes of Azules and eastern Villa Nueva are carefully arranged so that a body of water rings the public construction, with the exception of an elevated passageway giving access to each of the complexes (FIGS. 10, 20) (Stark 1997). The south part of Cerro de las Mesas (the Chivo group) also is a complex surrounded by an artificial pond (FIG. 6). Azules and Villa Nueva appear to lack Preclassic ceramics and are entirely Classic in date. It is possible that over time new Classic complexes were built with a somewhat different design, controlling access through the use of artificial ponds, perhaps to enhance either the sacred and social distinctions of formal complexes and/or to improve their defensibility. I suspect

that originally the larger formal ponds held water year-round.

ADORATORIES

At one complex, Zapotal South, we detected a trace suggestive of a freestanding adulatory or altar—a very small structure that might have served as an offertory location placed in a plaza. The feature, plowed down and lacking any structure above the surrounding plaza level, was preserved only as a small yellowish area (10 × 8.3 m, feature 932). We frequently detected a yellowish color in mound sediments compared to the surrounding soil. The feature does not appear on Figures 12 and 13 because it was visible only on two occasions after the field was plowed, and these did not coincide with the mapping. The feature is located in the middle of the plaza framed by 397-399-700-398. At other centers investigated during 1999, I have observed small, better preserved structures in formal plazas that seem analogous to what may have existed at Zapotal South.

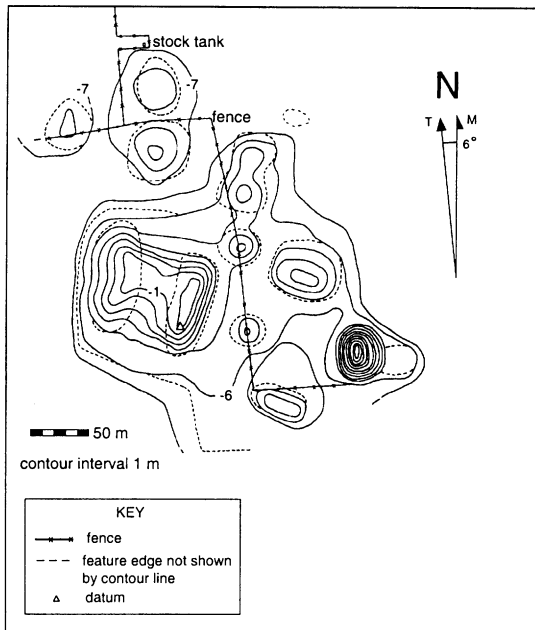


Figure 12. Contour map of the Zapotal South complex.

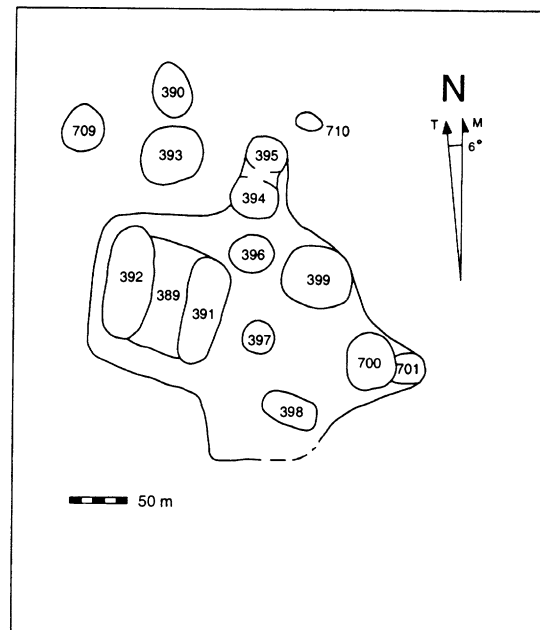


Figure 13. Feature numbers for Zapotal South.

Formal Layouts

Layouts at Mixtequilla complexes are rather variable, and, because of the relatively small number mapped so far, consistent patterns can be identified only on a trial basis. Layouts vary according to the size of the formal complex. Bigger complexes with more construction may exhibit distinct groups or arrangements contiguous to one another. The largest complexes contain all the major categories of buildings, but the smallest complexes have only one category of major building. Only Cerro de las Mesas and Azuzules have ballcourts, which do not occur in smaller complexes. Sometimes major buildings occur by themselves out in the “countryside.” For this reason, definition of the limits of formal construction is a delicate research question to which I return below.

A recurrent pattern at Tio Primo, Azuzules, and Chivo is a high conical mound at one end of a plaza, flanked by long, parallel, relatively high, loaf-shaped mounds. The end of the plaza opposite the conical mound varies in the type of structure present, but this structure is often modest in size. The flanking loaves may be noticeably unequal in size, as at Los Azuzules (1147-1148, FIGS. 10, 11) and Tio Primo (4041-4043, FIGS. 14, 15). Additional examples occur at Zapotal South, the north end of Ojochal, and at Palmas Cuatas (FIGS. 8, 12, 16). Another variant of this pattern consists of a conical mound accompanied by a single loaf instead of a pair.

Daneels (1997b) suggests that this flanking loaves lay-

out is distinctive of the Classic period, and Ceja (1997) reports it to be common on the south side of the Tuxtla Mountains. It also occurs in a Late Classic context at Las Limas and at other sites in southern Veracruz (Gomez 1996: 63, 65, 121-122). Mixtequilla data are inconclusive in regard to the temporal inception of the layout, although it clearly occurs during the Classic period at Azuzules, where there is no ceramic evidence for prior Preclassic occupation. This layout may have Preclassic origins in the formal plan of La Venta, for example, where a high conical mound fronts a plaza defined by two long flanking mounds (Drucker, Heizer, and Squier 1959: 9).

The azimuth orientations of formal complexes vary. Some are N-S, but most are E-W. This contrasts with Daneels’ (1997b) Río Cotaxtla data, immediately to the west, for which N-S orientations are more common. At present I lack sufficient cases to judge how common the two orientations are for the Mixtequilla and whether they are associated with any other differences, but they may signal a social division or difference in astronomical or sacred associations. Chronology does not seem to explain them.

Descriptions of Formal Complexes

I first present the two largest complexes, Cerro de las Mesas and Azuzules. Next I address two complexes that are problematic candidates for “secondary centers,” Tio Primo and Palmas Cuatas. Finally, some smaller complexes (El Zapotal, La Campana, South, Villa Nueva, Platform 1094 [the Molina Complex], El Tiesto, and La Fraternidad)

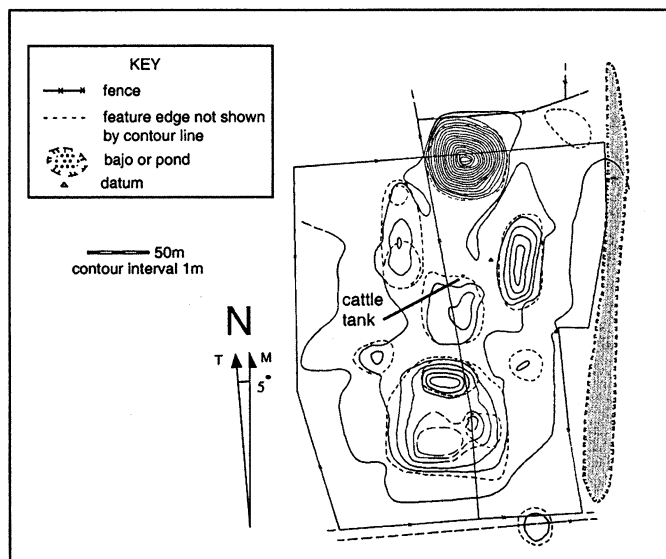


Figure 14. Contour map of the Tio Primo complex.

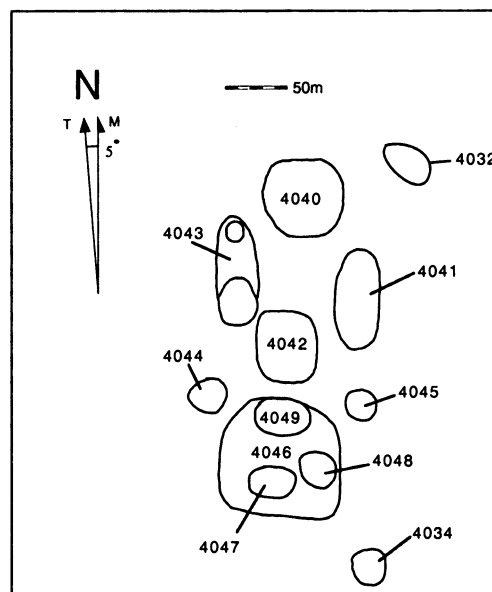


Figure 15. Feature numbers for Tio Primo.

more obviously raise the question of whether we should think of Mixtequilla complexes as levels of a settlement hierarchy or as outlying construction groups that were part of a single settlement.

On contour maps of each complex, mounds in the vicinity are shown by dotted lines if they were identified during pedestrian survey but not contour mapped. Additionally, two maps, those of central Cerro de las Mesas and Ojochal, overlap one another for greater clarity, and the overlapping structures are dotted on the Ojochal map. The decision regarding exactly which features to contour is not always self-evident for scattered mounds in the immediate vicinity of big structures. The contour mapped areas are indicated on the central block survey map by surrounding lines (FIGS. 2, 3), but the contour maps often show a larger area to indicate features in some of the surrounding terrain covered by pedestrian survey.

