ABSTRACT OF DISSERTATION

Wesley Durrell Stoner

The Graduate School

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DISJUNCTURE AMONG CLASSIC PERIOD
CULTURAL LANDSCAPES IN THE
TUXTLA MOUNTAINS, SOUTHERN VERACRUZ, MEXICO

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By
Wesley Durrell Stoner

Lexington, Kentucky

Director: Dr. Christopher A. Pool, Professor of Anthropology

Lexington, Kentucky

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Teotihuacan was the most influential city in the Classic Mesoamerican world-system. Like other influential cities in the ancient world, however, Teotihuacan did not homogenously affect the various cultural landscapes that thrived in Mesoamerica during the Classic period (300-900 CE). Even where strong central Mexican influences appear outside the Basin of Mexico, the nature, extent, and strength of these influences are discontinuous over time and space. Every place within the Classic Mesoamerican landscape has a unique Teotihuacan story. In the Tuxtla Mountains of southern Veracruz, Mexico, Matacapan, located in the Catemaco Valley, drew heavily upon ideas and symbols fostered at Teotihuacan, while Totocapan, a peer political capital located in the neighboring Tepango Valley, emphasized social institutions well-entrenched within Gulf Coast cultural traditions.

Through a detailed comparison of these two river valleys, I demonstrate that each polity developed along different trajectories. By the Middle Classic (450-650 CE) each polity displayed different political, economic, and ritual institutions. While they shared an underlying material culture style, the data suggest that the regimes of both polities promoted a different ideology. These cultural divergences did not, however, cause hostilities between them. To the contrary, compositional sourcing of Coarse Orange jars indicates that they engaged in material exchanges with each other.

Agents at each settlement within the study region made unique decisions with regard to their involvement in local, regional, and macroregional interaction networks, particularly with regard to the adoption or rejection of Teotihuacan cultural elements. As a result, the Classic period Tuxtlas comprised multiple overlapping, but disjoint, landscapes of interaction. Places of human settlement were nodes on the landscape where these disjoint landscapes intersected in space and time. By examining these disjunctures, world-system studies can reveal a trend of increasing cultural diversity that parallels the better-theorized trend of homogenization emphasized by core-periphery models. In this dissertation, I take the initial steps toward developing an *archaeology of* *disjuncture* that examines the cultural variability that develops where groups across the landscape employ different strategies of interaction within the world-system.

KEYWORDS: Mesoamerican Archaeology, Interaction Studies, Landscape, Archaeology of Disjuncture, World-Systems

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For the patience of Rebecca,
the inspiration of Kenzie,
and the motivation of Samuel…

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TABLE OF CONTENTS

Acknowledgments ... iii

List of Tables ... ix

List of Figures ... x

List of Files ... xv

Chapter 1: Introduction ... 1
- Limitations of Core-Periphery Models ... 5
- Disjuncture, Disruption, and Divergence ... 8
- Teotihuacan and the Classic Mesoamerican World-System ... 12
- The Role of Teotihuacan in the Classic Tuxtla Mountains ... 15
- The Tepango Valley Archaeological Survey ... 18
- Organization of the Dissertation ... 19

Chapter 2: Disruption, Divergence, and Disjuncture in Ancient World-Systems ... 23
- The Analytical Framework ... 25
  - Dimensions of Institution ... 26
  - Space, Place, Pathways, and Landscape ... 29
  - The Effects of Scale on Institutions and Landscapes ... 35
  - Institutional Landscapes ... 38
- Disjuncture, Disruption, and Divergence in the Multiscalar Layering of Ancient Networks ... 60

Chapter 3: The Classic Mesoamerican World-system and the Role of Teotihuacan ... 69
- Teotihuacan Polity and Local Governance ... 70
- Establishing a Legitimate Social Order ... 74
- Production, Appropriation, and Allocation of Wealth ... 80
- Foreign Influence at Teotihuacan ... 84
- Summary ... 85
- Teotihuacan in the Classic Mesoamerican World-System ... 86
  - Classes of Teotihuacan-Related Symbols ... 90
  - Central Mexican Highlands: The Core of the Teotihuacan-Related World-System ... 107
  - Southern Puebla and Oaxaca ... 115
  - Michoacán ... 120
  - Maya ... 121
  - Gulf Coast ... 131
- Local Disruptions, Regional Divergences, and Disjunctive Cultural Flows in the Classic Mesoamerican World-system ... 144
- Summary ... 149

Chapter 4: The Tuxtlas Environmental Setting and History of Archaeological Research 151
Tuxtlas Natural Environment........151
Climate........152
Physiography and Geology........153
Flora and Fauna........161
Tepango Valley Landscape........162
A Brief History of Research in the Tuxtlas Region........168
Summary........173

Chapter 5: Field and Laboratory Methods........175
Pedestrian Survey........175
Cataloging, Curation, and Analysis of Materials........180
Ceramic Analysis and Chronology........181
Chipped Stone Analysis........183
Ground Stone Tool Analysis........189
Figurine Analysis........190
Special Object Analysis........191
Reconstructing Landscapes........191
Symbolic Landscape........194
Political Landscape........197
Economic Landscape........215
Ritual Landscape........225
Summary........227

Chapter 6: Tuxtlas Chronology and Ceramic Distributions........229
Early Formative Period (1500-900 BCE)........233
Initial picayo (Middle Formative [900-400 BCE])........235
Non-Temporally Sensitive Types Associated with Initial Picayo Materials........243
Picayo Phase (400 BCE-1 CE)........244
Non-Temporally Sensitive Types Associated with Picayo phase Materials........250
Chininita Phase (Protoclassic [1 – 300 CE])........252
Non-Temporally Sensitive Types Associated with Chininita Materials........258
Santiago A (Early Classic [300-450 CE])........259
Non-Temporally Sensitive Types Associated with Santiago A Phase Materials 265
Santiago B (Middle Classic [450-650 CE])........266
Non-Temporally Sensitive Types Associated with Santiago B Phase Materials 277
Combined Santiago A and Santiago B Phase (Early to Middle Classic [300 - 650 CE])........280
Chaneque (Late Classic [650-800?])........282
Non-Temporally Sensitive Types Associated with Chaneque Phase Materials. 290
Vigía and Totogal Phases (Early [800?-1250 CE] and Late [1250-1521 CE] Postclassic)........292
Ceramic Distributions and Social Boundaries........295
Summary........301

