Archaeology of the Guatemala Pacific Coast

Research Year: 1999
Culture: Teotihuacán
Chronology: Pre-Classic, Early Classic and Late Post Classic
Location: Pacific Coast, Guatemala (this report includes several abstracts involving Oaxaca, the Gulf Coast, and Petén)
Site: Escuintla

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Abstract

Funding provided by FAMSI was utilized in four broad categories. These were (a) in the preparation of publishable manuscripts, (b) the design, implementation, and completion of a large relational database including sites, stratigraphic data from excavations, ceramics, obsidian, and other artifacts, (c) completion of all ceramic analysis and illustrations of key ceramic types and groups as well as other significant artifact classes such as obsidian, and (d) the design and implementation of a large GIS database encompassing all of the data collected. Each of these categories is more fully described below.

Publishable Manuscripts

One of the great advantages of the FAMSI funding was to provide precious time to analyze and reflect on the results of the various projects conducted over the past years. While work continued on the large ceramic, obsidian, and other artifact databases as well as the concurrent GIS project, the opportunity to initiate regional questions of potentially sweeping magnitude instead of the usual site limited reports was immensely rewarding. The assistance provided by FAMSI enabled me to take fresh looks at our

data with striking results. One concerned a Teotihuacán military takeover and colonization of a great deal of the central Escuintla, Guatemala coast. A preliminary version of these results, entitled *La Dinámica de la Interacción de Teotihuacán con el Pacífico de Guatemala* was presented at an invited five day Mesa Redonda held at Teotihuacán in 1999 and now published in *Las Memorias de la Primera Mesa Redonda de Teotihuacán* by the Centro de Estudios, Teotihuacán, México. Teotihuacán and other specialists participating at the meeting included Cowgill, Millon, Rattray, Cabrera, Manzanilla, Spence, Sugiyama, Langley, Charleton, Taube, and Fash among others. The discussions that followed helped enormously in solidifying the ideas that produced the longer and more detailed arguments put forth in a book chapter whose abstract is included below. Another concerns one of the most obscure periods on the Guatemala Pacific Coast–the Postclassic period. Yet another involved an independent analysis of the spatial distribution of plain stelae across the entire Guatemala South Coast with startling results that suggest close parallels between sites with and sites without plain stelae and the ceramic traditions proposed by Popenoe de Hatch. Another was an outcome of the collaborative program with Dr. Hector Neff and MURR that permitted an extension of the seminal research conducted by Neff to encompass questions related to the political history and economic interaction of the Middle-Late Classic period involving interaction and political relations between the lower coastal Montana and the piedmont focused Cotzumalguapa states. All abstracts follow.

Teotihuacán, Militarism, and Pacific Guatemala
by Frederick J. Bove and Sonia Medrano Busto
The Archaeology of Late Postclassic Settlements on the Guatemala Pacific Coast
by Frederick J. Bove
Plain Stelae of the Guatemala Pacific Coast: An Interpretation
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Economic Interaction and Political History: A Chemical Compositional Approach
by Frederick J. Bove and Hector Neff

In addition to these the following were also written and published as a result of the FAMSI funding.

Commentary on Travel Letter from Puerto México. In *Early Scholars' Visits to Central America*, 2000, M. Beaudry-Corbett & E. Hardy, editors, pp. 104-11. The Cotsen Institute of Archaeology, Occasional Paper 18, University of California, Los Angeles.

Prólogo. In *Taller Arqueología de la Región de la Costa Sur de Guatemala, 1999*, edited by C.S. de Lavarreda. Ministerio de Cultura y Deportes y Asociación Tikal, Guatemala City.

Book Review and Response. Cycles of the Sun, Mysteries of the Moon: The Calendar in Mesoamerican Civilization, 2000. *Mesoamérica* 39:434-51.

Relational Database

A critical phase was the major effort invested in the design, implementation, and completion of a relational database (RDB) to incorporate all existing site and artifact databases. The RDB allows the sophisticated query and analysis of data in significant ways to facilitate the preparation and publication of various planned papers and volumes. The relational database is now completely integrated with the Geographic Information System (GIS). Prior to this, the existing artifact files developed during our various projects over many years were all in flat file format (MINARK and EXCEL) with the single exception of the chemical compositional database developed by our colleague, Dr. Hector Neff at MURR. These included field notes, numerous site files, 11 individual ceramic databases, 15 obsidian database files, and other artifacts such as figurines, burials, spindle whorls, and archaeometric tables all of which caused great difficulties in analyzing our regional based data.

The design of a rigorous database is made exceptionally difficult with archaeological data because it is virtually all contextually based. Consequently meetings were held with archaeologists and database experts connected with the Archaeological Research Institute at Arizona State University and others. Broadly speaking, all artifacts–and there are over 100,000 ceramic sherds and 30,000 obsidian artifacts in the RDB–are handled as specimens. This means that all data such as burials, field notes, spindle whorls, figurines, other artifacts, archaeomagnetic data, photographs, ceramics, and obsidian, are handled at the lot level, which constitutes the minimum analytical unit. Additional files include suboperation, operation, and site. The site level contains geo-referenced data as well as administrative information. All environmental data are handled via the GIS coverages. Additional linked tables include features within sites such as temples, elite residential structures, plazas, ball courts, domestic units, etc. Yet another table contains site components that are largely chronological. And all are linked at a higher level–the complex. The design enables sophisticated queries and rapid analysis through the use of SQL and presentation of virtually any data class.

Considerable effort and expense was invested in the conversion process, which proved to be particularly painstaking and difficult work but made possible with the financial support of FAMSI. It was enormously complex because each older ceramic database was different. All had to be made compatible within the confines of a single ceramic relational database table that in turn was linked to the overall design. The important result is that all flat files are now converted to one master Microsoft Access RDB. The new RDB will greatly increase efficiency and accuracy during the complex analytical process, aid in model building and data presentation, as well as eventually making all data accessible on the web.

Ceramic and Other Artifact Analysis and Illustration

With funds provided by the FAMSI grant a complete review of all existing ceramic descriptions together with further analysis of type and group designations with the assistance of several Guatemalan collaborators was completed. A consequence was the decision to complete a pending analysis of a particularly critical and most difficult ceramic class–the various black wares. On the Guatemala Pacific Coast black wares play an important role and are present in significantly high percentages during all chronological periods. The ceramic database table contains data on over 100,000 sherds of which about 19,000 or 19% are black wares. Previous published descriptions were site specific, chronological deficient, and hence of limited use. Our knowledge of the subtleties involved in comprehending the rich variation present would not have been possible until recently based on our considerable experience covering a wide range of spatially and temporally distributed materials combined with binocular paste data and backed by results of the chemical composition program with MURR.

One important result is a refinement of the ceramic sequence during the Terminal Formative-Early Classic transition stemming from the Balberta project. The Balberta ceramic analysis represents a significant part of a doctoral dissertation by the project ceramicist Licda. Sonia Medrano a doctoral candidate at Vanderbilt University. Licda. Medrano completed a thorough review of all black wares of this crucial period identifying and describing nine new ceramic types. We can now distinguish the subtle differences between the Terminal Formative and Early Classic periods in the Balberta zone that earlier were obscure and difficult to demonstrate. Yet another is the incorporation of economically important ceramic material from the Cotzumalguapa salvage operations conducted by Chinchilla and Medrano in 1996-1997. These will augment considerably a Late-Terminal Classic comparative analysis that previously was restricted by the limited controlled excavations within the El Baúl and El Castillo groups of the Cotzumalguapa capital.

Existing illustrations were reviewed with our Guatemala illustrators and a large number of new sherd samples were selected for illustration (inked drawings). This work was funded by the FAMSI grant. The large figurine corpus was reviewed and a representative sample selected across sites and temporal periods for illustration–both inked drawings and photographs. Additional ceramic samples were selected for neutron activation analysis at MURR at no cost.