CENTRAL CERRO DE LAS MESAS-CHIVO-OJOCHAL

I refer to the combined complexes as "Cerro de las Mesas," but when it is necessary to distinguish the central portion, it will be referred to as central Cerro de las Mesas (FIGS. 4, 5). The Chivo (FIGS. 6, 7) and Ojochal (FIGS. 8, 9) parts can be distinguished by their local names. Because of local removal of our datum between field seasons, we were not able to link the western and eastern segments of central Cerro de las Mesas as accurately as needed, and comparison to aerial photographs suggests the western structures in the modern settlement of Paso del Bote need

rechecking and possibly slight adjustment of azimuths. Mapping within Paso del Bote was particularly difficult because of obstructions and disturbance. Cerro de las Mesas is the largest complex mapped to date in areal extent and number of structures. Among all three maps the area of formal architecture covers approximately 1.46 sq km. Cerro de las Mesas contains all the types of structures (except adoratories) and arrangements identifiable elsewhere and may have been located near a remnant channel of the Viejo River (today only a seasonal drainage).

Central Cerro de las Mesas has two ballcourts, each with one end framed by a mound situated cross-ways to the court. Whether another ballcourt exists at the south end of Paso del Bote is uncertain (300, 302). Likewise, it is inconclusive whether 307 and 312 form a flanking loaves layout extending south from the conical mound (308). Central Cerro de las Mesas has several high conical mounds, particularly to the north, where they may have been constructed partly during the Late and Terminal Preclassic periods (Stark and Heller 1991a). The large central pond contains an alignment of very low mounds (1235, 1236, 1237, 1238), only visible after contour mapping was completed. They may represent a prior pond edge, now breached, or remnants of a dike. In 1999 another small mound was visible (951) that could represent a breached closure for the NE square-shaped portion of the pond, which is deeper.

Central Cerro de las Mesas has two palace candidates, massive platforms surmounted by elongated low mounds

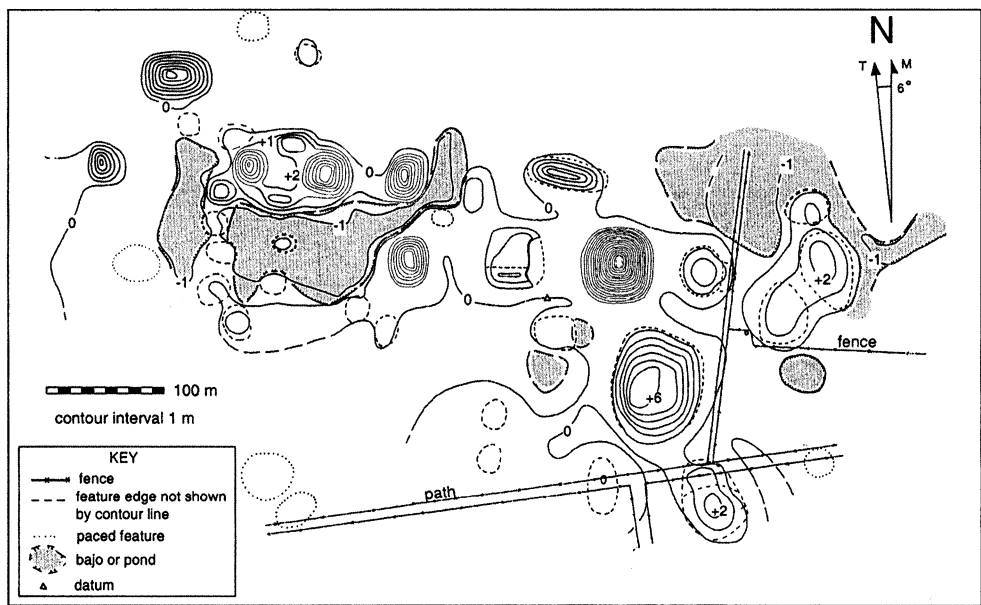


Figure 16. Contour map of the Palmas Cuatas complex.

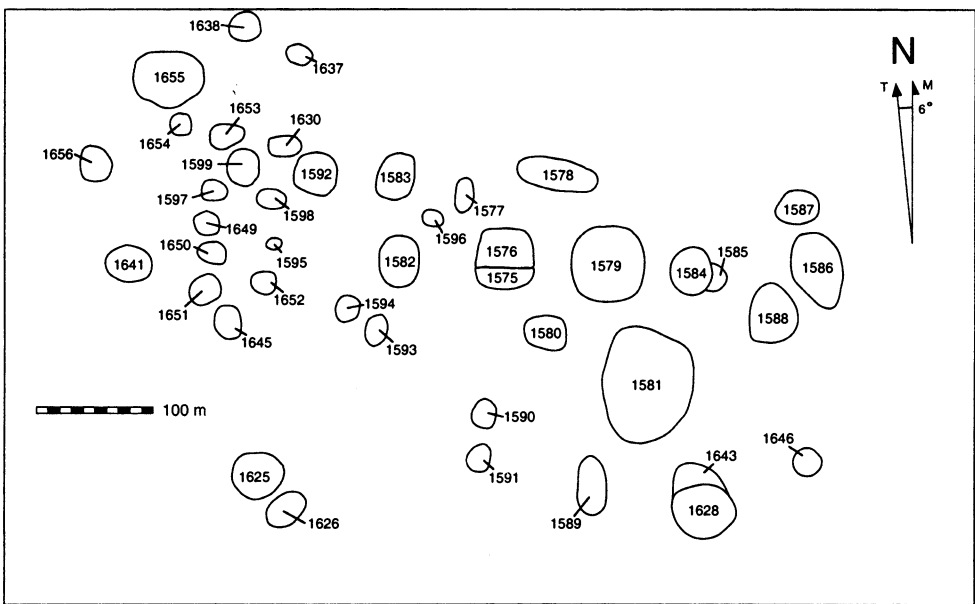


Figure 17. Feature numbers for Palmas Cuatas.

(platform 98 and platform 45 complexes, to the sw and NW on FIGS. 4 AND 5). A possible variant is the 62-59-58 complex, where a lower platform (59) has a conical mound at the west end (62). Residential platforms might have undergone conversion or an addition to their function upon the demise of an important resident if a conical funerary temple platform was built at the location. The Chivo map has another, better example of this possibility; the 77-78-

79-924-925 complex at the north end has an “L” shaped, elongated pair of mounds on a relatively low platform, with a conical mound at the east end (FIGS. 6, 7). The south part of the Chivo map shows a N-s plaza group with linear flanking mounds and the high mound called Cerro del Chivo. This plaza is framed at the south end by what is possibly a very small ballcourt (88, 89).

Ojochal displays several distinct groups of mounds

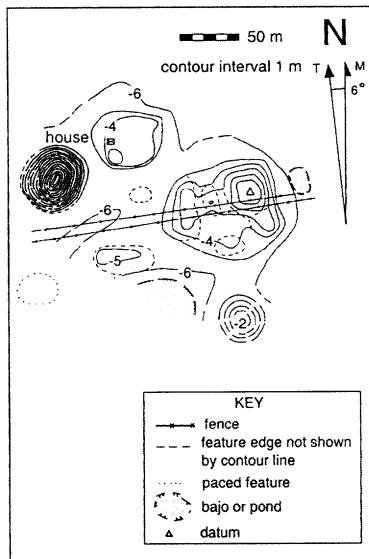


Figure 18. Contour map of the La Campana complex.

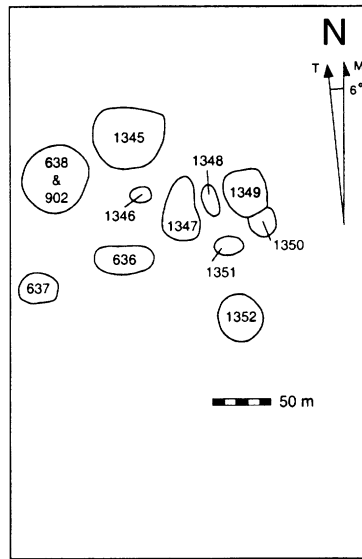


Figure 19. Feature numbers for La Campana.

(FIGS. 8, 9). The north area exhibits a plaza group similar to that associated with Cerro del Chivo except that it has an E–W orientation and the linear flanking mounds are noticeably unequal in height (814-813-816-815). West of the plaza group is another candidate for an elite residence, a platform (823) bearing elongated “L”-shaped mounds (822). A massive platform to the south (712) has a centrally placed conical mound (713). Because of this placement, this complex differs from the massive platforms possibly tied to elite residence.

A small E–W plaza group (597-807-804-806-805) is dominated by a conical mound. This plaza group, in combination with various mounds to the south, affords another instance of mounds ringing a pond.

AZUZULES

Azuzules is the next largest complex to Cerro de las Mesas in the overall sizes of structures and area (FIGS. 10, 11). It comprises a western and a NE group, both surrounded by a pond system. The groups combined cover 0.16 sq km. Western Azuzules, dominated by an E–W oriented plaza with a centrally located ballcourt (1141-1142), has dry land access only at the east end. A long causeway-like platform extends to the south to mound 1195, which is surmounted by a “U”-shaped structure, perhaps a palace. Nearer to the main plaza an enclosed courtyard is surrounded by elongated mounds (1192-1191-1189-1188) and may be a form of palace. The NE Azuzules group, dominated by a massive platform (1213) surmounted by an “L”-shaped structure and a small, symmetrical mound, may be a palace complex.