Chapter 7: Experience of Polity and the Tuxtla Political Landscape 303
TVAS Settlement Distribution and Site Rank during the Initial Picayo Phase 305
Regional Polity Boundaries during the Middle Formative (900-400 BCE) 309
TVAS Settlement Distribution and Site Rank during the Picayo Phase....................311
TVAS Political Centralization during the Picayo Phase..316
Regional Polity Boundaries during the Late Formative (400-1 BCE).......................318
TVAS Settlement Distribution and Site Rank during the Chininita Phase................321
TVAS Political Centralization during the Chininita Phase......................................323
Regional Polity Boundaries during the Protoclassic (1-300 CE)..............................324
TVAS Settlement Distribution and Site Rank during the Santiago A Phase.............328
TVAS Political Centralization during the Santiago A Phase...................................330
Regional Polity Boundaries during the Early Classic (300-450 CE)........................332
TVAS Settlement Distribution and Site Rank during the Santiago b Phase.............335
TVAS Political Centralization during the Santiago B phase 345
Regional Polity Boundaries during the Middle Classic (450-650 CE)......................349
Regional Distribution of Centers 355
TVAS Settlement Distribution and Site Rank during the Chaneque Phase..............357
TVAS Political Centralization during the Chaneque Phase 361
Regional Polity Boundaries during the Late Classic (650-800? CE) 363
TVAS Settlement Distribution and Site Rank during the Vigía Phase (Early Postclassic) (800-1250 CE)...367
TVAS Settlement Distribution and Site Rank during the Totogal Phase (Late Postclassic) (1250-1521 CE)..368
The Rise and Fall of Two Classic Period Polities in the Tuxtlas..............................369
Summary 371

Chapter 8: Imagination and Perception of Tuxtlas Polities, Regimes, and Politico-Ritual Institutions during the Middle Classic 373
Architectural Plans as Institutions of Politico-Ritual Authority in Central and Southern Veracruz 374
Standard Plan 375
The Long Plaza Group and Villa Alta Quadripartite Arrangement 382
Tres Zapotes Plaza Group.. 384
Catemaco Valley 385
Tepango Valley Architectural Comparison 397
Architectural Summary...412
Signification of Regimes and the Imagination of Political Unity.............................414
Teotihucan-Style as a Symbol of the Matacapan Regime 414
Totocapan and the Cipactli Cult 419
Connections to the Lower Papaloapan Basin?..427
Perception and Imagination of Politico-Ritual Authority on the Tuxtlas Political Landscape 428
Evaluation of Polity Boundaries 431
Summary 436

Chapter 9: Economic Landscapes in the Tuxtla Mountains 438
Pottery 438
Pottery Production 438
Coarse Orange Production and Exchange 447
Chipped Stone 465
Tuxtlas Economic Landscapes 480
Summary 483

Chapter 10: Disruption, Disjuncture, and Divergence in the Classic Tuxtla Mountains 485
Differential Experience of the Classic Mesoamerican World-System 485
Institutional Divergences between the Tepango and Catemaco Valleys 490
Intervalley Relationships During the Classic Period 500
Summary: Classic Mesoamerican Disjuncture as Seen through the Tuxtla Region .. 502
Implications for Understanding Teotihuacan's Role in the Classic Mesoamerican World-System 507
Developing an Archaeology of Disjuncture 509

Appendix A 513

Appendix B 515

Appendix C 524

Appendix D 533

Appendix E 537

References Cited 547

Vita 592

LIST OF TABLES

Table 2.1. Analytical framework. 26
Table 6.1. Chronological sequences of the central and western Tuxtlas. 230
Table 6.2. Initial Picayo phase-sensitive ceramics itemized by site (totals in red italics provide only tenuous evidence for occupation during this phase). 239
Table 6.3. Picayo phase-sensitive ceramics itemized by site (totals in red italics provide only tenuous evidence for occupation during this phase). 247
Table 6.4. Chininita phase-sensitive ceramics itemized by site (sites that do not conforming to the selection criteria described above have been omitted from this table) 255
Table 6.5. Santiago A phase-sensitive ceramics itemized by site. Totals in red italics represent only scant evidence of Santiago A phase occupation. 264
Table 6.6. Santiago B phase-sensitive ceramics tabulated by site. Totals in red italics represent sites with only sparse evidence of Santiago B phase occupation. 268
Table 6.7. Ceramics common to the Santiago A and B phases sorted by site. 280
Table 6.8. Chaneque phase-sensitive ceramics tabulated by site. Totals in red italics represent sites with sparse evidence for Chaneque phase occupation. 286
Table 7.1. Initial Picayo phase sites sorted by material density-weighted site area. 306
Table 7.2. Picayo phase sites sorted by material density-weighted site area. 312
Table 7.3. Chininita sites sorted by density-weighted site area. 322
Table 7.4. Santiago A phase sites sorted by area. 329
Table 7.5. Santiago B phase sites sorted by area. 336
Table 7.6. Sites with collections dating to the Chaneque phase sorted by material density-weighted site area. 358
Table 9.1. Production loci for the Tepango Valley Archaeology Survey sorted by phase. 439
Table 9.2. Percentage of Coarse Orange sherds of total Santiago B phase-sensitive sherds (sites with fewer than 10 Coarse Orange sherds excluded). 449
Table 9.3. Coarse Orange and clay sample and group assignments. 456
Table 9.4. Eigenvalues and percentage of variance explained. 457
Table 9.5. Eigenvector loadings. 458
Table 9.6. Scaled factor loading matrix. 459
Table 9.7. Percentage of the CO1 paste recipe among all assigned specimens per site. 464
Table 9.8. Obsidian source use patterns over time (percentages shown in parentheses). 467
Table 9.9. Ratio of obsidian blade production indicators to finished obsidian blades[1]. 468
Table 10.1. Summary of different types of disjuncture and variables for measuring them. 510