A positive development was the inauguration of a "ceramoteca" housed within the Instituto de Antropología e Historia (IDEAH) main center in Guatemala City with the assistance of our ceramicist, Licda. Medrano. All of our ceramic type collections and neutron activation analysis samples were transported there as part of a permanent archive. It is believed that eventually all coastal (and other) type collections are to be housed here to facilitate comparative analysis. Some discussions were also held with the view toward eventually making the type collections graphically accessed through the web.

Approximately 30,000 obsidian artifacts are now in a single RDB table following their conversion from 15 separate flat files. Arrangements were made with Guatemala archaeologists to classify, code, and enter a substantial number of artifacts from Chinchilla's Cotzumalguapa excavations in 1994-1995. A large sample from his controlled surface collections were previously classified and coded by myself. A Guatemala archaeological student worker entered these into the RDB. This development finally allows a comparative analysis of obsidian procurement, distribution, and use on a regional basis during all periods.

Design and Implementation of the Regional GIS

With funds provided by FAMSI, a regional GIS was designed and implemented with the assistance of specialists from the University of California, Santa Barbara and Arizona State University. Over 1000 sites are now in the GIS that are linked to the relational databases previously described. The GIS is a work in progress due to the complexities involved to include all sites for all time periods on the central Guatemala South Coast. What this means is that the wealth of archaeological, spatial-locational, environmental, and administrative data are all geo-referenced, an essential stage to grasp fully the complexities of long-term regional development and cultural evolution. It is anticipated that eventually these data will be made available on the web.

Future Goal

Our work effort is now concentrated on completing the write-up of the volume on the ceramics and chronology. A publishable manuscript is programmed to be completed by late summer–early fall 2002. I hope that summary descriptions and drawings of key ceramic types and groups will be made available on the FAMSI web page shortly thereafter to complement the published volume.

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Teotihuacán, Militarism, and Pacific Guatemala

Frederick J. Bove and Sonia Medrano Busto

In *Teotihuacán and the Maya: Reinterpreting Early Classic Interaction*, edited by G.E. Braswell, University of Texas Press, Austin. In press.

Abstract

The nature of interaction between Teotihuacán and distant regions has been ambiguous, and an understanding of its essential characteristics is important for several reasons. First, from the perspective of regions such as Pacific Guatemala, we need to know if local political and economic shifts reflect changes in the foreign relations of Teotihuacán. Such a determination also would help us understand Teotihuacán's own political and ideological development. Second, we need to develop explanatory models of local evolutionary trends against the background of Teotihuacán interaction. This can be achieved by determining the degree to which Teotihuacán affected the dynamics of local political institutions and controlled the economies of other complex societies. Conversely, we need to know the extent to which local elites legitimized their power through the manipulation of goods and ideology imported from Teotihuacán.

In the published version, we first present a brief historical summary of the evidence for and speculations regarding interaction between Teotihuacán and the Guatemala South Coast. This provides the framework needed to better appreciate changing perceptions of Teotihuacán-Pacific Guatemala interaction. We then examine new findings from our regional projects conducted in Pacific Guatemala during the past two decades, and emphasize the contextual and chronological nature of central Mexican-style objects and symbols found during research. The findings are divided into two sections. The first covers the objectives and results of the Balberta Regional Project, which began in 1983 and 1984 and was followed by extensive excavations and controlled surveys over a wide area in 1986 to 1987. The next section focuses on the Montana Project of 1991 to 1992, which was followed by subsequent surveys and material analyses. The Balberta Project concentrated on the Guacalate and Colojate phases (the Terminal Formative to Early Classic transition), while the Montana Project focused on the Colojate and San Jerónimo phases (the Early-Middle Classic). These periods, roughly from 100 B.C. to about A.D. 650/700, coincide with increasing and waning Teotihuacán interests in the Pacific Coast. For both periods and regions our data are linked with local social, political, and economic variables. These show that regional political and economic shifts reflect changes in the dynamics of relations with central México. We argue that Teotihuacán ultimately achieved complete dominance of this section of the Pacific Coast, most likely through the dual processes of military victory and colonization.

The limited contextual evidence from the Pacific Coast of Guatemala combined with the obviously complex nature of Teotihuacán relations with it, Kaminaljuyú, and the Maya

lowlands, are the basis of a classic anthropological dilemma. To what extent was cultural change in the Maya area, including Pacific Guatemala, stimulated by interaction with Teotihuacán? Conversely, to what extent was it driven by local factors? We follow Stuart (1998; 2000) in reducing the myriad arguments to two theoretical camps that focus on *external factors* (e.g., commercial networks, intervention, military conquest, and foreign ideology) *or internal processes* (such as symbolic emulation). Complicating the issue is the changing nature of relations over the centuries of Teotihuacán-Maya interaction. The dilemma is analogous to the continuing debate regarding the status of the Olmec as a mother or a sister culture, and the related difficulty in modeling–much less quantifying–the complex processes of interaction (e.g. Clark, 1997; Flannery and Marcus, 2000; Grove, 1993; 1997; Hammond, 1989).

These results provide the basis for the following summary covering the research area in regional perspective. By the Early Classic period on the central coast, an early state-like polity was established centered at the Balberta regional capital. Through a series of monumental constructions and related demographic movements Balberta was transformed into a fortified regional center with political dominion over a wide area (Bove, 1990; Bove, Medrano, Lou and Arroyo, 1993). It is believed that the process was triggered by warfare when Balberta began to take over neighboring chiefdoms eventually turning them into subject provinces of a much larger polity in order to expand the financial base. This process was also stimulated to a significant degree by early and ongoing contacts with Teotihuacán.

The series of initial contacts with Teotihuacán during the Formative-Classic transition continued into the Early Classic culminating in the eventual military conquest and colonization of Escuintla by the Middle Classic San Jerónimo phase. The massive Montana site became the dominant regional capital with political and economic dominion over a large portion of Escuintla (Bove, 1999; Bove and Medrano, in press). This dramatic shift in orientation mirrors the extraordinary changes that occurred at Teotihuacán during the same period. Teotihuacán scholars believe that following an early period of autocratic rule, a shift occurred to collective, group-oriented or corporate leadership and at the same time, a new state-dominated ideology emerged (Cowgill, 1997; Millon, 1988; Pasztory, 1996; Sugiyama, 1998a). It is believed that the local population was incorporated into a Teotihuacán-centered polity most likely through an overt military incursion and conquest. The most likely model explaining these events is that "Teotihuacán established colonies in distant lands to exercise direct military power; these entered into local alliances, multiplying their own power by that of local allies" (Hassig, 1992).

Concurrent with these events was a massive desanctification of the potbelly and stela cults and all other classes of sculpture that resulted in the virtual absence of monumental art during all the Early and Middle Classic periods. This trend is surely related to the shifting ideological and power concern of the elite. Power and legitimization during this period were expressed principally through monumental construction and the sacred aspects of architectural arrangements and not with carved stone monuments depicting individual rulers (Bove, 2001a; 2001b; 2001c; Bove and Medrano, in press). The virtual absence of monumental art on the coast continued until

the collapse or withdrawal of Teotihuacán-oriented systems and the subsequent development of new social and political structures. This included a return to personalized rulership as glorified in the Pantaleón-phase monuments of Late to Terminal Classic Cotzumalguapa (Chinchilla, 1996a; Parsons, 1967; 1969; Popenoe de Hatch, 1989b).