SMALL COMPLEXES

The Tio Primo group was contour mapped during a later project in 1998; it covers an area of approximately 0.06 sq km (FIGS. 14, 15). It has a high conical mound at the north end fronting a plaza flanked by long mounds, oriented N–S. The western loaf mound had two higher areas in 1998 that were not observed in 1988, and they could be an artifact of plowing (they have not been assigned feature numbers).

The Palmas Cuatas complex, lacking an integrated formal arrangement (FIGS. 16, 17), has a mapped area of 0.21 sq km. The western half displays several high conical mounds and a number of smaller mounds surrounding a pond. To the east a high conical mound fronts an E–W plaza that resembles those with flanking loaf mounds except the south flanking mound is particularly low.

The small (0.1 sq km) complex of Zapotal South is dominated by a high conical mound fronting a plaza flanked by loaf mounds (FIGS. 12, 13). A massive platform to the west is surmounted by two elongated mounds and might be a palace.

La Campana is a small complex (0.03 sq km) dominated by a single high conical mound (FIGS. 18, 19). Nearby a set of mounds (1351-1347-1348-1349) forms a plaza group.

The Villa Nueva complex can be divided into three somewhat separated groups that in combination cover 0.3 sq km (FIGS. 20, 21). The largest consists of a large platform (756) topped by a linear mound and a small, circular mound—possibly a palace complex, as is the smaller 1090-

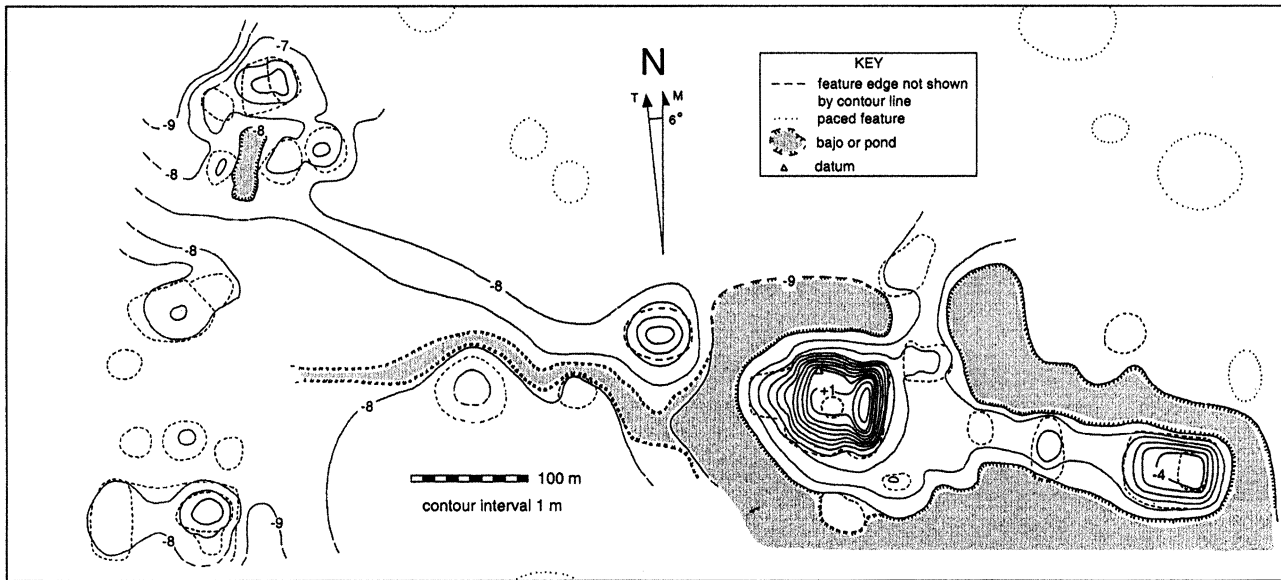


Figure 20. Contour map of the Villa Nueva complex.

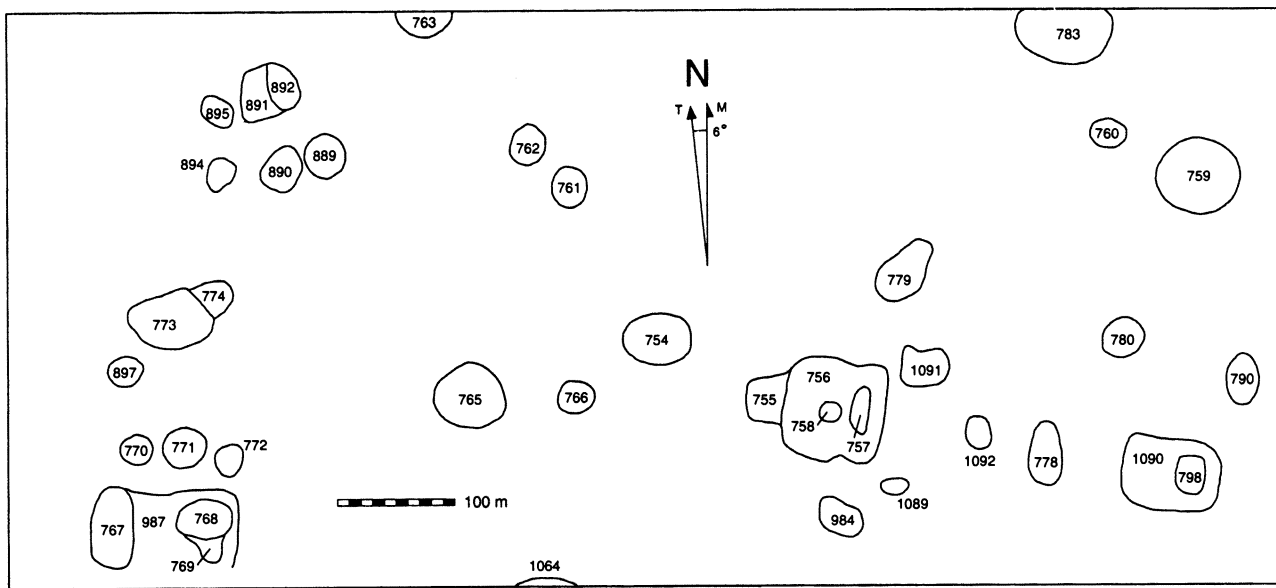


Figure 21. Feature numbers for Villa Nueva.

798. These platforms and mounds nearby are surrounded by a pond, except for the sole dry access on the north side. To the west two small groups display a formal arrangement. The more southerly has three small mounds in a row placed before a platform topped by two mounds—an uncommon arrangement. To the north a set of small mounds surrounds a rectangular pond.

Platform 1094 (Molina Complex) is a platform group more than a complex, but the platform supports three

small mounds, a possible palace (FIGS. 22, 23). The mapped area covers 0.02 sq km.

The small (0.09 sq km) complex of El Tiesto is dominated by a high conical mound (1735), with adjoining mounds to the north (FIGS. 24, 25). A scatter of small mounds nearby are part of the area surrounded by a shallow pond or drainage.

La Fraternidad is a small (0.08 sq km) complex dominated by a sizable platform on which rest a linear mound

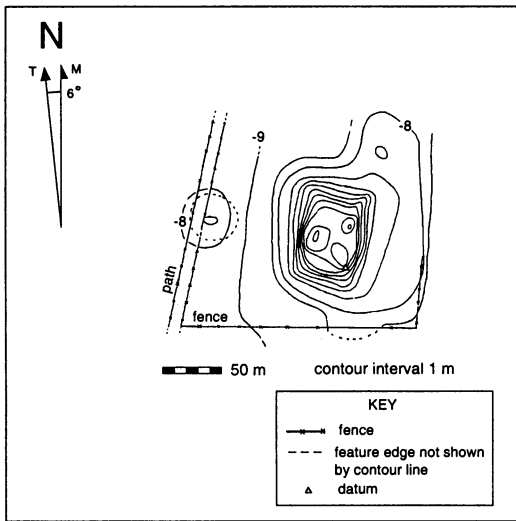


Figure 22. Contour map of Platform 1094 (the Molina complex).

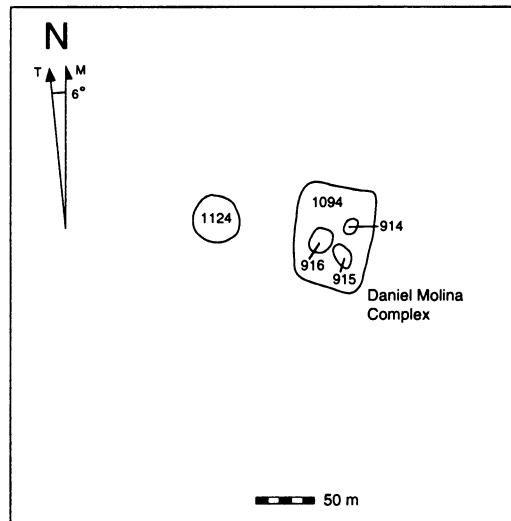


Figure 23. Feature numbers for Platform 1094.