LIST OF FIGURES

Figure 1.1. The Tuxtla Mountains showing the location of the project area in Mexico. Sites depicted are major Classic period centers. 2
Figure 1.2. Mesoamerica showing locations of important Classic period sites and regions mentioned in the text. 3
Figure 2.1. Two views of coal mines in Leslie County, Kentucky (Stoner 2009).......... 30
Figure 2.2. Simplified diagram of network scales and the interconnectivity among them. 36
Figure 3.1. Map of Teotihuacan (Millon et al. 1973: Map 1).. 71
Figure 3.2. Façade of the Feathered Serpent Pyramid, showing the Feathered Serpent (left) and saurian (right) deities (Pasztory 1997:127). 78
Figure 3.3. "Great Goddess" image on mural painting at Tetitla, Teotihuacan (Pasztory 1997:125). 78
Figure 3.4. Old God brazier (Pasztory 1997:163, Figure 10.1). 80
Figure 3.5. Mural depiction of a canine warrior on Portico 1 of the White Patio, Atetelco (Headrick 2007:Figure 4.2 [drawing by Bongard after von Winning 1987:Figure 3c]) 92
Figure 3.6. Depiction of a Butterfly from a mural in Room 12, Zone 5-A, Teotihuacan (Headrick 2007:Figure 7.3 [Drawing by Bongard after von Winning 1987: Volume 1, Figure 3]). 92
Figure 3.7. Mural depiction of Tlaloc from Corridor 21 at Tetitla, Teotihuacan (Headrick 2007:Figure 7.2 [Drawing by Bongard after Séjourné 1966:Figure 160]). 94
Figure 3.8. Drawing of an Old Fire God brazier (Headrick 2007:Figure 6.16 [Drawing by Bongard after von Winning 1987:Volume 1, Figure 1).. 94
Figure 3.9. Late Xolalpan *candeleros* from Teotihuacan (Rattray 2001:Figure 137). 96
Figure 3.10. Theater-type incense burner from Teotihuacan (Rattray 2001: Figure 131). 96
Figure 3.11. Marionette-style figurines from Xolalpan phase Teotihuacan (Pasztory 1997:Figure 14.6).. 98
Figure 3.12. Teotihuacan-style stone mask (Pasztory 1997:130). 98
Figure 3.13. *Talud tablero* architecture (Santley 2007:Figure 6.2) 100
Figure 3.14. Thin Orange ware vessels from Teotihuacan (Rattray 2000)................... 103
Figure 3.15. Metepec Stucco painted vase showing hollow rectangular supports (Rattray 2000). 103
Figure 3.16. Florero from Teotihuacan (Rattray 2001:Figure 118).............................. 104
Figure 3.17. Cover plate from Teotihuacan with three loop supports (Rattray 2001:Figure 140). 104
Figure 3.18. Stucco painted cylindrical vases from Metepec Phase Teotihuacan (Rattray 2000). 105
Figure 3.19. Sample of Teotihuacan-style materials recovered from Matacapan (Santley 2007: Figure 6.1)... 138
Figure 4.1. Geological map of the study area (after Pool 1990: Map 5). 154
Figure 4.2. Showing the distribution of Concepción sedimentary outcrops and their chemical group designations (after Stoner et al. 2008: data derived from Pool and Santley 1992: Figure 9.1; Rios-Macbeth 1952, and Stoner 2003)........................... 158

Figure 4.3. Photograph of a grain of volcanic ash in a clay matrix in cross-polarized light. Black colors are volcanic glass, the brown matrix is clay, white or colorless minerals in clay are quartz, and the colored minerals within the volcanic glass are pyroxene, olivine and plagioclase. 159
Figure 4.4. The Tuxtlas landscape showing prominent features and large settlements. 163
Figure 4.5. Overview of the Tepango River toward the southern end of the survey area (facing northwest). Cerro el Vigía depicted in the background. 164
Figure 4.6. Overview of Totocapan (foreground), showing Cerro el Vigía in the background (facing southwest). 164
Figure 4.7. View of the Central Uplands, showing Cerro Coyoltepec (facing southwest). 165
Figure 5.1. Photograph from the Acropolis at Totocapan, overlooking Plaza Group 1 on the Principal Terrace (facing southeast). 176
Figure 5.2. Photograph depicting the survey crew walking shovel-tested transects. 176
Figure 5.3. Photograph of workers collecting materials from a 3x3 m square associated with a mound (Site 24 [Chilchutiuca] facing west). 180
Figure 5.4. Example of ceramic sherds recovered within the TVAS, Thin-Walled Polished Black with fine orange or gray paste (Code 2122.4). 182
Figure 5.5. Typical obsidian blade fragments recovered from survey. 184
Figure 5.6. Examples of obsidian bifaces recovered on survey. 187
Figure 5.7. Example of groundstone artifacts typically recovered on survey. 190
Figure 5.8. Examples of figurines found on survey. 191
Figure 5.9. Idealized rank-size plots. 203
Figure 6.1. Diachronic trends in relative ceramic type frequency from excavations at Matacapan and Bezuapan. The width of each band represents percentage of rim sherds for that type for the occupation indicated (modified from Pool and Britt 2000: Figure 10). 231
Figure 6.2. Bar Chart depicting relative ceramic type frequency from excavations at Bezuapan. The width of each band represents percentage of rim sherds for that type within the occupation indicated (modified from Pool and Britt 2000: Figure 9). Occupation I=early Picayo phase; Occupation II & III=Late Picayo and Chininita; Occupation IV= Classic. 231
Figure 6.3. Smoothed relative frequencies of pottery types at Totocapan Pit 3 (data from Ortiz 1975: Tables 9 and 10; Figure from Pool and Britt 2000: Figure 11). 232
Figure 6.4. Sample of Middle Formative ceramics. 238
Figure 6.5. Distribution of Initial Picayo phase (900-300 BCE) sites and ceramics within the TVAS. 241
Figure 6.6. Sample of Picayo Phase ceramics. 246
Figure 6.7. Distribution of Picayo phase (400 BCE – 1 CE) sites and ceramics within the TVAS. 248
Figure 6.8. Sample of Chininita phase ceramics. 254
Figure 6.9. Distribution of Chininita phase (1 - 300 CE) sites and ceramics within the TVAS. 256
Figure 6.10. Sample of Santiago A phase ceramics. 262
Figure 6.11. Distribution of Santiago A phase (300 – 450 CE) sites and ceramics within the TVAS. 263