It appears that by the time of Teotihuacán's collapse or shortly thereafter, there was a disruption of the centralized Montana political system whose core zone became more diffuse. The region formerly united during the San Jerónimo phase (Table 1) disintegrated into small competitive polities. The proliferation of "palangana-style" sunken ballcourts at relatively small acropolis-type sites such as Bolivia, Lirios 3, and Pantaleón phase Manantial exemplify this process of political fragmentation. It is during this phase that Cotzumalguapa became the dominant political and economic power center on the upper Guatemala coast (Chinchilla, 1996a; 1996b). Results of the Ceramic Resources Project clearly show that economic relations between Manantial and the Cotzumalguapa region were maintained during the Pantaleón phase, but it is difficult to prove that the lower coastal polities were either economically or politically dominated by the Cotzumalguapa State (Bove and Neff, in press; Neff and Bove, 1999). The process outlined here, however, very well may be a direct outcome of Teotihuacán's "withdrawal" from Pacific Guatemala and the eventual absorption of former colonists into the local population. The Cotzumalguapa state collapsed by the Terminal Classic (ca. A.D. 900) as all monumental construction and associated sculptural art ceased, a situation similar to large regions of the Lowland Maya (Bove, 1981).

A number of research questions are posed and answered in the published version using the new data and interpretations. Here only several models and research questions are presented. Following a model proposed by Cheek (1977a; 1977b) and Sanders (1977), the data from Balberta suggest that a period of occasional, economically-motivated contact led to more-frequent and periodic visits by trading expeditions from Teotihuacán. This process accounts for the sporadic finds of green obsidian, Thin Orange, and imported fine paste ceramics at Balberta and within both the Paryjuyu and Tiquisate zones during the Guacalate and Colojate phases. Succeeding stages of military conquest and colonization by both men and women from Teotihuacán fit the Colojate to San Jerónimo-phase data from Montana.

Were actual Teotihuacanos attracted to the region? If so, was the interaction initially reciprocal—for example, involving some type of exchange between "equals"? Was the interaction direct, or was it mediated by some other center such as Kaminaljuyú? Were these Pacific Coast Guatemalans incorporated into some sort of Teotihuacán "realm"? Were they actually conquered or just economically tied to central México? Did Teotihuacán dominate the economy or political structure of central Escuintla? Did local centralization and political hierarchy increase because of the presence of a more powerful neighbor in the highlands? Did the local state become more centralized before the Teotihuacán epoch and maintain its autonomy like Oaxaca? Did local political power develop after the decline of Teotihuacán, suggesting that local elites obtained greater

wealth and power in the vacuum left by the withdrawal of the great highland state from local affairs?

Based on the answers developed from the extensive research We now are convinced that Teotihuacanos arrived on the south coast in significant numbers, and brought with them a powerful new ideology and sufficient military prowess–perhaps combined in the notion of sacred war–to interact intensively with the local elites of central Escuintla. An actual military conquest has yet to be proven and more research is required. But we now suspect that such an event did take place and resulted in the establishment of Teotihuacán colonies at Montana and other nearby sites, including Ixtepeque in the Tiquisate zone.

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The Archaeology of Late Postclassic Settlements on the Guatemala Pacific Coast

Frederick J. Bove

In *Incidents of Archaeology in Central America and Yucatán: Essays in Honor of Edwin M. Shook*, edited by M. Love, M.P. de Hatch, & H. Escobedo. University Press of America, Landham, MD. In press.

Abstract

Dynamic transitional phases are a recurring feature of prehispanic societies and these robust periods mark critically important developmental stages in the evolution of Mesoamerican civilization. One of these, the Postclassic period in Mesoamerica, was one of massive social, political, economic, and demographic upheaval following the disintegration of Classic period polities in central México, Oaxaca, the Gulf Coast, and the Petén. An important fundamental causal factor of this dramatic change is the aftermath of Teotihuacán's withdrawal and/or collapse as an integrative force throughout Mesoamerica, a process that brought about fundamental changes in ideology, increasing regionalization, and warfare (Diehl and Berlo, 1989). Andrews (1990) believed that the Classic-Postclassic transitional period was "a time of momentous change, of great social stress exacerbated by foreign influences, migrations, invasions, and warfare." A noted ethnohistorian remarked "the Epiclassic period was marked by the disintegration of the theocratic classic world and the appearance of new militaristic cultures. A great crisis shakes Mesoamerica from end to end, and in the midst of the chaos, a new world germinates" (Jiménez Moreno, 1966). Until recently emphasis was placed on the seeming deterioration of Postclassic Mesoamerican society but this view is no longer acceptable and a more complex picture has evolved. For example in the Lowland Maya area "Decline, decadence, and depopulation" are three terms that have long been used to describe the Maya Postclassic but these processes are refuted by recent research (Chase and Chase, 1985; Rice, 1986a; Rice, 1986b).

Three broad trends can now be recognized for the Postclassic period. These are a decentralization of political and ideological structures, development of pan-Mesoamerican economic systems, and the emergence of more uniform ideological/symbolic systems (Gasco, 1987; Hodge and Smith, 1994; Sabloff and Andrews V, 1986; Smith and Hodge, 1994). For the Postclassic Maya, Freidel (1985; 1986) links "…innovation of the tribute-government and the development of a market economy" to the "dismantling of the "great wall" of cultural distinctiveness and the attempted incorporation of the lowlands into a Mesoamerican international culture." According to Marcus (1983) "The Late Postclassic period also had aspects of genuine "internationalism", ceramic complexes became extremely widespread, with some wares crosscutting many ethnic boundaries." The causes of these cataclysmic events are obscure. Models emphasizing the political aspects have developed that focus on the

fragility and cyclical nature of Mesoamerican complex societies (Flannery, 1999; Freidel, 1983; Hassig, 1992; Love, 2001; Montmollin, 1989). The great cycles of centralization and decentralization, the widespread breakdown of centralized political systems, and the subsequent reorganization of city-states are also being examined (e.g. Marcus, 1992).

One salient fact that must be considered is the Nahua migrations from central México and the Gulf Coast to the Soconusco region, the Pacific Coast of Guatemala, and lower Central America. "The migrations of Nahua-speaking groups from México to Central America are perhaps one of the best known examples of large-scale population movements in New World culture history" (Fowler, 1989b; 1989a). While the dating of these migrations is still debatable most experts would probably agree that the historical, linguistic, and archaeological evidence indicate that the Nahua migrations to Central America were a complex series of population movements that occurred from about A.D. 800 to A.D. 1350 (Davies, 1977; Fowler, 1989a; Justeson, 1985; Torquemada, 1969; Voorhies, 1989a). They had a profound impact on much of Postclassic Mesoamerica and in particular Pacific Guatemala. The unexpected discovery of large Late Postclassic centers distributed non-randomly on the central Pacific Coast in the past decade are the subject of the contribution to the Shook volume (Figure 1). The preliminary evidence suggests that these sites represent a large-scale migration of Nahua (Pipil) speaking populations most likely from the Soconusco region at about A.D. 1100-1200.

Terminal Classic-Early Postclassic Transition

The results of the earlier Texas-Montana and Cotzumalguapa projects supported an existing belief in a widespread social and demographic collapse that terminated at the beginning of the traditional Early Postclassic period (ca. A.D. 900). As Shook (1965) stated "There is no certain record to date of an Early Postclassic site in the 0-300 m elevation zone of the South Coast." These processes were believed linked with increasing factionalism in the Terminal Classic concurrent with a dramatic trend toward decentralization and severe depopulation by the Early Postclassic. The only conclusion was that by about A.D. 850-900 there were not only an elite cultural collapse but also a massive depopulation shortly thereafter as we were unable to securely identify Early Postclassic sites.