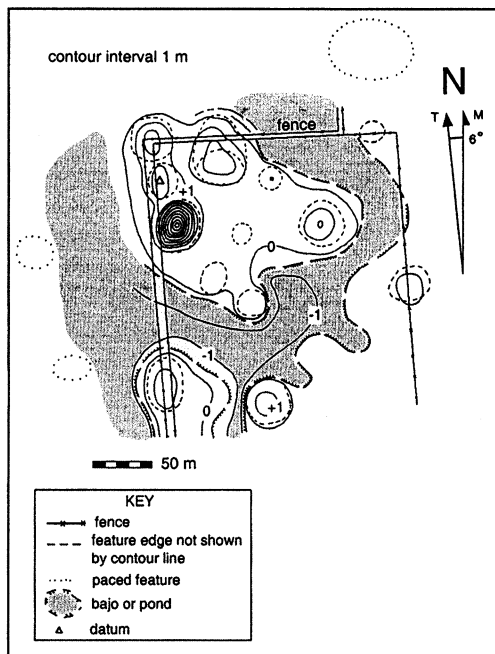


Figure 24. Contour map of El Tiesto.

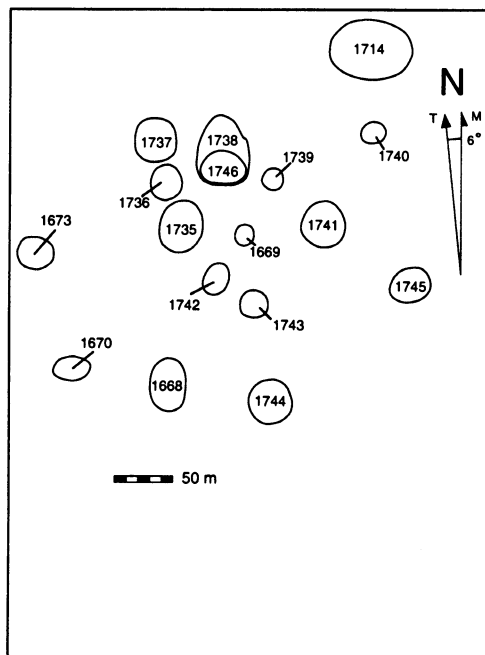


Figure 25. Feature numbers for El Tiesto.

(1151) and a smaller symmetrical mound (1154), a possible palace group (FIGS. 26, 27). Other mounds help define a small plaza.

Not yet contour mapped, the 1473 complex in the central block is dominated by a 6.5 m high conical mound from which a long, curving, narrow, stepped access structure extends out to the NW (FIG. 3), but this structure may be a Postclassic addition. To the south, an L-shaped plat-

form group is a possible palace. Stuart Speaker (personal communication 1997) contoured three small complexes, El Salto (0.05 sq km), Rincon del Tigre, and Paso de las Mulas (each 0.02 sq km) (FIG. 2). El Salto has a high conical mound with two flanking loaf mounds and a small ballcourt in the plaza. To the SE lies a courtyard group. Rincon del Tigre has a high conical mound fronting a small mound across a plaza and flanked by one linear mound. Paso de las

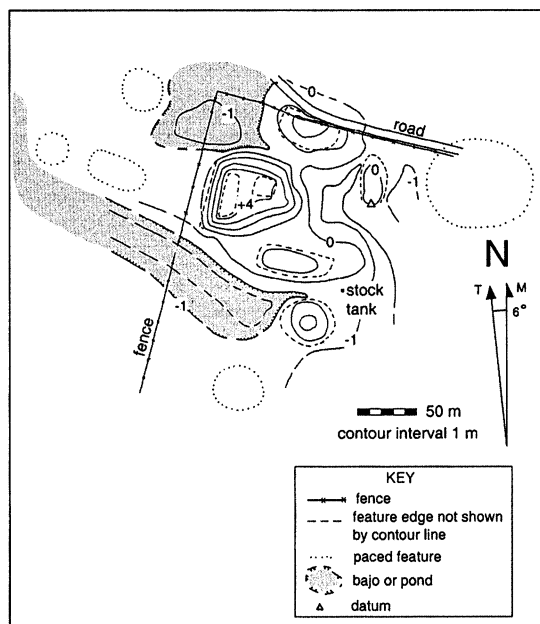


Figure 26. Contour map for La Fraternidad.

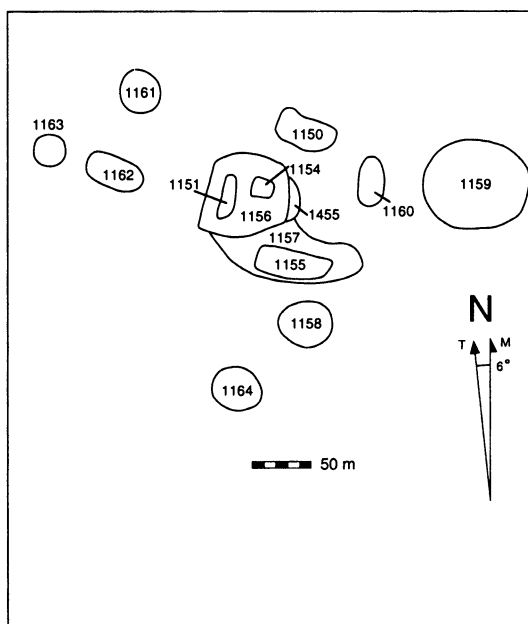


Figure 27. Feature numbers for La Fraternidad.

Mulas has a high conical mound and an array of smaller mounds, three of which may form a plaza group. Two more centers were subject to pedestrian survey mapping: Rincon del Tigre Norte has a high conical mound and flanking loaf mounds, as does El Salto Norte (FIG. 2).

Discussion

Sizes, types of structures, and layouts among formal architectural complexes vary considerably. Although repetitive patterns in layout and types of buildings can be recognized, so too can variability in positioning and sizes of structures. Consequently, there seems to have been room for considerable innovation or re-interpretation in commissioning monumental structures. High conical temple platforms are a recurrent but not ubiquitous feature, suggesting that sacred buildings were an important part of major architecture. Ballcourts, however, were not a common occurrence. The complexes are distinct spatially from each other, but the presence of recognizable groupings or segments within the larger complexes might indicate that formal complexes were distributed at a variety of distances. This issue of how complexes related to one another is addressed in the next section. The proximity of complexes to one another raises the possibility that some were outlying groups linked socially and politically as part of a zone of construction. To evaluate this possibility five categories of evidence can be addressed, with the proviso that additional survey will be necessary to assess the connected and disconnected models more fully.

Evidence Bearing on the Two Models

DATING

As noted, my initial view of Mixtequilla settlement hierarchy was that the major complexes represented a succession of centers, with some of the smaller complexes as outlying subsidiary construction. Ceramic evidence casts doubt on the idea of succession, however, and suggests that new complexes did not imply the demise of older ones. At Cerro de las Mesas two large platforms yielded ceramic diagnostics from the Late Classic period (platform 98 and mound 65 atop platform 64); Torres' excavations revealed Late Classic offerings in a mound at Zapotal (Medellín 1983; Torres 1972; Torres, Reyes, and Ortega 1975). Azuzules produced mainly Classic surface diagnostics, with the Late Classic strongly represented. Thus, all three of the biggest complexes appear to have at least some major buildings with Late Classic associations.

SPACING

The spacing of large and small architectural complexes is sufficiently close that we can question the extent to which the smaller complexes were distinct centers versus separated complexes in a sprawling area of formal construction. Major centers in the Maya lowlands may have one or more central complexes accompanied by lesser complexes at varying distances. Puleston (1983: 25, 26) notes two "minor centers" within 3–4 km of the Great Plaza at Tikal (plus 7 within 4–6.5 km, and four within 9–12 km,

with other “separate” centers at 13 and 16 km). Nine of the 13 minor centers recorded fall within Tikal’s outer limits as he defined them. At Cobá, distances to smaller complexes within the occupation area, most of them connected to the site core by causeways, ranged from 1.1 to 5.5 km (Folan 1983: 6). Caracol’s mapped causeways lead to subsidiary groups up to 10 km distant but most fall within 4 km (Chase and Chase 1996: 806); a few more distant causeway links are suggested by aerial photographs.

Secondary centers tend, with considerable variation, to occur at greater distances than outlying complexes. Kurjack and Garza (1981: 300–303, 305–307) point out the varying expressions of Classic settlement hierarchy in the northern Maya area, where secondary centers are sometimes nearly as large as the primary centers but are located at distances of 10, 32, 18, and 8 km. In southern Quintana Roo, Harrison (1981: 274–276) found a tendency for spacings of 13 and 26 km between major centers. A day’s round trip walking, about 20 km, has been among the criteria used to distinguish independent settlements as well as secondary centers in a hierarchy, i.e., settlements not part of the spread of remains around a major center (Kepecs, Feinman, and Boucher 1994). Thus, small distances between complexes, especially up to about 6 km, raise a possibility of complexes forming a single settlement, provided that occupational remains occur throughout, as they do in the Mixtequilla.