Figure 6.12. Sample of Santiago A phase ceramics.. 267
Figure 6.13. Distribution of Santiago B phase (450 – 650 CE) sites and ceramics within the TVAS. 271
Figure 6.14. Sample of Chaneque phase ceramics. 284
Figure 6.15. Distribution of Chaneque phase (650 - 800? CE) sites and ceramics within the TVAS. 289
Figure 6.16. Sample of Postclassic ceramics. 293
Figure 6.17. Distribution of Vigía phase (800? - 1250 CE) sites within the TVAS. 293
Figure 6.18. Distribution of Totogal phase (1250 - 1521 CE) sites within the TVAS. . 294
Figure 6.19. Ceramic types and decorations that primarily follow the Tepango River. 296
Figure 6.20. Distribution of ceramic types that strongly cluster closely to both the Tepango and Xoteapan Rivers. 298
Figure 6.21. Ceramic types and forms that display spatially restricted distributions. ... 300
Figure 7.1. Rank-Size Plot of Initial Picayo Phase Sites using Density-Weighted Site Area. 308
Figure 7.2. Rank-Size Plot of Initial Picayo Phase Sites using Site Area. 308
Figure 7.3. Middle Formative settlements in the southwestern Tuxtla Mountains (Kruszczynski's [2001] survey south of Cerro el Vigía did not distinguish Middle and Late Formative collections). 309
Figure 7.4. Monument 1 and sample of petroglyphs found in a boulder field east of Cobata. 310
Figure 7.5. Plan view of Arroyo Salado. 314
Figure 7.6. Map of Cruz de Vidaña showing the locations of mounds. 316
Figure 7.7. Rank-size plot of Picayo phase sites using density-weighted site area. 317
Figure7.8. Rank size plot of Picayo phase sites using site area. 317
Figure 7.9. Xtent model LF1 results with *a*=0.5 and *k*=0.5. 319
Figure 7.10. Xtent model LF2 results with *a*=0.6 and *k*=0.5. 319
Figure 7.11. Rank-size plot of Chininita phase sites using density-weighted site area. . 324
Figure 7.12. Chininita phase rank-size plot using site area. 325
Figure 7.13. Xtent model PTC1 results with *a*=0.5 and *k*=0.5. 326
Figure 7.14. Xtent model PTC2 results with *a*=0.6 and *k*=0.5. 326
Figure 7.15. Rank-size plot of Santiago A phase sites using density-weighted site area. 331
Figure 7.16. Rank-size plot of Santiago A phase sites using site area.......................... 331
Figure 7.17. Xtent model EC1 results with *a*=0.5 and *k*=0.5. 333
Figure 7.18. Xtent model EC2 results with *a*=0.6 and *k*=0.5. 334
Figure 7.19. Xtent model EC3 results with *a*=0.65 and *k*=0.5. 334
Figure 7.20. Plan view of Totocapan showing the distribution of mounds. 339
Figure 7.21. Photograph of the Acropolis from the top of Mound 32 (facing north). ... 340
Figure 7.22. Google Earth image of the Acropolis and Plaza Group 1. 340
Figure 7.23. Plan view of Site 19 showing the distribution of mounds and modern habitation. 342
Figure 7.24. Plan view of Tilzapote showing the distribution of mounds. 343
Figure 7.25. Plan view of Francisco Madero showing the locations of mounds. 344
Figure 7.26. Rank-size plot of Santiago B phase sites using density-weighted site area. 346

Figure 7.27. Rank-size plot of Santiago B phase sites using site area. 346
Figure 7.28. Histogram of the number of mounds at sites with two or more mounds during the Santiago B phase. 348
Figure 7.29. Xtent model MC1 results with *a*=0.5 and *k*=0.5. 352
Figure 7.30. Xtent model MC2 results with *a*=0.5 and *k*=0.5. Calculated with large centers only. 352
Figure 7.31. Xtent model MC3 results with *a*=0.6 and *k*=0.5. 353
Figure 7.32. Plan view of Maxyapan showing the distribution of mounds. 360
Figure 7.33. Rank-size plot of Chaneque phase sites using density-weighted site area. 362
Figure 7.34. Rank-size plot of Late Classic sites using site area. 362
Figure 7.35. Xtent model LC1 with *a*=0.5 and *k*=0.5. 365
Figure 7.36. Xtent model LC2 results with *a*=0.6 and *k*=0.5. 365
Figure 7.37. Xtent model LC3 results with *a*=0.65 and *k*=0.5. 366
Figure 8.1. Architectural Plans from Central and Southern Veracruz. 376
Figure 8.2. Yokes recovered at the Tres Zapotes Ranchito Group (Weiant 1943: Plate 67:1). 379
Figure 8.3. Votive axe (*hacha*) from Napatecuhtlan (Medellín 1960: Plate 66) 379
Figure 8.4. *Palma* recovered from Ranchito de las Animas (Medellín 1960). 380
Figure 8.5. Drawing of the Papaloapan Stela (Sanchez 1999: Figure1). 381
Figure 8.6. Architectural reconstruction of central Matacapan (from Santley 2007: Figure 3.18). 386
Figure 8.7. Matacapan showing mound distribution and relative size (Santley et al 1984). 387
Figure 8.8. Plan map of the architectural core of Teotepec (after Arnold 2007). 392
Figure 8.9. Urban core of Teotepec (after Santley 2007: Figure 3.23) 393
Figure 8.10. Sample of architectural plans identified in the TVAS area. 398
Figure 8.11. Plan view of Totocapan showing districts and district administrators. 403
Figure 8.12. Engraved plate recovered by Valenzuela (1945b) at Pollinapan. 415
Figure 8.13. Distribution of Ceramic Materials Discussed in the Text. 417
Figure 8.14. Engraved images of cipactli recovered from the Pollinapan, Totocapan (Valenzuela 1945b: Laminas 1.a. and 1.b.). The lower image may be an iguana or saurian animal. 420
Figure 8.15. Partial vessel recovered by Valenzuela in the Pollinapan district of Totocapan (Valenzuela 1945b: Figure 16). 420
Figure 8.16. Ceramic types and forms that frequently display saurian images collected during the TVAS. 421
Figure 8.17. Sample of Cipactli Cult engravings and vessel forms collected during the TVAS. 422
Figure 9.1. Locations of identified ceramic and obsidian tool production during the Picayo and Chininita phases. 440
Figure 9.2. Locations of ceramic and obsidian tool production during the Santiago A and Santiago B phases. 442
Figure 9.3. Locations of ceramic and obsidian tool production during the Santiago B and Chaneque Phases. 445
Figure 9.4. Coarse Orange jar on display at the Museo Tuxtleco in Santiago Tuxtla. This vessel functioned as a funerary urn, containing the remains of two infants 447