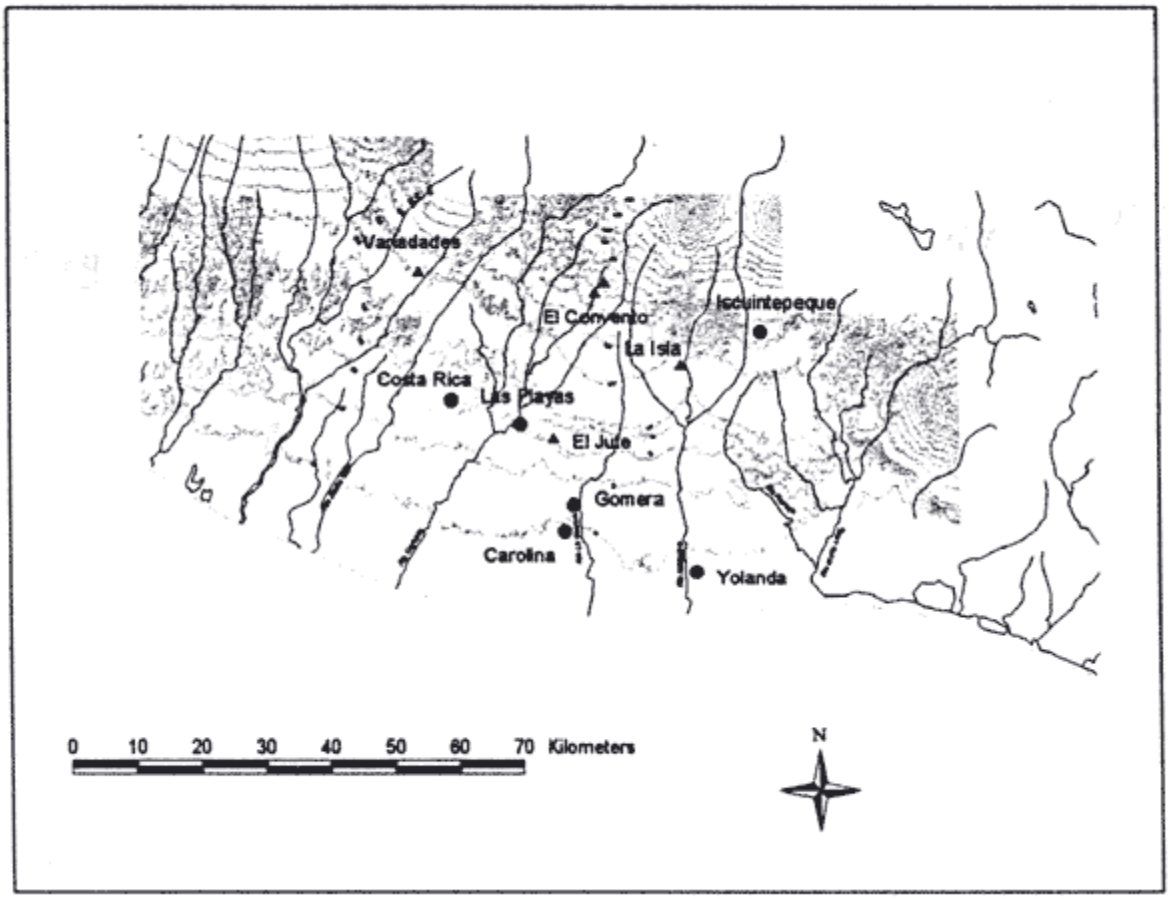

Figure 1. Late Postclassic Sites, Pacific Guatemala.

We were also left with a troublesome analytical problem. What precisely did constitute the Early Postclassic period on the Guatemala Pacific Coast since the only chronological ceramic marker available was Tohil Plumbate ware? Fortunately, the continuing research on the entire Plumbate problem by Neff helped to formulate a different view of the Classic-Postclassic period. Through Neff's research we now recognize that Tohil and San Juan Plumbate are easy to separate into two distinct compositional groups. Tohil as a compositional group, however, does not correspond very well with Tohil as a stylistic unit made up of fancy incised or effigy vessels. The simple vessels in both compositional categories, that is in both San Juan and Tohil, occur with other good Late and Terminal Classic diagnostics on the South Coast. It is estimated that Tohil (defined as a compositional unit), arrives at the same time as San Juan, most likely around A.D. 700-800. The fancy incised and effigy Tohil Plumbate, however, are late and probably brief manifestations within the Plumbate tradition (Neff, 1989; Neff and Bishop, 1988; Neff, Bishop and Harbottle, 1989; Voorhies, 1989b) (H. Neff, personal communication, 2000). In this scenario the innovative Tohil vessels come in at the end of the Pantaleón phase and mark the dividing line between the old Early Postclassic and Late Postclassic periods. These findings combined with the new data from our Late Postclassic surveys led to the currently favored working hypothesis which

is to include the old Early Postclassic period into the Late-Terminal Classic Pantaleón ceramic phase (Table 1). It is believed that the Pantaleón phase gradually fades away and is replaced by a completely new ceramic Late Postclassic Ixtacapa phase.

Table 1. Ceramic Phases–Classic and Postclassic Periods

PERIOD		PHASE
Postclassic	Late A.D. 1100/1200-1500	Ixtacapa
	Early	Pantaleón
Classic	Late A.D. 650/700 – A.D. 1100/1150	
	Middle A.D. 400 – 650/700	San Jerónimo
	Early A.D. 100/200 – 400	Colojate

Ceramics and Chronology

The Ixtacapa phase (A.D. 1100/1200-1500) is equivalent to the Ixcaflores phase of the southeastern Guatemala coast (Santa Rosa and Jutiapa) and the Peor-es-Nada phase at Bilbao in the Cotzumalguapa zone (Kosakowsky, Belli and Pettit, 2000; Parsons, 1967). The brief ceramic summaries that follow cover the principal groups and/or types from the region and are excerpted from a much larger and detailed study of the ceramic chronology of Pacific Guatemala (Bove, m.s.). The summaries do not include several types that have yet to be fully analyzed and that may alter to a degree some of the tentative conclusions that appear here. These would include types that are provisionally named Postclassic or Late Postclassic Miscellaneous, Red, Polished Black Brown, Sandy Paste, Fine Paste, and Red-on-White. Almost all of these ceramics are from upper lots of Texas-Montana and Manantial domestic structures. The Red-on-White ceramics in particular may eventually be incorporated either into the Remanso Group or a new group or type as they bear similarities to other Late Postclassic Red-on-White pottery found at Bilbao (e.g. Parsons, 1967).

The Late Postclassic ceramics from the South Coast are poorly known with the only published descriptions in Parsons Bilbao reports. Parsons speculated that the Peor-es-Nada complex was probably derived from the highlands based on its ephemeral nature since the collection at Bilbao consisted of only 423 sherds, or 2.3% of the site total. My classification, aided principally by the Texas-Montana Project ceramicists Licda. Sonia Medrano and Lic. José Genovéz, was also aided by descriptions in Wauchope (1970) and Navarrete (1962). No radiocarbon dates are available from any Postclassic site on the Pacific Coast so that chronologies are based predominantly on cross-ceramic comparisons and stratigraphic excavations. A number of obsidian hydration readings tend to support the dating of the Ixtacapa complex although the fundamental equations that were previously acceptable for the obsidian hydration model are now known to be incorrect. The position of the optical boundary also varies relative to the true diffusion front and is therefore inherently imprecise and cannot be used for accurate dating. These dates are therefore not included here (Anovitz, Elam, Riciputi and Cole, 1999) (Hector Neff, personal communication, 1997).

One example of the summaries of the principal characteristics of ceramic groups/types for the Late Postclassic Ixtacapa ceramic phase that appear in the published version are reproduced below.