What is unusual about the Mixtequilla is that the three largest complexes are not so close as to be obviously related, as with the set of four complexes in central Cobá, three of which are on the “Great Platform” (their distances from Cobá itself are approximately 0.6, 1.4, and 1.1 km). The distance from Cerro de las Mesas to Zapotal is 1.6 km and the distance from Zapotal to Azuzules is 5.67 km (measuring from the margins of one mapped area to another). If, instead, we consider the distances among *intervening*, smaller formal complexes, the longest distance between any two complexes lying between Zapotal and Azuzules drops to 1.13 km.

The spacing of major complexes within the PALM study zone is smaller than along the lower Río Cotaxtla, the next drainage west. Daneels (1997a) reports distances of 6 to 10 km between her largest Classic complexes, with most well above 6 km. Thus, the distances between Mixtequilla major complexes are small enough that, given the dispersed occupation, they may form outlying groups of constructions rather than secondary or tertiary settlements that have some distinct administrative identity in a settlement hierarchy. Also, if formal complexes were strung out along the Viejo River, which is at least partially the case, then distances could become greater.

NON-DOMINATION

A second unusual feature of Mixtequilla complexes is that no single formal complex dominates the surrounding landscape as thoroughly as, for example, central Tikal. Cerro de las Mesas is by far the largest in area but Azuzules has a bigger ballcourt and Zapotal has a platform-and-plaza group fronted by Cerro del Gallo that constitutes the most massive construction I have seen in the region.

NON-DISCRETENESS

Isolated large structures, such as platform 1094, call into question the discreteness of centers in the Mixtequilla. Also not all major structures in the Mixtequilla are part of formal complexes—a map showing mounds taller than 5 m reveals blurring of the separation of major formal complexes (FIG. 28). This information bolsters the idea of a capital zone and suggests that Classic Mixtequeños did not adhere to a neat segregation between formal construction complexes and the countryside, at least in the possible capital zone area.

LAYOUTS

Layouts of formal construction support the idea of smaller outlying complexes forming part of a dispersed capital zone settlement. Several small complexes consist of a single major structure morphologically like those in major complexes but in a small arrangement that lacks any other major construction (e.g., La Fraternidad, platform 1094). Such a small complex represents in part the characteristics of major centers. In other words, some complexes are not smaller versions of what we encounter at the largest complexes, but, rather, incomplete ones.

The two complexes I singled out as possible secondary centers have an intermediate size but also greater similarity in structural “ingredients” to major complexes. None but the largest complexes has a ballcourt, however, so in this sense the others all are incomplete. (No ballcourt has been reported at Zapotal or shown on Torres’ unpublished map, but a modern settlement obscures parts of the site.) The largest complexes are also distinguished by the presence of stone sculpture. Cerro de las Mesas had a sizable corpus (Miller 1991; Stirling 1943), and Stirling (1941: 279) reported a stela at Zapotal that has since disappeared. A plain stela is visible today at Azuzules.

In sum, some complexes are intermediate in size and have a mix of conical mounds and platforms similar to major complexes except for the absence of ballcourts and sculpture (e.g., Palmas Cuatas). Whether such complexes are the intermediate tier(s) of a settlement hierarchy or, instead, outlying groups pertaining to a larger center remains

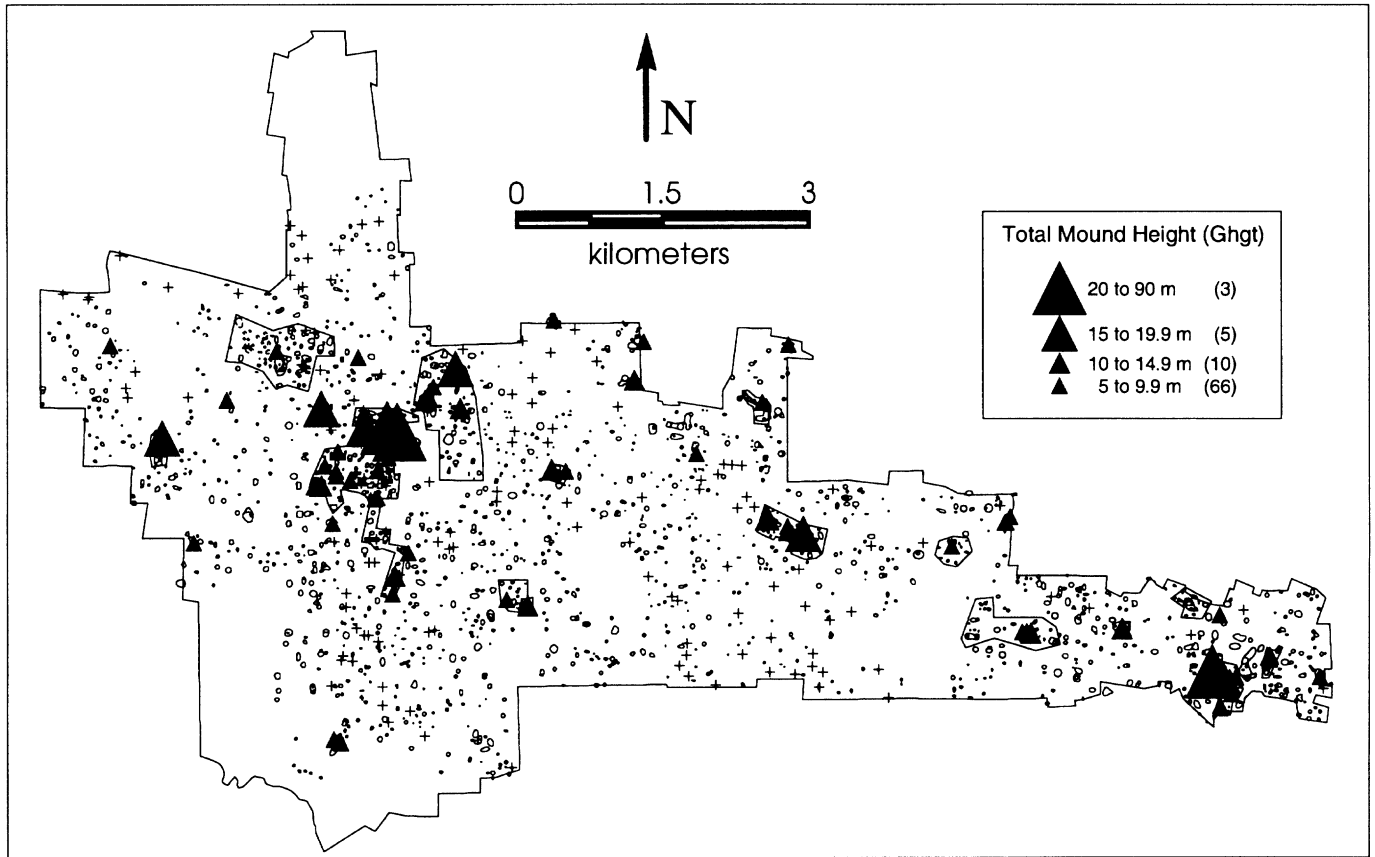


Figure 28. The central survey block showing the outlines of structures with differently sized triangles superimposed to show heights of 5 m or more. (“Ghgt” is a variable that refers to the height of a mound plus any substructural platform on which it is placed.)

uncertain, but spacing and ceramic dating make the second possibility more promising.

A Regional Perspective

The surrounding territory does not match the study zone in the size of the largest formal complexes, so far as can be discerned from current evidence. On the basis of non-systematic survey in the mangrove zone to the east of the Mixtequilla study zone, most centers there are secondary in size or smaller, perhaps on the order of Villa Nueva or Palmas Cuatas rather than Cerro de las Mesas and Azules.

One possible exception to the secondary status is Nopiloa (Medellín 1987), to the sw. Nopiloa is situated along the Guarenguito drainage; it has produced at least one major sculpture, a boulder effigy depicting, perhaps, a toad. Other apparently uncarved monument fragments are present at the site, as is a ballcourt. The volume of construction at Nopiloa and monumental groups in the vicinity suggests that it will prove to be a Late Classic capital with

a dependent territory, but the data from my 1999 field season there are only in the initial stages of analysis.

The largest centers along the lower Río Cotaxtla, on the basis of Daneels’ survey, are of secondary size compared to Cerro de las Mesas and Azules (Daneels 1997a, 1997b). They are perhaps approximately the size of Palmas Cuatas in the Mixtequilla. Some complexes to the north of the study zone, on fossilized dune ridges, also are secondary in amount of construction, but some have ballcourts. The distribution of ballcourts may prove to have political significance. Smaller complexes in possible outlying territories more consistently have ballcourts than do those in the vicinity of Cerro de las Mesas; the presence of ballcourts may signal a distinct locality identity.

Therefore, there is reason to expect that center information at a larger regional scale will provide a basis to assess the case for a capital zone in the Cerro de las Mesas vicinity. Secondary centers tied to major ones in a settlement hierarchy are likely to be distinguishable by 1) the absence or greatly diminished quantity of their own outlying con-

struction complexes; 2) the presence of ballcourts; 3) less construction volume; and 4) a relatively complete array of structure types and plaza arrangements. Also, secondary contexts will tend to occur at distances from the core well above 6 km. Expectations for tertiary centers cannot be specified with the current evidence, aside from an anticipated still-smaller volume of construction. Perhaps the possible tertiary groups in the central block survey (on the basis of size) are simply outlying groups of the main complexes and therefore part of a single settlement. Thus, I may not have good examples of tertiary centers. Overall, the regional evidence, although spotty, does not immediately discredit the idea of Cerro de las Mesas and its environs as a capital zone with an extensive outlying territory, but further detailed mapping and survey are essential to an adequate determination.