Figure 9.5. Coarse Orange rim sherds from neckless jars (photograph by Christopher A. Pool). 448
Figure 9.6. Updraft kiln excavated at the Comoapan production facility in Matacapan (photograph by Christopher A. Pool) 448
Figure 9.7. Percentages of the Coarse Orange type of all Santiago B phase-sensitive ceramics at sites within the TVAS (excluding sites with fewer than 10 Coarse Orange specimens) 450
Figure 9.8. Comoapan Valley Coarse Orange pottery and Concepción clays plotted on axes of chromium and iron (Stoner et a. 2008: Figure 10). 453
Figure 9.9. Scatter plot showing the Coarse Orange sample from the Tepango Valley projected on calcium and chromium axes. Ninety percent confidence ellipses were calculated from Coarse Orange compositional data from the Catemaco Valley (see Stoner et al. 2008). 454
Figure 9.10. RQ-Mode plot of ceramic and clay compositional groups and factor loadings for the entire sample of Coarse Orange jars and Concepción clays. 457
Figure 9.11. Chemical groups depicted on Principal Components 1 and 2, ellipses represent 90 percent confidence intervals. 458
Figure 9.12. Chemical groups depicted on logged axes of Ca and Cr, ellipses represent 90 percent confidence intervals. 459
Figure 9.13. Coarse Orange specimens from Comoapan projected over 90 percent confidence ellipses calculated from the entire Tuxtlas Coarse Orange and Concepción clay chemical database. 460
Figure 9.14. Distribution of Coarse Orange paste recipes. 461
Figure 10.2. Major patterns of interaction among Classic period groups in the Tuxtla Mountains. 503

LIST OF FILES

Stoner_Dissertation_2011.pdf (83,655 kb)

CHAPTER 1: INTRODUCTION

Teotihuacan was the most influential city in the Classic Mesoamerican world-system. Most regions of Mesoamerica interacted at some level with the central Mexican metropolis, through peaceful or hostile means. Like other influential cities in the ancient world, however, Teotihuacan did not homogenously affect the various cultural landscapes that thrived in Mesoamerica during the Classic period (300-900 CE). Even where strong central Mexican influences appear outside the Basin of Mexico, the nature, extent, and strength of these influences are discontinuous over time and space. Every place within the Classic Mesoamerican landscape has a unique Teotihuacan story. Groups that boast the strongest relationships often played important political economic and ritual roles within their respective regions. In all cases, these Teotihuacan-linked groups were bordered by peers that lay outside the interaction network centered on the central Mexican metropolis. I examine how these different strategies of interaction can lead to sociocultural contrasts with significant implications for understanding regional cultural evolution.

With regard to the role that Teotihuacan played in Mesoamerica, the lion's share of archaeological research has concentrated on urban centers that present the strongest evidence for direct interaction with central Mexico (but see Braswell [ed.] 2003). Considerably less attention has been given to the variability of these linkages over the Mesoamerican cultural landscape. Almost nothing has been written regarding the broader consequences for regional settlement systems where closely situated groups employed different strategies of interaction with Teotihuacan or other contemporary polities throughout Mesoamerica.

In the Tuxtla Mountains of southern Veracruz, Mexico, Classic period settlements in two neighboring river valleys display dissimilar histories of interaction with Teotihuacan (Figures 1.1 and 1.2). Since Juan Valenzuela's work in the late 1930s (1945a), archaeological research has recognized a special relationship between Matacapan, in the Catemaco Valley, and Teotihuacan. In the same year as his investigation at Matacapan, Valenzuela conducted research at Totocapan, in the neighboring Tepango Valley, and found little to indicate a central Mexican connection

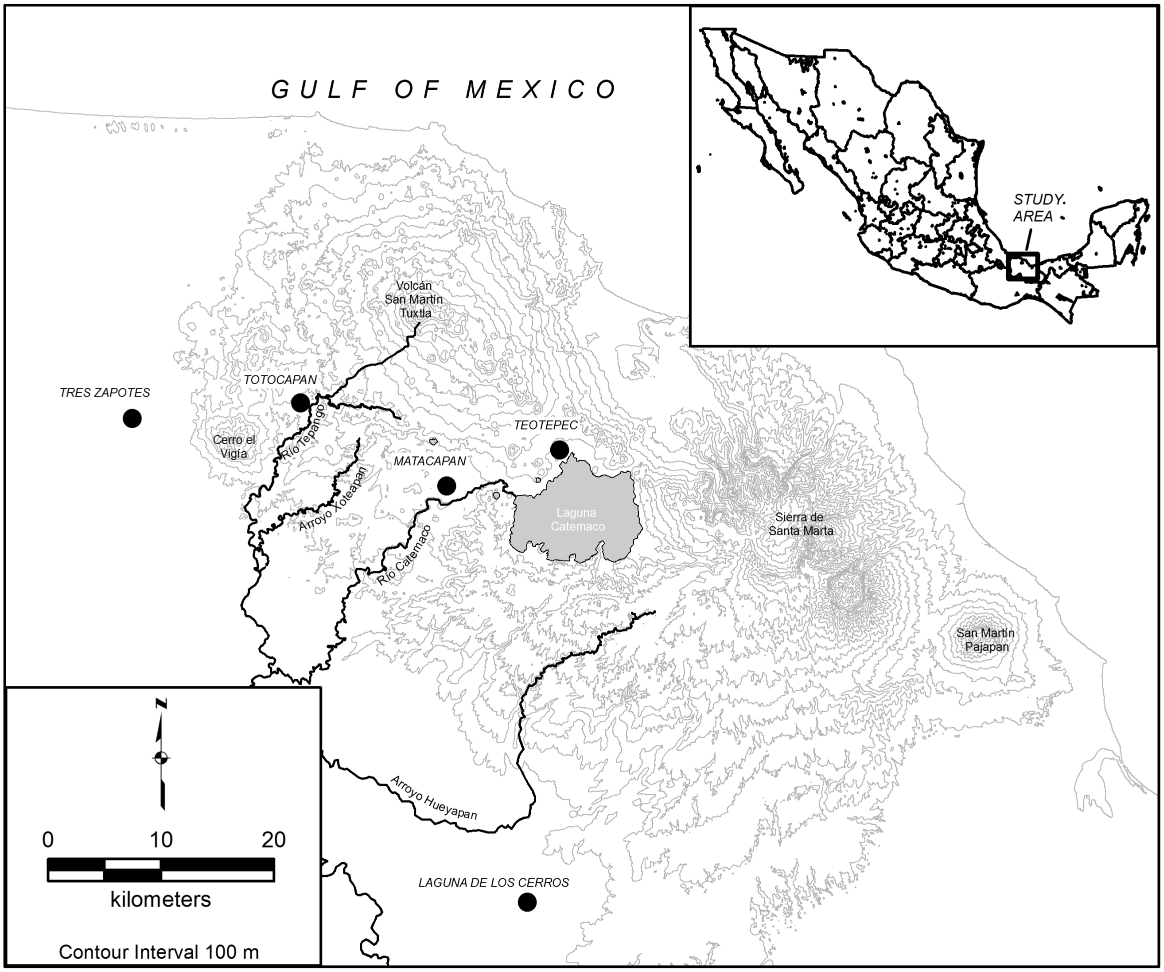

Figure 1.1. The Tuxtla Mountains showing the location of the project area in Mexico. Sites depicted are major Classic period centers.