1-Ceramic Group: Santa Rita Group

2-Ceramic Types: Santa Rita Micaceous, Santa Rita Jabonoso

3-Principal Characteristics: This is the most abundant ceramic group in the Cotzumalguapa region during the Ixtacapa phase although the group may have originated during the late aspect of the preceding Pantaleón phase because contexts of excavated units with abundant Santa Rita types often include Pantaleón phase pottery. The most distinguishing feature is the readily observable presence of mica (or steatite?) on the surface and in the paste. The major difference between the two types is that while Micaceous has some mica within the paste, the Jabonoso type is completely saturated with it and has a distinctly soapy feel. Santa Rita Micaceous accounted for 89% of the Late Postclassic Peor-es-Nada phase at Bilbao, although only 2.2% of the site total (Parsons, 1967). Navarrete has a good description of the Micácea type at Mixco Viejo that represented 28% of all ceramics from that site (Navarrete, 1962). Mica Ware is described by Wauchope (1970) who mentions a number of highland proveniences. High percentages of a Santa Rita Micaceous equivalent are found at the Late Postclassic Chitak Tzak site in the Sumpango Valley of the adjacent Guatemala highlands. These are El Poaquil Micáceo, Variedad Poaquil and account for from 40-80% of the total ceramics recovered depending on location (Robinson, 1994; 1998). Based on the principal of abundance alone it would appear to be of highland origin. Parsons believes that "Its rarity or absence during the Early Postclassic Tohil phase at Zacualpa (Wauchope, 1948) would indicate that this ware became popular only during the Late Postclassic period" (Parsons, 1967). Santa Rita types are extremely rare at lower coastal sites. Only six sherds of Santa Rita Micaceous were found at five lower coastal sites and only four sherds of Santa Rita Jabonoso from three lower sites. These numbers represent insignificant fractions of the total Santa Rita sherd count. A sample

of 12 Santa Rita Micaceous sherds was analyzed via instrumental neutron activation at MURR. All were manufactured from raw material sources near the upper piedmont Cotzumalguapa zone or perhaps higher up toward the highlands.

Settlements

The published version contains detailed descriptions and maps of the major Late Postclassic regional centers as well as several smaller rural centers. These are not summarized here. In addition to these, approximately 50 sites with some Ixtacapa phase pottery have been identified covering virtually the entire research area of central Escuintla. The documentary sources identify a number of Pipil towns occupied in the immediate aftermath of the conquest. The unpublished Cerrato Tasaciones de Tributos provides some data on 19 Pipil towns in the Escuintla and Santa Rosa departments and it contains "the earliest intact set of tribute assessments in existence" (Fowler, 1989a). Feldman (1974) lists 21 Pipil tribute payers in the early Colonial period and Orrelana (1995) contains some data on 30 towns. Feldman (1989) has demonstrated that a wealth of documentation exists for the research area apart from the better-known Archivo General de América Central (Guatemala City) or the Archivo General de Indias (Seville) both of which still contain vast quantities of uncataloged documents. There are a host of useful records such as census, tax assessments, and land titles that should be examined to shed light on the probable existence and location of sites and perhaps residual lineages.

Discussion

Since no project has ever focused on the Postclassic period in Pacific Guatemala the research involved in the preparation of this paper raised a number of critical issues that are reflected to some degree in the printed version. These unresolved questions have resulted in the decision to conduct a regional project focused on the Postclassic period in Pacific Guatemala that is now under preparation. I close with a partial list of research questions to be addressed by the proposed project. What were the temporal parameters of the Pipil settlement system? What was the nature of the Pipil migration? Is there evidence for a mass migration or did it take place over several centuries? Was the migration principally an elite move or were all facets of Pipil population involved? Can an earlier Postclassic presence be substantiated and if so is it due to residual local populations extending from the Pantaleón phase or the early beginnings of the Pipil movements? Assuming that local populations continued to inhabit some portion of the research zone, were they absorbed and integrated within the Pipil occupied area or were they pushed out? If partially absorbed, is there evidence for barrios of previously local inhabitants? Were the Pipil migrations causal or epiphenomenal in the collapse of Late-Terminal Classic society at Cotzumalguapa and the lower coastal city-states? What was the nature of Pipil sociopolitical organization and how was it characterized in the regional settlement system? Did the Pipil sociopolitical organization mirror Nahua

city-state units of social organization and if so to what degree, or were new forms of social life generated? Are the elites concentrated only within the larger regional centers or is there evidence for elite residences in the rural hinterland (B.L. Stark, personal communication) (Chase and Chase, 1992). Do the Late Postclassic Pipil of the Pacific Coast show evidence of divergent evolution and non-adaptive drift? Is social stratification increasing during the three centuries of the Ixtacapa phase? Do significant differences exist between "altepetl" in terms of size and wealth and are the differences related to environmental differences? Do the Pipil polities become more centralized or more fragmented toward the end of the Late Postclassic when hostilities with the Kachiquel (and K'iche) are documented and the Pipil area was reportedly reduced? Is there archaeological evidence of warfare with these groups as well as the Xinca? How were the Pipil societies economically integrated? What evidence exists for economic specialization, its organization and control by elites, and participation in pan-Mesoamerican networks in such commodities as cacao and salt? To what degree did the Pipil region participate in the enormous Postclassic trade and tribute payment of cotton? Was the production and processing of cotton fiber largely controlled by elites at either major centers or specialized rural settlements? What is the nature of obsidian procurement, exchange, and tool production? Do elites control the procurement and production phase? Is there evidence of a mixed strategy with households able to independently procure raw or partially finished materials? How are these processes affected by concepts of modularity?

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Plain Stelae of the Guatemala Pacific Coast: An Interpretation

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Abstract

> "An interesting and lesser known aspect of Middle to Late Preclassic times is the association of mounds with uncarved, usually plain columnar basalt stelae. Of the 35 Preclassic Central Highland sites listed by Shook (1952b), at least 13 have yielded such stelae…They range from slender shafts of columnar basalt to large, roughly shaped stelae. They stand in front of low platform mounds, erected in parallel north south rows" (Borhegyi, 1965).
>
> "By Middle Pre-classic times, a trait had become established in the Highlands and South Coast of Guatemala…that of erecting plain stelae in towns and cities. These stelae may be exceedingly rough unmarked shafts of stone, unworked sections of columnar basalt, or partly well shaped and dressed stones in the typical stela form. They were erected in formal positions in courts or plazas, at the base, on the frontal slope, or on top of the earthen substructures" (Shook, 1971).

The Guatemala Pacific Coast is known for its rich sculptural tradition ranging from boulder sculptures including potbellies, heads, long count dated monuments, elaborate altars, the beautifully carved headless sculptures from Sin Cabezas, monuments with representations of personages, and the extraordinary collection of Cotzumalguapa style Late Classic monuments (Chinchilla, 1996a; 1996b; Coe, 1957; Graham, 1989; Grove, 1993; Kappelman, 1997; Lowe, Thomas A. Lee and Espinosa, 1982; Miles, 1965; Orrego Corzo, 1988; 1997; Orrego Corzo and Schieber de Lavarreda, 2000; Parsons, 1969; 1981; 1986; Popenoe de Hatch, 1989a; 1989b; Rodas, 1993). But one class of monuments has been seriously neglected until now the plain stelae (and altars) of the Guatemala Pacific Coast (and adjacent highlands) of which Borhegyi and Shook spoke. And while Borhegyi (1965) stated that Late Preclassic plain stelae are known only sporadically outside the Central Highlands, the newer data now available will show that they are also amply distributed on the Guatemala Pacific Coast.

Their function(s) is speculative. They could have served as commemorative markers of specific events, dedicated to political rulers, calendrical-astronomical markers, ritual but non-calendrical memorials, or some combination. Functions could also have been associated principally or only with specific ethnic/linguistic groups and not with others. Complicating these interpretations further is that their function(s) could have evolved into different usage through time.