Discussion and Comparisons

The unusual density of formal complexes and their form and arrangements in the Mixtequilla study zone pose a problem for interpretation. Was this an agrarian society with multiple bases of wealth and authority funded through quasi-independent major estates, with no single authority or line of succession to high office able to maintain itself over a long period? If so, these conditions would lead to a highly decentralized and only mildly hierarchical system with different centers of formal construction, many sequential, and little differentiation between the PALM study area and its surroundings. Or is state authority and capital construction expressed differently from contemporaneous regions in a “capital zone”—though more akin to Maya patterns than to urban capitals such as Monte Albán or Teotihuacan in the highlands? The capital zone variant of the connected model for the Cerro de las Mesas area is crucial for the idea of a strong state authority that may have encompassed surrounding areas that exhibit only smaller centers.

Additional information to confirm or deny the Mixtequilla capital zone idea will help us comprehend the nature of Mixtequilla society and the variety of urban forms in Mesoamerica. Despite obvious parallels with settlement patterns in the Maya lowlands, Mixtequilla society may have originated a somewhat different urban form in part because of a regional centralization of wealth through early cotton production and export to the highlands. Mayanists actively debate the size of Maya polities and whether major regional capitals existed (Chase and Chase 1996; Culbert 1988, 1991; Marcus 1995). The challenge of constructing Maya settlement hierarchies is reflected in alternative approaches, summarized by de Montmollin (1995: 72–76) as use of emblem glyphs in epigraphy, vol-

ume of construction, plaza counts, and architectural diversity. A related problem plagues the interpretation of Classic Mixtequilla society, but it can be framed more exactly in terms of settlement evidence. Maya research has neglected minor formal complexes away from major centers in comparison to the attention devoted to major complexes (or centers). One lesson from the Mixtequilla case is that lesser complexes play a crucial role in the determination of scale and complexity.

Although other comparative data do not precisely parallel the Mixtequilla situation, they do underscore the variability in urbanism and settlement hierarchies, along with the presence of related phenomena. Perhaps the closest comparison derives from McIntosh's study of the West African center of Jenne-jenno in the Middle Niger Valley. He describes the early process of urban clustering, in which individual communities gravitate to a locality and provide diverse services and manufactures to a wider, integrated hinterland (McIntosh 1991: 204). Although Jenne-jenno lacks monumental constructions and other material indicators of centralized rule, the Chinese cases he points to, such as Cheng-chou and An-yang in the Shang Bronze Age, do have royal precincts in an extensive cluster of differentiated settlements. McIntosh argues for early urbanization as a context in which the non-despotic resolution of social ambiguities is critical. In non-incipient contexts like the Mixtequilla, it remains to be seen whether the related issue of pluralism (multiple socially powerful groups, probably mainly involving elite factionalism) also involves diverse mechanisms for resolving social ambiguities and helps account for aspects of settlement or artifact patterns.

It is worth remarking that the Mixtequilla does not closely parallel heterarchical patterns—each element possessed the potential of being unranked or ranked in a number of different ways (Crumley 1979: 144) because we cannot distinguish either unranked elements or multiple rankings (hierarchies) with different functional properties. Further economic investigations, however, could disclose a distinction in production and distribution networks between elite sumptuary and commoner goods that Potter and King (1995) regard as evidence of heterarchical systems in the Maya lowlands.

We also lack evidence for a “Löschian” central place hierarchy, i.e., with partially independent, differentially co-occurring hierarchical lattices below the first-order center, each lattice involving different goods or services (Lösch 1954: 124–132). The Tarascan area as described by Pollard (1980: 691) is a possible Mesoamerican example because of the contrastive locations of economic and ritual functions in lesser centers.

A different but related problem to that encountered in

the Mixtequilla affects the interpretation of Late Postclassic settlement evidence in the Basin of Mexico (Sanders, Parsons, and Santley 1979: 163–166). This period shows a population peak, with occupational remains relatively continuous in some areas, reducing the spatial distinctness of individual settlements. Political and economic changes associated with the Aztec empire led to a new level of valley-wide integration. Lockhart (1992) questioned the distinctness of central settlements that were divided by *calpulli* (residential and quasi-kin groups) memberships and argues for a more territorial, partitioned view than a town-oriented concept. Another highland example comes from the Valley of Oaxaca. Perhaps the possible rank one center (DMTG), which involves merging four separate Monte Alban IIIA "sites" within a 500 m radius, will not seem so problematic to researchers in that area when dispersed patterns are better understood and even accepted (Kowalewski et al. 1989:226–240). This problematic four-part site array, lacking an obvious single dominant focus, led the researchers to consult a proverbial "Cognitive Archaeologist" and a "Skeptical Graduate Student" enrolled in Symbolic Archaeology, without much result (Kowalewski et al. 1989: 238). DMTG is unusual in the Oaxacan record as seen through the lens of their field and analytic methods, but less so in a wider Mesoamerican perspective. In sum, a "muddiness" to settlement and community boundaries makes for recurrent problems in interpreting settlement "systems" (Flannery 1976: 162), urbanism, and hierarchy.

Regional settlement hierarchy in the lower Cotaxtla drainage to the west offers certain contrasts to the Mixtequilla area, as well as parallels. The tendency toward dispersed residential remains appears to be a trait in common, but the evidence concerning settlement hierarchy during the Classic period is different. Three hierarchical levels of Cotaxtla centers are described by Daneels (1997b), each with a similar layout and each including ballcourts, but with lower-order centers presenting a smaller scale of construction. They are reduced replicas of higher-order centers. Greater variability in construction patterns is present in the Mixtequilla, along with a possible major superordinate zone in the Cerro de las Mesas area. On this basis, we can anticipate that the south-central Gulf lowlands had some variability in political forms as well as architectural practices. Differences in survey methods and interpretive approaches, however, also contribute to our picture of variation and require that comparisons be cautious (Stark in press). Likewise, interpretations of Tuxtlas settlement hierarchies using Central Mexican site categories, which may have a variable fit with Gulf patterns, combined with differences in survey methods and environmental conditions in the Tuxtlas (Santley and Arnold 1996) insure that not all

the settlement pattern variability among Gulf regions is likely to be ascribable to ancient social and economic organization.

Acknowledgments

The Proyecto Arqueológico La Mixtequilla was authorized by the Instituto Nacional de Antropología e Historia and funded by the National Science Foundation (BNS-8519167 and 8741867), the Wenner-Gren Foundation for Anthropological Research, and Arizona State University. The project was made possible through the cooperation of many talented staff members, whose contributions I gratefully acknowledge. Lynette Heller, Clare Yarborough, Stuart Speaker, Oralia Cabrera, and Kevin Johns helped produce the contour maps. Christopher Pool and anonymous reviewers contributed beneficial suggestions regarding the manuscript but do not, or course, bear responsibility for its final form.

Barbara Stark is a Professor in the Department of Anthropology at Arizona State University. Her interests include developmental trajectories of complex societies and their economic and sociopolitical organization. Mailing address: Department of Anthropology, Arizona State University, Tempe, AZ 85287-2402.

-
- Andrews, George F.
1975 *Maya Cities: Placemaking and Urbanization*. Norman: University of Oklahoma Press.
- Bintliff, John, and Anthony Snodgrass
1988 "Off-site Pottery Distributions: A Regional and Interregional Perspective," *Current Anthropology* 29: 506–513.
- Blanton, Richard E.
1976 "The Anthropological Study of Cities," *Annual Review of Anthropology* 5: 249–265.
1978 *Monte Alban: Settlement Patterns at the Ancient Zapotec Capital*. New York: Academic Press.
- Blanton, Richard E., Stephen A. Kowalewski, Gary M. Feinman, and Jill Appel
1982 *Monte Alban's Hinterland, Part 1: The Prehispanic Settlement Patterns of the Central and Southern Parts of the Valley of Oaxaca, Mexico. Memoirs of the Museum of Anthropology* No. 15. Ann Arbor: University of Michigan.
- Carr, Robert F., and James E. Hazard
1961 *Map of the Ruins of Tikal, El Petén, Guatemala. Tikal Reports* No. 11. *Museum Monograph* 21. Philadelphia: University Museum, University of Pennsylvania.
- Ceja Tenorio, Jorge Fausto
1997 "Los Sitios Arqueológicos del Sureste de los Tuxtles," in Sara Ladrón de Guevara G. and Sergio Vásquez Z., coords., *Memoria del Coloquio Arqueología del Centro y Sur de Veracruz*. Xalapa: Universidad Veracruzana, 177–196.
- Chase, Arlen F., and Diane Z. Chase
1996 "More than Kin and King, Centralized Political Organiza-