(1945b). As a result of the current research, and that undertaken by Valenzuela (1945b), and Ortiz (1975), and Santley (2007) it is known that Matacapan and Totocapan were contemporary regional centers of roughly equal size and power within the Tuxtlas. Both were linked through intraregional social and economic networks, yet they employed very different strategies of interaction within the broader Mesoamerican world-system. What were the consequences of differential positioning in the world-system for existing regional networks in the Tuxtlas? What were the local and regional conditions that gave rise to the different linkages of Matacapan and Totocapan to central Mexico? These questions call for a systematic comparison of the evolution of these two river valleys in the context of the Classic Mesoamerican world-system.

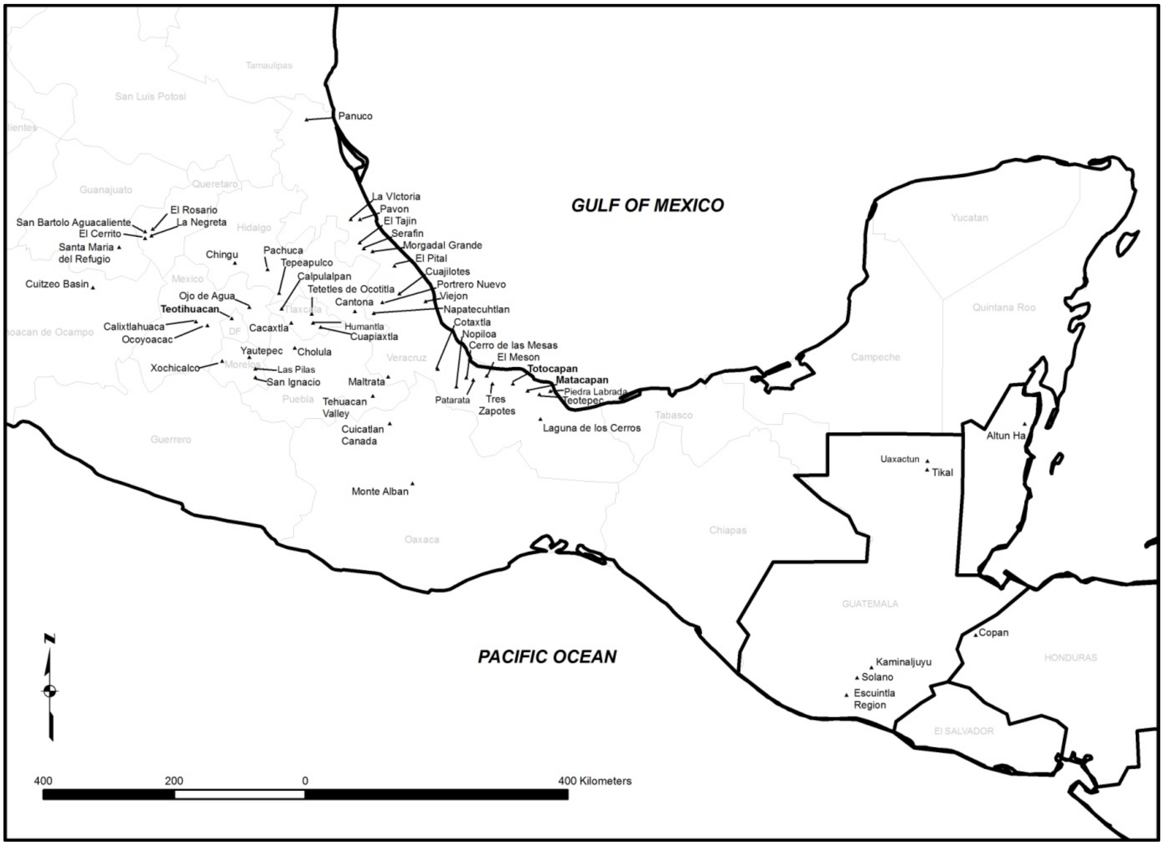

Figure 1.2. Mesoamerica showing locations of important Classic period sites and regions mentioned in the text.

A major pursuit of the study of ancient states over the past three decades has been to understand how distant groups fit together into world-systems. Classic world-systems theorists posited a system of unequal exchange where raw materials were imported into the core and finished goods were exported to the periphery (Wallerstein 1974). Alterations to this theory have examined the systemic dependencies created by long distance exchange of prestige goods, ideas, and religion (Frank and Gills 1993, Hall 1999, Kohl 1989, Peregrine 1992, Schneider 1977). Regardless of what relationships define the system logic, applications of core-periphery models in archaeology have typically emphasized the homogenizing cultural tendencies of world-systems processes. A large segment of the system comes to share certain cultural elements – such as ritual beliefs, language, material culture styles, and architectural plans. These cultural similarities develop regardless of whether groups interact asymmetrically through dominance and subordination or through more symmetrical, peer polity exchanges

(Kroeber 1944, Renfrew 1994, Willey 1991). Methodologically, archaeologists would be unable to identify world-systems without some coherent set of symbols or goods found among groups over a wide geographic area.