The preliminary findings are presented in the published version as an interim report, which although incomplete, is part of a larger study in progress. The printed version includes an inventory of all sites with plain stelae (and altars) of Formative and Classic period sites on the Southern Coast of Guatemala. The site list is presented alphabetically instead of chronologically, as temporal placement in several cases is uncertain. The data includes site maps (or references), UTM coordinates, and monument locations when known. These data include the number, dimensions, and illustrative references of plain stelae when possible. Sources of data, other than my own regional project, rely heavily on Edwin Shook's site records and field notes accumulated during his many years of fieldwork on the Pacific Coast and adjacent highlands. These are accessible through the Shook archive at the Universidad del Valle de Guatemala directed by Dr. Marion Popenoe de Hatch. The descriptions are also supplemented by recent research on the South Coast, Estrada Belli (1999) on the southeastern coast and for the western coastal area (Love, 1989; Love, Castillo and Balcárcel, 1996).

The site inventory in the published version is presented in two sections with the proviso that it is not exhaustive. The first section includes all sites with reported monuments whether or not they are still present (exist). In the past several decades there has been widespread looting, continual destruction through intensive agricultural operations, and modern encroachment of coastal sites. All too often sites with previously known monuments (or at least reported by informants) are virtually destroyed and monuments can no longer be located. Presumably many were sold to collectors and reside in someone's patio. The second list is comprised of large Formative centers that represent primary and secondary integral elements of complex regional hierarchies but lack plain stelae. Reasons for their absence are complex and may possibly be due to the fact that existing monuments that had not been reported earlier are now gone or perhaps there are regional cultural, ethnic, or temporal differences that condition their use. A distributional map indicates that the later suggestion has considerable merit (Figure 1).

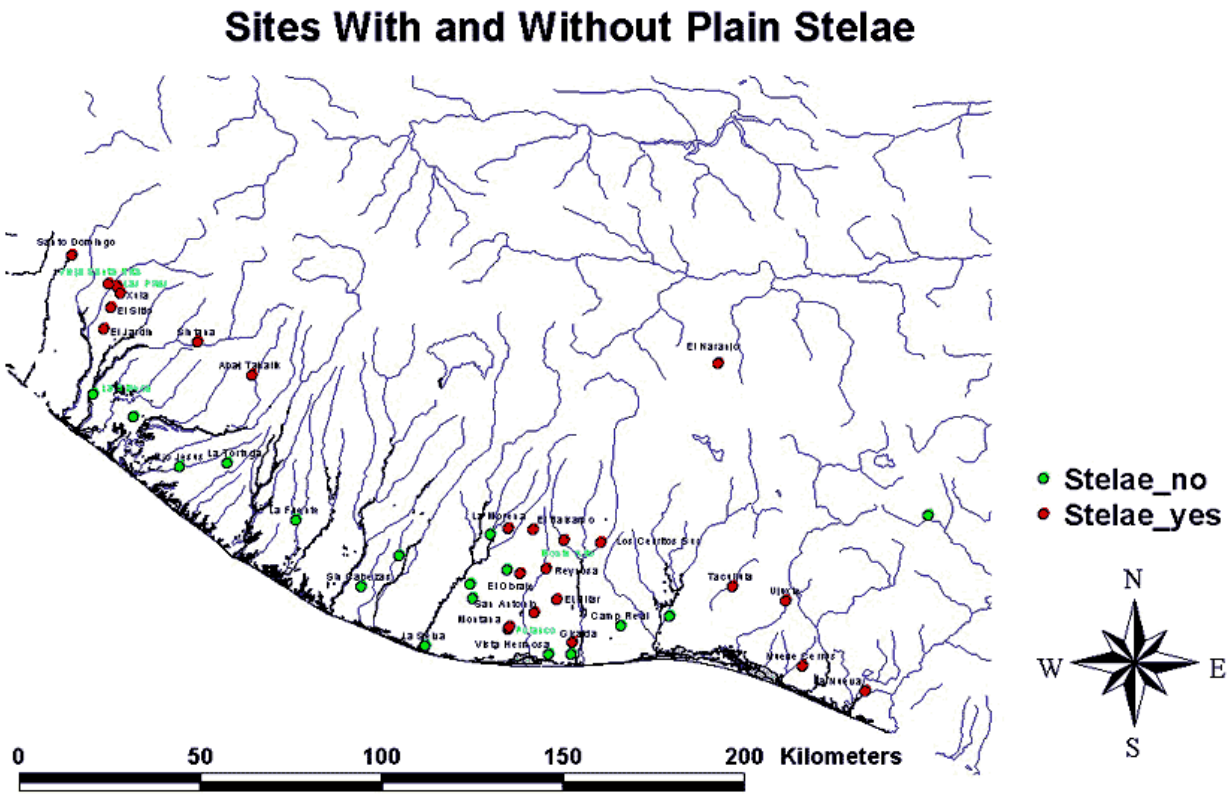

Figure 1. Sites with and without plain stela on the Guatemala Pacific Coast.

An example of the type of data appearing in the printed version is included here:

Monte Alto (UTM 722341E, 1573508N)

A large predominately Late Formative regional center thoroughly investigated by Shook and Parsons over two lengthy field seasons in 1969-70 or 68-69 (Parsons, 1976; 1981; Popenoe de Hatch, 1989a; Shook and Hatch, 1981). There is a light Early to Middle Formative presence but significantly less than either El Bálsamo or Los Cerritos-Sur located about 10 km west and east of Monte Alto respectively. There is also a substantial Early Classic occupation but it is largely localized at Structure 6, a large platform located well to the northeast. Although Monte Alto is noted for its corpus of boulder sculptures (heads and potbellies), Parsons (1976) states that more than a dozen tabular shaped stone stelae were found as well as two stone altars. Shook (1971) reports that 15 plain stelae were recorded at Monte Alto and that one alignment of three large plain stelae erected in a north south line could have served astronomical purposes as a means for recording days and the position of the sun for agricultural purposes. Shook noted that the azimuth from the principal pyramid to the south stela marked the winter solstice on December 21. The sun rose over the central stela on February 19 which at the time meant little to him. Popenoe de Hatch became interested in the problem recently and stated that February 19 at midnight marks the eastern elongation of Eta Draconis during the Late Preclassic period (Popenoe de Hatch,

personal communication, 2000). According to Hatch, Eta Draconis shows unusual stability and that from 1800 B.C. to A.D. 500 the annual date of its meridian midnight transit varied less than one day (Popenoe de Hatch, 1975). She has shown that alignments of certain monuments at Abaj Takalik also mark the eastern elongation of Eta Draconis at various periods during Abaj Takalik's existence. This work builds on research that produced startling results when using alignments at La Venta in the Early Formative. The La Venta site was found to be oriented toward the setting azimuth of CP Ursae Major apparently because its meridian transit and point of contact with the horizon occurred at midnight of the summer solstice so that the solar year was keyed to the sidereal year (Popenoe de Hatch, 1971).

In attempting to temporally place the plain stelae, Parsons was of the opinion that "However it is more probable that the plain stone stelae and altars do represent the Terminal Preclassic ("Izapa") period" (Parsons, 1976). He later reiterated this belief in a detailed and perceptive review of the origins of Maya art.

> Another common class of sculpture at Monte Alto is the group of plain stone stelae (fifteen) and plain round altars (three). Considering the abundance of both plain and carved stelae and altars at Terminal Preclassic Izapa, it could be conjectured that these represent the true sculptural effort contemporary with the major occupation phase at Monte Alto–with the boulder sculptures having been reset from the Post-Olmec phase when the site was first established. Even the basic central site layout follows the terminal Middle Preclassic pattern, with parallel north-south plazas flanked by platforms and mounds (cf. The Providencia phase mound grouping at KJ). (Parsons, 1986).