- tion among the Late Classic Maya," *Current Anthropology* 37: 803–810.
- Chase, Diane Z., Arlen F. Chase, and William A. Haviland
1990 "The Classic Maya City: Reconsidering the Mesoamerican Urban Tradition," *American Anthropologist* 92: 499–506.
- Crumley, Carole L.
1979 "Three Locational Models: An Epistemological Assessment for Anthropology and Archaeology," in Michael B. Schiffer, ed., *Advances in Archaeological Method and Theory*, Vol. 2. New York: Academic Press, 141–173.
- Culbert, T. Patrick
1988 "Political History and the Decipherment of Maya Glyphs," *Antiquity* 62: 135–152.
1991 "Polities in the Northeast Peten, Guatemala," in T. Patrick Culbert, ed., *Classic Maya Political History: Hieroglyphic and Archaeological Evidence*. Cambridge: Cambridge University Press, 128–146.
- Curet, L. Antonio, Barbara L. Stark, and Sergio Vásquez Z.
1994 "Postclassic Change in South-central Veracruz, Mexico," *Ancient Mesoamerica* 5: 13–32.
- Cyphers, Ann
1997 "Olmec Architecture at San Lorenzo," in Barbara L. Stark and Philip A. Arnold, III, eds., *Olmec to Aztec: Settlement Patterns in the Ancient Gulf Lowlands*. Tucson: University of Arizona Press, 96–114.
- Daneels, Annick
1997a "El Proyecto Exploraciones en el Centro de Veracruz, 1981–1995," in Sara Ladrón de Guevara G. and Sergio Vásquez Z., coords., *Memoria del Coloquio Arqueología del Centro y Sur de Veracruz*. Xalapa: Universidad Veracruzana, 59–73.
1997b "Settlement History in the Lower Cotaxtla Basin, Veracruz, Mexico," in Barbara L. Stark and Philip A. Arnold, III, eds., *Olmec to Aztec: Settlement Patterns in the Ancient Gulf Lowlands*. Tucson: University of Arizona Press, 206–252.
- de Montmollin, Olivier
1989 *The Archaeology of Political Structure. Settlement Analysis in a Classic Maya Polity*. Cambridge: Cambridge University Press.
1995 *Settlement and Politics in Three Classic Maya Polities. Monographs in World Archaeology* 24. Madison, WI: Prehistory Press.
- Drennan, Robert D.
1988 "Household Location and Compact Versus Dispersed Settlement in Prehispanic Mesoamerica," in Richard R. Wilk and Wendy Ashmore, eds., *Household and Community in the Mesoamerican Past*. Albuquerque: University of New Mexico Press, 273–293.
- Drucker, Philip
1943 *Ceramic Stratigraphy at Cerro de las Mesas, Veracruz, Mexico. Bureau of American Ethnology, Bulletin* 141. Washington, D.C.: Smithsonian Institution.
- Drucker, Philip, Robert F. Heizer, and Robert J. Squier
1959 *Excavations at La Venta, Tabasco, 1955. Bureau of American Ethnology, Bulletin* 170. Washington, D. C.: Smithsonian Institution.
- Dunnell, Robert C., and William S. Dancy
1983 "The Siteless Survey: A Regional Scale Data Collection Strategy," in Michael B. Schiffer, ed., *Advances in Archaeological Method and Theory*, Vol. 6. New York: Academic Press, 267–287.
- Fedick, Scott L., and Anabel Ford
1990 "The Prehistoric Agricultural Landscape of the Central Maya Lowlands: An Examination of Local Variability in a Regional Context," *World Archaeology* 22: 18–33.
- Flannery, Kent V.
1976 "Evolution of Complex Settlement Systems," in Kent V. Flannery, ed., *The Early Mesoamerican Village*. New York: Academic Press, 162–173.
- Folan, William J.
1983 "Archaeological Investigations of Cobá: A Summary," in William J. Folan, Ellen R. Kintz, and Laraine A. Fletcher, *Cobá: A Classic Maya Metropolis*. New York: Academic Press, 1–10.
1990 "Calakmul, Campeche: A Centralized Urban Administrative Center in the Northern Peten," *World Archaeology* 24: 158–168.
- Folan, William J., Ellen R. Kintz, and Laraine A. Fletcher
1983 *Cobá: A Classic Maya Metropolis*. New York: Academic Press.
- Ford, Anabel
1986 *Population Growth and Social Complexity: An Examination of Settlement and Environment in the Central Maya Lowlands. Anthropological Research Papers* 35. Tempe: Department of Anthropology, Arizona State University.
- Freidel, David A.
1981 "The Political Economics of Residential Dispersion among the Lowland Maya," in Wendy Ashmore, ed., *Lowland Maya Settlement Patterns*. Albuquerque: University of New Mexico Press, 371–382.
- Gallant, T. W.
1986 "'Background Noise' and Site Definition: A Contribution to Survey Methodology," *Journal of Field Archaeology* 13: 403–418.
- Gomez Rueda, Hernando
1996 *Las Limas, Veracruz, y Otros Asentamientos Prehispánicos de la Región Olmeca. Colección Científica* 324. *Serie Arqueología*. Mexico, D.F.: Instituto Nacional de Antropología e Historia.
- Gutiérrez Solana, Nelly, and Susan K. Hamilton
1977 *Las Esculturas en Terracota de El Zapotal, Veracruz*. Mexico, D.F.: Universidad Nacional Autónoma de México.
- Hall, Barbara A.
1994 "Formation Processes of Large Earthen Residential Mounds in La Mixtequilla, Veracruz, Mexico," *Latin American Antiquity* 5: 31–50.
1997 "Spindle Whorls and the Cotton Production at Middle Classic Matcapan and in the Gulf Lowlands," in Barbara L. Stark and Philip A. Arnold, III, eds., *Olmec to Aztec: Settlement Pattern Research in the Ancient Gulf Lowlands*. Tucson: University of Arizona Press, 115–135.
- Harrison, Peter D.
1981 "Some Aspects of Preconquest Settlement in Southern Quintana Roo, Mexico," in Wendy Ashmore, ed., *Lowland Maya Settlement Patterns*. Albuquerque: University of New Mexico Press, 259–286.
- Heller, Lynette, and Barbara L. Stark
1998 "Classic and Postclassic Obsidian Tool Production and Consumption: A Regional Perspective from the Mixtequilla, Veracruz," *Mexicon* 20: 119–128 and *Mexicon* 21: two

unnumbered pages following p. 12.