While some degree of cultural homogenization occurs in all world-systems, several related processes simultaneously produce an increasing cultural diversity that is not well understood for ancient states. Agents selectively appropriate and modify symbols and behaviors of the core to serve their own purposes (Helms 1993). The ways in which non-local stimuli are incorporated into the local cultural fabric can vary tremendously over short distances. Individuals and groups that interact on a daily basis – whether in the same region, city, or even members of the same household –negotiate different roles for themselves in the external world. Because of the variable and discontinuous nature of these external connections over time and space, social and cultural contrasts often develop among closely related components of the regional network. Much of this variation has been discarded in order to construct generalizations about world-systems processes (e.g., Frank 1999). Generalizations, while necessary for theoretical development, oversimplify the negotiations that take place at nested scales of interaction. The multiscalar nature of interaction in ancient states contributes to the development of increasingly fluid, multicultural landscapes. On the 'global' stage, a process of increasing cultural diversification parallels the better-theorized trend of cultural homogenization.

I adapt Appadurai's (1996) concept of disjuncture to examine the cultural diversification that accompanies expanding interaction networks in ancient states. Disjuncture refers to the decoupling of symbols, meaning, ideas, politics, economy, technology, ethnicity, and identities from their specific cultural associations in time and space. Since the 16th century, the world has become increasingly interconnected through global exchanges, colonization, migration, and mass media. As images and goods cross territorial boundaries, connecting groups with different histories, the traditional idea of culture as a conglomeration of different social institutions that conjoin in a specific time and place breaks down. Culture in such a dynamic environment becomes less like marbles colliding in a box, where each group remains a coherent whole, and more like ripples formed by throwing a handful of pebbles into a pond, where different elements of culture flow across space more freely and in different directions. Specific behaviors, symbols, goods, and ideas are disjoined from their traditional cultural associations, disseminated for mass consumption, and reinterpreted in new contexts. A symbol may be passed around world-wide (homogenization), but its meaning, and sociopolitical context changes dramatically from group to group (diversification).

I use the concept of disjuncture in this dissertation to highlight the diversification of Tuxtla settlements as a result of differential interaction with Teotihuacan, among other influential Classic period settlements. The Tuxtla Mountains area of the Gulf Coast of Mexico is but one of hundreds of cases where neighboring groups within a region employed very different strategies of interaction with the outside world. The relationships between Matacapan and Totocapan may therefore be generally representative of the spotty patterns of influence enacted by Teotihuacan. This study not only offers a better understanding of Teotihuacan's role outside the Basin of Mexico, it also provides the context for an examination of the intraregional consequences for neighboring groups that forge contrasting extraregional connections.

LIMITATIONS OF CORE-PERIPHERY MODELS

Over the past three decades, core-periphery models have been invoked frequently to explain macroregional interactions in ancient states (Hall 1999; Hall and Chase-Dunn 1993; Frank 1999; Gills and Frank 1993; Kardulias 1999; Kardulias and Hall 2008; Kohl 1989; Peregrine 1992; Schneider 1977; Smith and Berdan 2003; Wallerstein 1974). Several researchers have applied it to understand Teotihuacan's role throughout Mesoamerica (e.g., Blanton and Feinman 1984, Blanton et al. 1993, Filini 2004, Montiel 2010, Santley and Alexander 1996, Santley and Pool 1993, Smith and Montiel 2001). Teotihuacan was the single most influential city throughout the Classic Mesoamerican macroregion, and therefore resembles a 'core' more than any other polity of its time. The role of Teotihuacan in shaping the development of groups in its 'periphery', though, varied tremendously over space and time (Chapter 3). It is this variation that I hope to better understand through the Tuxtla case.

While core-periphery models have made strides in describing broad-scale interactions in ancient states, they are poorly suited to characterize variability within the system for two reasons. First, applications of world-systems theory to ancient states have typically employed radial models of core-periphery interaction (see Jennings 2006 for criticisms). The radial core-periphery model examines core influence through direct, or down-the-line, linkages to nodes in the periphery (Barabási 2002, Newman et al. 2006). Connections among different groups in the periphery, however, typically do not enter the discussion. This model forgoes consideration that groups active within the world-system make decisions based first and foremost on their positions within local and regional networks. Archaeologists have focused on all of these scales of social integration, but have paid little attention to how they articulate.

Radial influences exist in all world-systems, but exclusive focus on these linkages obscures how *external* interactions embed within the *internal* organizations of local and regional networks. In this research, I employ an analytical scale that compares at least two neighboring polities that display different external linkages. I present comparative data regarding the institutional structures and interaction networks developed by both polities prior to, and following, the introduction of foreign influence. By definition, all components of a network (or system) are interlinked such that a change to one node could potentially ripple through all connected nodes (Barabási 2002). If Matacapan was the origin of Teotihuacan-related cultural influences seen elsewhere in the Tuxtlas, how did other nodes in the regional network respond (see Arnold and Santley 2008, Pool 1992a, Pool and Stoner 2004, Santley 2007:159-160)?

Second, the reduction of world-systems interaction to relatively few modes of interaction among cores and peripheries (and semi-peripheries and margins) analytically precludes the recognition of behavioral variation among groups (e.g., Friedman 1994; Chase-Dunn and Hall 1998; Smith and Berdan 2003; Wolf 1982). Most of these approaches give primacy to either political interactions, as with prestige goods models, or economic interaction, as with tributary and commercially based world-systems (cf., Brumfiel and Earle 1987; Frank and Gills 1993; Helms 1993; Peregrine 1992, 1999). More recent world-systems analyses allow for other types of interaction. Hall (1999:7), for example, proposes a model of nested boundaries of symbolic, prestige good, political/military, and bulk goods interaction that are greatly influenced by cost-distance concerns (see Stein 1999). Santley and Alexander (1996) similarly characterize the Teotihuacan-centered world-system. While these approaches examine the multivariate nature of macroregional interaction, the local and regional negotiation processes are glossed over.

I draw upon elements of world-systems research, but not with the premise of investigating core-periphery interactions or radial lines of influence. In a recent examination of the Classic Mesoamerican world-system, Filini (2004) examined the system's logic outside a core-periphery framework. Her approach to the topic highlighted the diversity of the system. I construct my own analytical framework in Chapter 2 combining elements of institutional analysis (Giddens 1979, 1984) and a landscape perspective (Bender 1993; Hirsch 1995; Ingold 1993; A. Smith 2004; Tilley 1994, 2008; Zedeño 2000). Social institutions are stable elements of social structure that create order by establishing norms for human behavior and interaction (e.g., Durkheim 1964, Mauss 1967, Weber 1978). Institutions are embodied by the structure of space, which is one of the most accessible datasets for archaeological studies. Landscapes, on the other hand, are fluid fields of interaction that can remain stable or change rapidly over time. Landscapes are experienced, perceived, and imagined differently by different social actors. The landscape perspective makes allowances for agency that operates outside established local institutions. Combining the two perspectives results in a framework of *institutional landscapes*. Institutional landscapes are multiscalar plains of political, economic, ritual, and symbolic interaction that differently intersect at every place on the landscape, creating a mosaic of imagined worlds across time and space.