The astronomical data and research of Popenoe de Hatch independently and fully support the Late Formative dating of the monuments.

Chronology

There is no unequivocal evidence that plain stelae were being used in the early Middle Formative period although several sites with significant evidence for occupation during this period have stelae. These are Los Cerritos-Sur, El Bálsamo, and Reynosa and to a lesser extent Monte Alto and El Pilar. The evidence seems to favor a slightly later placement, most likely in the late aspect of the Middle Formative and certainly throughout the Late Formative. Shook, however, believed that:

The erection of stelae, sometimes in position for astronomical observations, was a well established practice…during Middle Preclassic times, long before this trait became so prominent in the Lowland Maya area during the Classic period (Shook, 1971).

Borhegyi (1965) was of the opinion that the ceremonial use of plain stelae was most probable in their Middle Preclassic Providencia phase (ca. 600-300 B.C.). The Late Formative period (ca. 400-100 B.C.) currently in favor for the Pacific Coast ceramic chronology overlaps to some extent the Kaminaljuyú Providencia phase. Parsons found

a Late to Terminal Formative period as the most likely period of maximum distribution, a period that correlates highly with our current data.

Spatial Distribution

There are striking differences in the spatial distribution of sites with, and sites without, plain stelae during the same chronological span as shown on Figure 1.

My regional research combined with colleagues over the past several decades suggests that there were marked cultural differences across the Pacific Coast from the earliest times. In the Early Formative period differential ceramic styles emerge and while I am always uncomfortable with attempting to link too facilely ceramic styles with specific ethnic or linguistic groups, in this instance it seems to have merit. It had been fashionable, for example, to show that the Mixe-Zoque were present across the entire lower coast in the Early-Middle Formative periods. This view is no longer accepted by most archaeologists, at least east of the San Marcos and possibly Retalhuleu departments. While the specific linguistic relationships are open to question there is no doubt that considerable differences existed along the Guatemala littoral.

Over the past 15 years Popenoe de Hatch, aided by students, developed a model that attempts to show how a series of ceramic traditions emerged not only on the Pacific Coast but also along the piedmont and adjacent highlands (e.g. Herrick de Herrera, 1995; Popenoe de Hatch and Shook, 1999). The most interesting for this discussion are the Achiguate, Naranjo, and Ocosito ceramic traditions. Acceptance of the model has not been complete and for some time I have been somewhat uncomfortable with the broad generalizations that such a model require. There is little question, however, that the Ocosito and Achiguate ceramic traditions which have broad similarities correlate closely with the spatial distribution of sites with plain stelae. And the Naranjo ceramic tradition also tends to correlate with sites without plain stelae at least on the western Guatemala coast. There seems to be, therefore, a broad relationship of some type between the spatial distribution of sites with and without plain stelae and the ceramic tradition model proposed by Popenoe de Hatch. A relationship I hasten to add that is *independently derived* (i.e., non-ceramic) and one that has given me pause to rethink the entire problem of how best to distinguish ethnic or linguistic groups.

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Economic Interaction and Political History: A Chemical Compositional Approach

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Abstract

A review of ceramic characterization by Bishop (1994) suggested that it was most often attempted on a particular class of pottery or by reference to a specific site or time period. There is, however, an increasing reliance on the use of trend data as the basis for archaeological interpretation. Innovative studies by one of us (Neff) successfully characterized the circulation of ceramics based on individual-specimen provenance by adapting standard approaches to single-specimen "groups" so that each ceramic pertains to a single-specimen "group" thus permitting the generation of individual-specimen probability surfaces. Using this methodology, we show how regional ceramic resource procurement and exchange relations that are independent of standard typological approaches can be a useful aid in the development of regional evolutionary models and in reconstructing the political history of the Pacific Coast of Guatemala during the Middle-Late Classic period.

Introduction

The research stems from our recent projects at Texas-Montana (formerly Los Chatos-Manantial) and Cotzumalguapa, two regional states on the central Escuintla, Guatemala Pacific Coast during the Middle-Terminal Classic periods (ca. A.D. 400-900/1000). We are especially interested in understanding the shifting nature of political competition and social-economic relations between the two regional polities during these periods. Available evidence suggests that the Texas-Montana core zone at its Middle Classic height of power (A.D. 400-700) probably controlled an area stretching from the Río Coyolate, including the Paryjuyu zone, to the east side of the Río Achiguate, and possibly as far north as Cristóbal and Los Cerritos-Norte. It is likely that at some point during the Middle Classic period, it either exercised dominion over, or had more intense ties with Cotzumalguapa. Beginning at about the end of the Middle Classic San Jerónimo phase (ca. A.D. 650-700) there was apparently a breakdown of the centralized political system headed by the Texas-Montana core into small competitive polities analogous to small city-states in the Terminal Classic Pantaleón phase (Bove, 1994; Bove and Medrano, in press).

Coincident with this transformation is the rise of the Cotzumalguapa state during the Late Classic period (A.D. 700-900/1000). The nuclear zone, comprised of Bilbao-El Baúl and associated El Castillo groups, is located 40 km north of Texas-Montana and centralized to a considerable extent. This zone contains an overwhelming percentage of major architecture and sculptures within a continuous settlement area. Major centers such as Palo Gordo and Los Cerritos-Norte are located at some distance but its influence in the form of monumental sculpture can be found as far as the El Salvador frontier. A potentially important factor is that the Cotzumalguapa state is largely a piedmont phenomenon in contrast to the lower coastal oriented Texas-Montana polity.

Our working hypothesis is that the two polities were politically and economically independent in the Late-Terminal Classic period. This interpretation is based on significantly different settlement patterns and architectural arrangements of contemporary site systems as well as somewhat different ceramic complexes although many attributes are shared. Another major factor is the spatial distribution of the unique Cotzumalguapa sculptural art style considered an expression of nuclear zone political ideology (Chinchilla, 1996a). There is some evidence for a single overarching domain in the Middle Classic that would have included the Cotzumalguapa nuclear zone within the Texas-Montana sphere. However, the extent to which residents of the two political units participated in similar or different economic networks are the research questions we address in this study.

Two alternative approaches are typically used. The first is to form reference groups of "knowns" by intensively sampling sources sufficient to estimate within-source variation and then to source artifacts or ("unknowns") by comparison with a series of known groups. This is a practical approach when raw materials occur in localized flows, or if potters exploited local resources preferentially. But where clays are practically ubiquitous, such as Pacific Guatemala, it is in fact difficult or impractical to obtain a large enough sample that represents the range of variation in most, or in all clay sources. A second alternative approach is to use pattern-recognition and statistical group-refinement techniques to form reference groups of "unknowns", and then to compare a series of "knowns" (i.e. source materials) to unknowns. The locations where raw materials are found within the range of group variation are most likely to contain the sources of ceramics in the reference groups. This method is the so-called standard approach to ceramic sourcing and chemical compositional analysis.

Pacific Coast Ceramic Resource Project

One of the reasons we believed that a chemical compositionally oriented project was potentially feasible for Pacific Guatemala ceramics is due to its unique geological and climatological characteristics. Although it appears superficially on maps as largely a homogenous alluvial plain it is an extremely dynamic area. The chain of quaternary volcanoes and accompanying slopes contains broadly deposited volcanic ash and other debris and are subject to tremendous annual rainfalls (Bishop, 1994). The combination of torrential rainfall and steep, locally unvegetated slopes provides abundant bed load to

high-gradient, low-sinuosity braided streams discharging on the coastal plain. The resulting wide coastal strip is therefore thickly covered with fluvial sediments ranging from fine, well-stratified volcanic sands, silts, and clays to coarse, bouldery, unstratified accumulations left by torrential lahares with increasing fineness of deposits and degree of sorting toward the coast (Williams, 1960).