- Hirth, Kenneth G.
1995 "Urbanism, Militarism, and Architectural Design," *Ancient Mesoamerica* 6: 237–250.
- Johnson, Gregory A.
1973 *Local Exchange and Early State Development in Southwestern Iran. Museum of Anthropology, University of Michigan, Anthropological Papers* 51. Ann Arbor: University of Michigan.
- Justeson, John S., and Terrence Kaufman
1993 "A Decipherment of Epi-Olmec Hieroglyphic Writing," *Science* 259: 1703–1711.
1997 "A Newly Discovered Column in the Hieroglyphic Text of La Mojarra Stela 1: A Test of Epi-Olmec Decipherment," *Science* 277: 207–210.
- Kepecs, Susan, Gary Feinman, and Sylviane Boucher
1994 "Chichen Itza and Its Hinterland: A World-Systems Perspective," *Ancient Mesoamerica* 5: 141–158.
- Kowalewski, Stephen
1982 "The Evolution of Primate Regional Systems," *Comparative Urban Research* 9 (1): 60–78.
- Kowalewski, Stephen A., Gary M. Feinman, Laura Finsten, Richard E. Blanton, and Linda M. Nicholas
1989 *Monte Alban's Hinterland, Part II: Prehispanic Settlement Patterns in Tlacolula, Esla, and Ocotlan, the Valley of Oaxaca, Mexico. Memoirs of the Museum of Anthropology*, No. 23. Ann Arbor: University of Michigan.
- Krotser, George R.
1973 "El Agua Ceremonial de los Olmecas," *Boletín del Instituto Nacional de Antropología e Historia* 6 (época 2): 43–48.
- Kurjack, Edward B.
1979 *Introduction to the Map of the Ruins of Dzibilchaltun, Yucatan, Mexico. Middle American Research Institute, Publication* 47. New Orleans: Tulane University.
- Kurjack, Edward B., and Sylvia Garza T.
1981 "Pre-Columbian Community Form and Distribution in the Northern Maya Area," in Wendy Ashmore, ed., *Lowland Maya Settlement Patterns*. Albuquerque: University of New Mexico Press, 287–309.
- Lockhart, James
1992 *The Nahuas after the Conquest: A Social and Cultural History of the Indians of Central Mexico, Sixteenth through Eighteenth Centuries*. Stanford: Stanford University Press.
- Lösch, August
1954 *The Economics of Location*, trans. from the second revised edition by William H. Woglom with the assistance of Wolfgang F. Stolper. New Haven: Yale University Press.
- McIntosh, Roderick J.
1991 "Early Urban Clusters in China and Africa: The Arbitration of Social Ambiguity," *Journal of Field Archaeology* 18: 199–212.
- Marcus, Joyce
1989 "From Centralized Systems to City-states: Possible Model for the Epiclassic," in Richard A. Diehl and Janet C. Berlo, eds., *Mesoamerica after the Decline of Teotihuacan A.D. 700–900*. Washington, D.C.: Dumbarton Oaks Research Library and Collection, 201–208.
1995 "Where is Lowland Maya Archaeology Headed?," *Journal of Archaeological Research* 3: 3–53.
- Medellín Zenil, Alfonso
1983 *Obras Maestras del Museo de Xalapa*. Mexico, D.F.: Miguel Galas, S.A.
- 1987 *Nopiloa: Exploraciones Arqueológicas*. Xalapa, Mexico: Universidad Veracruzana.
- Méluzin, Sylvia
1992 "The Tuxtla Script: Steps Toward Decipherment Based on La Mojarra Stela 1," *Latin American Antiquity* 3: 283–297.
- Miller, Mary
1991 "Rethinking the Classic Sculptures of Cerro de las Mesas, Veracruz," in Barbara L. Stark, ed., *Settlement Archaeology of Cerro de las Mesas, Veracruz, Mexico, Monograph* No. 34. Los Angeles: Institute of Archaeology, University of California, 26–38.
- Millon, René
1973 *The Teotihuacan Map. Urbanization at Teotihuacan, Mexico, Vol. 1*. Austin: University of Texas Press.
- Pollard, Helen Perlstein
1980 "Central Places and Cities: A Consideration of the Protohistoric Tarascan State," *American Antiquity* 45: 677–696.
- Potter, Daniel R., and Eleanor M. King
1995 "A Heterarchical Approach to Lowland Maya Socioeconomics," in Robert M. Ehrenreich, Carole L. Crumley, and Janet E. Levy, eds., *Heterarchy and the Analysis of Complex Societies. Archaeological Papers of the American Anthropological Association* 6: 17–32.
- Puleston, Dennis E.
1983 *The Settlement Survey of Tikal. Tikal Report* No. 13. University Museum Monograph 48. Philadelphia: The University Museum, University of Pennsylvania.
- Rodríguez, María del Carmen, and Ponciano Ortíz
1997 "Olmec Ritual and Sacred Geography at Manatí," in Barbara L. Stark and Philip A. Arnold, III, eds., *Olmec to Aztec: Settlement Patterns in the Ancient Gulf Lowlands*. Tucson: University of Arizona Press, 68–95.
- Sanders, William T.
1974 "Chieftdom to State: Political Evolution at Kaminaljuyu, Guatemala," in C. B. Moore, ed., *Reconstructing Complex Societies: An Archaeological Colloquium, Supplement to the Bulletin of the American Schools of Oriental Research* 20: 97–116.
- Sanders, William T., Jeffrey R. Parsons, and Robert S. Santley
1979 *The Basin of Mexico: Ecological Processes in the Evolution of a Civilization*. New York: Academic Press.
- Sanders, William T., and David Webster
1988 "The Mesoamerican Urban Tradition," *American Anthropologist* 90: 521–546.
- Santley, Robert S., and Philip J. Arnold, III
1996 "Prehispanic Settlement Patterns in the Tuxtla Mountains, Southern Veracruz," *Journal of Field Archaeology* 23: 225–249.
- Santley, Robert S., Clare Yarborough, and Barbara Ann Hall
1987 "Enclaves, Ethnicity, and the Archaeological Record at Matcapan," in Reginald Auger, Margaret F. Glass, Scott MacEachern, and Peter H. McCartney, eds., *Ethnicity and Culture*. Calgary: Archaeological Association, University of Calgary, 85–100.
- Smith, Michael E.
1989 "Cities, Towns, and Urbanism: Comment on Sanders and Webster," *American Anthropologist* 91: 454–460.
- Stark, Barbara L.
1991 "Survey Methods and Settlement Features in the Cerro de

- las Mesas Region: A Comparative Discussion," in Barbara L. Stark, ed., *Settlement Archaeology of Cerro de las Mesas, Veracruz, Mexico, Monograph 34*. Los Angeles: Institute of Archaeology, University of California, 39–48.
- 1992 "Ceramic Production in La Mixtequilla, Veracruz, Mexico," in George J. Bey, III, and Christopher A. Pool, eds., *Ceramic Production and Distribution: An Integrated Approach*. Boulder, CO: Westview Press, 175–204.
- 1997 "Discusión de Dos Aspectos del Patrón de Asentamiento en La Mixtequilla," in Sara Ladrón de Guevara G. y Sergio Vásquez Z., coords., *Memoria del Coloquio Arqueológico del Centro y Sur de Veracruz*. Jalapa: Universidad Veracruzana, 211–222.
- 1999 "Commentary: Ritual, Social Identity, and Cosmology: Hard Stones and Flowing Water," in David C. Grove and Rosemary A. Joyce, eds., *Social Patterns in PreClassic Mesoamerica*. Washington, D.C.: Dumbarton Oaks Research Library and Collection, 301–317.
- In press "Las Jerarquías en Patrones de Asentamiento en el Sur-central de Veracruz, Mexico," in *IV Coloquio Bosch-Gimpera*. Mexico City: Universidad Nacional Autónoma de México.
- Stark, Barbara L., editor
- 1991 *Settlement Archaeology of Cerro de las Mesas, Veracruz, Mexico: University of California Los Angeles Institute of Archaeology Monograph 34*. Los Angeles: Institute of Archaeology, University of California.
- In press *Classic Period Mixtequilla, Veracruz, Mexico: Diachronic Insights from Residential Investigations*. Albany: Institute for Mesoamerican Studies, State University of New York at Albany.
- Stark, Barbara L., and L. Antonio Curet
- 1994 "The Development of Classic Period Mixtequilla in South-central Veracruz, Mexico," *Ancient Mesoamerica* 5: 267–287.
- Stark, Barbara L., and Barbara A. Hall
- 1993 "Hierarchical Social Differentiation among Late to Terminal Classic Residential Locations in La Mixtequilla, Veracruz, Mexico," in Robert S. Santley and Kenneth G. Hirth, eds., *Household, Compound, and Residence: Studies of Prehispanic Domestic Units in Western Mesoamerica*. Boca Raton, FL: CRC Press, 249–273.
- Stark, Barbara L., and Lynette Heller
- 1991a "Cerro de las Mesas Revisited: Survey in 1984–1985," in Barbara L. Stark, ed., *Settlement Archaeology of Cerro de las Mesas, Veracruz, Mexico: University of California Los Angeles Institute of Archaeology Monograph 34*. Los Angeles: Institute of Archaeology, University of California, 1–25.
- 1991b "Residential Dispersal in the Environs of Cerro de las Mesas," in Barbara L. Stark, ed., *Settlement Archaeology of Cerro de las Mesas, Veracruz, Mexico, Monograph 34*. Los Angeles: Institute of Archaeology, University of California, 49–57.
- Stark, Barbara L., Lynette Heller, Michael D. Glascock, J. Michael Elam, and Hector Neff
- 1992 "Obsidian Artifact Source Analysis for the Mixtequilla Region, South-central Veracruz, Mexico," *Latin American Antiquity* 3: 221–239.
- Stark, Barbara L., Lynette Heller, and Michael A. Ohnerson
- 1997 "People with Cloth: Mesoamerican Economic Change from the Perspective of Cotton in South-central Veracruz," *Latin American Antiquity* 9: 1–30.
- Stark, Barbara L., and Pamela Showalter
- 1990 "Reconocimiento en La Mixtequilla Sur-central de Veracruz," *Arqueología* (n. s.) 4: 67–86. Mexico City: Instituto Nacional de Antropología e Historia.
- Stirling, Matthew W.
- 1941 "Expedition Uncovers Buried Masterpieces of Carved Jade," *The National Geographic Magazine* 80: 277–327.
- 1943 *Stone Monuments of Southern Veracruz. Bureau of American Ethnology Bulletin No. 138*. Washington, D.C.: Bureau of American Ethnology, Smithsonian Institution.
- Stirling, Matthew W., Froelich Rainey, and Matthew W. Stirling Jr.
- 1960 "Electronics and Archaeology," *Expedition* 2(4): 19–29.
- Torres Guzmán, Manuel
- 1972 "Hallazgos en El Zapotal, Ver.," *Boletín del Instituto Nacional de Antropología e Historia* 2 (época 2): 3–8.
- Torres Guzmán, Manuel, Marco Antonio Reyes, and Jaime Ortega G.
- 1975 "Proyecto Zapotal, Ver.," in *Arqueología, Balance y Perspectiva de la Antropología en Mesoamérica. XII Mesa Redonda*. Tomo 1: 323–329. Mexico, D.F.: Sociedad Mexicana de Antropología.
- Wheatley, Paul
- 1972 "The Concept of Urbanism," in Peter J. Ucko, Ruth Tringham, and G. W. Dimbleby, eds., *Man, Settlement and Urbanism*. London: Gerald Duckworth and Co., 601–637.
- Wilkinson, T. J.
- 1982 "The Definition of Ancient Manured Zones by Means of Extensive Sherd-sampling Techniques," *Journal of Field Archaeology* 9: 323–333.
- 1989 "Extensive Sherd Scatters and Land-use Intensity. Some Recent Results," *Journal of Field Archaeology* 16: 31–46.
- Winfield C., Fernando
- 1988 *La Estela 1 de La Mojarra, Veracruz. Research Reports on Ancient Maya Writing* No. 16. Washington, D.C.: Center for Maya Research.
- Yadecun A., Juan
- 1974 "Análisis Espacial de la Zona Arqueológica de Tula, Hgo.," in Eduardo Matos M., coord., *Proyecto Tula (la Parte), Colección Científica* 15. Mexico City: Departamento de Monumentos Prehispánicos, Instituto Nacional de Antropología e Historia, 53–59.