Bishop (1994) observed, "as a result of the sedimentary conditions this is an area that is not readily seen as conducive to a compositionally based investigation." It was believed, however, that the chemical variation presumably present in the highlands and adjacent southern slopes could show significant variation in the chemical signature of clays, sands, and ashes as erosion in the respective areas carried these materials south toward the Pacific Ocean.

Early research was undertaken of Pacific coastal ceramics for neutron activation analysis in the late 1970's and early 1980's initially by Frederick J. Bove, Arthur A. Demarest, and Barbara L. Stark. These analyses were carried out at Brookhaven National Laboratory (BNL) under the direction of Ronald L. Bishop (e.g. Bishop, Demarest and Sharer, 1989; Neff and Bishop, 1988; Neff, Bishop and Bove, 1989; Neff, Bishop and Harbottle, 1989; Stark *et al.*, 1985). The preliminary results indicated that compositional subgroups should be recognized. Consequently a program of ceramic raw material sampling combined with a substantially larger ceramic sampling program was begun in 1987 with major survey conducted in 1991 and intermittently since under the direction of Neff and associates (Neff, Bove, Lou and Piechowski, 1992). These analyses were carried out at the University of Missouri Research Reactor Facility (MURR). The total MURR database now exceeds 2000 ceramic and 300 raw material analyses. The sample ranges geographically from the western Guatemala coast to the El Salvador border with additional samples from the adjacent highlands principally in the vicinity of Kaminaljuyú and the Panchoy and Sumpango valleys directly north of the central Escuintla, Guatemala coast.

It is important to emphasize the underlying premise of this research given the above conditions which is "to the extent that regional trends are characterized adequately, any particular ceramic compositional profile may be assigned to a likely zone of origin within the region, even though, in the vast majority of cases, the exact locations exploited by ancient potters will not have been sampled" (Neff, Bove, Lou and Piechowski, 1992). As observed in Figure 1, Principal Component 1 (PC1) captures a strong west-to-east trend on sampled clays and it is possible to distinguish clays at both extremes with the highest scores at the eastern end and lower on the western although an obvious continuous gradation exists. It is important to point out that the total analyzed pottery sample from central Escuintla overlaps almost entirely with analyzed clays indicating that the ancient potters did in fact use the same range of raw materials that we sampled. However, the same plot also shows that the addition of ash temper tends to make the ceramic look more "western" while sand tempers tend toward a more eastern profile. Therefore the effect of temper must also be taken into account.

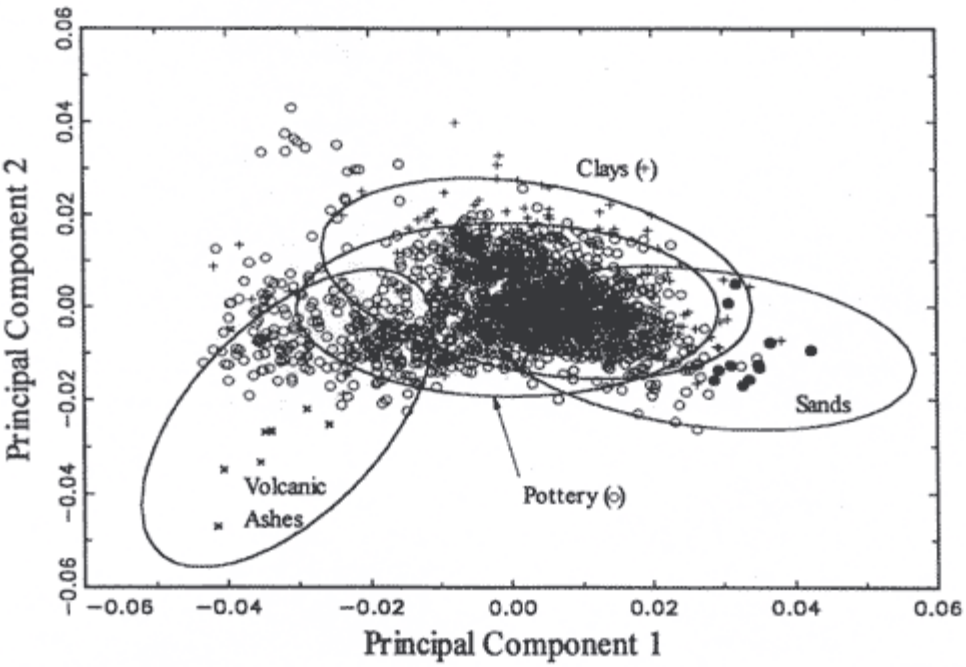

Figure 1. Principal Component Analysis of Pottery, Tempers, and Sampled Clays.

The earlier research can be summarized as follows. In Pacific Guatemala where ceramic raw materials generally vary along a continuum with few discontinuities, the standard approach to chemical compositional analysis is severely limited as subgroups can only be defined by an arbitrary partition of the compositional continuum. These partitions not only represent production zones that include a number of sources as well as a number of paste recipes but the geographic meaning of the groups also shifts as group membership changes. Ultimately, the only non-arbitrary partition of the continuum is one that places every individual specimen in its own group. This approach would eliminate uncertainty in source assignments that arise from the inclusion of ceramics from multiple sources in groups obtained by arbitrary partition.

A method was developed that more realistically models the ceramic environment by adapting the standard approach to accommodate the possibility that each ceramic may be linked to its own unique or specific source. In addition the effect of temper is explicitly modeled by calculating best-fit mixtures of geographically proximate clays and tempers (or none) to compare to each individual ceramic composition. The methodology is described in detail elsewhere and is not repeated here except to state that maps representing the likelihood that a given location contains the source of a given pot are generated for each and every analyzed sample in a collection, and then all the maps for a given collection are amalgamated into a composite (Neff and Bove, 1999).

Characterizing Circulation of Ceramics–New Approach

But how can this variation be described to facilitate testing of hypotheses concerning spatial and temporal production and consumption variation? (And more importantly as archaeologists to the shifting nature of political and economic networks.) Generally the information on sources of pottery can be consolidated by defining classes of analyzed ceramics by criteria other than composition and then comparing these classes as they relate to the geographic space indicated by the source data. We believe that a major strength of our approach is that, because it assesses provenance on a specimen-by-specimen basis, it provides a monitor of ceramic resource use and circulation that is completely independent of other evidence such as is typically embodied in ceramic typologies. The resulting data are therefore independent of preconceived culture historical approaches.

To best illustrate the new approach we analyzed approximately 600 examples of serving vessels derived from a number of sites across the study region and presumed to be chronologically concordant dating generally to the Middle-Terminal Classic period (ca. A.D. 400-1000). We tested the hypothesis that geographic location determines access to serving vessel production centers and stems from the expectation that consumption location or sites should be a good predictor of similarity in access to production zones. Results of the analysis suggested, however, that Paraiso and Lirios 3 are grouped together at one extreme of principal component space, whereas Los Chatos-Manantial is grouped with Castillo-Cotzumalguapa. This finding contradicted our initial expectations that political independence would also imply a high degree of economic competition based on the working hypothesis that the two polities of Los Chatos-Manantial and Cotzumalguapa were politically and possibly economically independent (competitive) in the Late-Terminal Classic period (Bove and Neff, 1998; Neff and Bove, 1999). The ramifications of these results continue to be explored in detail and we are in the process of augmenting the individual-specimen sourcing data within the framework of further refinements in ceramic typology and chronology emerging across the region. Ultimately we hope that that our models can accommodate multiple lines of independent evidence including the incorporation of GIS methodology to prepare new derived composite map layers incorporating the chemical compositional data to compare with hypothesized political units or zones over time.

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