The approach employed in this research is not simply a preference for particularism over generalization. It is an attempt to examine how the variable experiences of differently positioned local groups can transform the system as a whole. Social contrasts that emerge from this differential interaction can provoke a change to existing relationships within a region. The current research presents an exploration of the Classic Mesoamerican world-system through a more inductive interrogation of its variability, represented by the Classic period Tuxtla Mountains case study. These data are used to develop an *archaeology of disjuncture* designed to augment existing perspectives on broad-scale interactions in ancient states.

DISJUNCTURE, DISRUPTION, AND DIVERGENCE

The concept of disjuncture proposed by Appadurai (1996) has potential to enhance the archaeological understanding of how local groups fit into world-systems. Appadurai argues that the modern global economy has become too complex to be explained by core-periphery models or others that attempt to generalize global interactions into simple relational models. Electronic media, migration, and global exchanges have developed a situation where agents imagine their local worlds from a global realm of possibilities. He suggests that "the complexity of the current global economy has to do with disjunctures between economy, culture, and politics that we have only begun to theorize (1996:33)".

Broad-scale interaction networks have transmitted images or 'snapshots' of different cultures across the globe with increasing rapidity over the last 100 years. As a result, different 'whens' and 'wheres' have become deterritorialized and consumed world-wide. Local consumers indigenize these dislocated cultural traits as they apply them within common everyday contexts. Appadurai attempts to examine the modern global situation through a flexible framework of five global landscapes named ethnoscapes, mediascapes, financescapes, ideoscapes, and technoscapes. These landscapes are amorphous cultural flows, but they do not follow the same trajectories over space or time. They are characterized more by their disjuncture than their conjuncture, or correlation. Hybrid cultural forms develop simultaneously representing multiple cultural identities. This is the diversity that core/periphery models mask.

I begin with Appadurai's concept and modify it to augment the study of broad-scale interaction networks for ancient states. While disjuncture of this kind was a feature of ancient world-systems long before the modern era, Appadurai's essays and my own deal with very different subjects. My application of his work therefore requires modification.

Like Appadurai's critique of the traditional ethnographic concept of culture (as a noun) (1996:12-13), I believe that the shortcomings of archaeological applications of world-systems theory stem from a rather static and territorial treatment of culture. Archaeologists too often treat their survey areas, for example, as holistic cultural units neatly bounded in space that can be compared with other neatly-bounded cultural units (i.e., survey areas). This is a methodological necessity that I do not escape, but I instead examine settlements within the Tuxtla region as places where four multiscalar cultural landscapes intersect in space and time. These landscapes are political, economic, symbolic, and ritual webs of interaction that have expanded to incorporate many local realities over the Classic Mesoamerican world-system.

Like Appadurai, I see more potential for disjuncture among these landscapes, as they flow through time and space, than for their conjuncture. Modern and ancient situations differ principally due to the medium of interaction. In the modern world, global interactions often take place through decentralized media. Mass media, piracy, and the 'free market' in the modern world spread ideas, goods, and images through the globe with relatively little centralized regulation. Broad-scale interactions in the ancient world, by contrast, most frequently took place through agents well positioned within centralized institutions. All world-systems throughout the human past can be characterized on a continuum between centralized and decentralized interactions, but the modern world can no more be characterized as completely decentralized as the ancient world can be characterized as completely centralized.

In both the ancient and modern worlds, places on the landscape can be understood as nodes where these different interaction networks overlap for a moment in time. The agents that occupy each node negotiate many different cultural, political, and economic influences from multiple scales of interaction. The outcomes of this negotiation process vary greatly depending on the context and perspective of the interacting agents. Repetition of this process across the world-system, or even across a single city, creates diversity in the forms that culture assumes. In no case were identical cultural replicas of Teotihuacan set up outside the Teotihuacan Valley. In fact, the Teotihuacan "culture", which itself comprised a multiethnic population, was dismantled, reinterpreted, and used in very different contexts throughout Mesoamerica. In this sense, the Classic

Mesoamerican world-system was a living set of political, economic, symbolic, and ritual flows that followed different trajectories through the landscape.

In my adaptation of Appadurai's concept for application to ancient world-systems, I define three components of disjuncture: institutional, temporal, and spatial. The institutional component of disjuncture deals with the variable combinations of political, economic, symbolic, and ritual facets of culture that fit together into place-specific configurations. These four institutions are embedded within all cultures. They are interrelated in ways that have been long understood within anthropological thought (Polanyi 1957), but they can combine in a number of ways at every place on the landscape. In the Classic Tuxtlas, agents within Matacapan and Totocapan used very different symbols and ideas to define their political, ritual, and social identities. Matacapan and surrounding settlements drew upon the symbols and behaviors developed at Teotihuacan, whereas Totocapan was much more entrenched within Gulf Coast traditions. Underlying these dissimilarities, however, were many common elements of material culture style and my ceramic compositional analysis provides strong evidence for economic exchange between the two centers. While Matacapan and Totocapan clearly share, and in part define, a common Classic Tuxtleco culture, their different institutional configurations represent contrasting 'global' strategies.

The temporal component of disjuncture can be thought of as institutional disruption. Disruption refers to the alteration of local and regional institutions as a result of integration into broader-scale cultural flows. It is primarily a temporal distinction because it indicates the discontinuation of a preexisting, or traditional, cultural practice and its replacement by imported symbols, materials, and ideas. Disruption is a central tenet of world-systems theory (Wallerstein 1974) in that the peripheralization of a locality can lead to a reorganization of local political economies and social structure. Conquest of a territory, for example, can lead to dramatic changes in local political economy and settlement organization (Hirth 1980, Wells 2005). This dramatic disruption can shape the system into a more radial set of interactions, as local networks are dissolved and realigned toward the core. Institutional modification does not necessarily result from force, though. The adoption and use of any aspect of foreign culture presents variation to local settlement systems. Groups across the regional landscape differentially negotiate the integration, modification, or rejection of that variation, producing social contrasts among them (discussed below). A sometimes subtle form of disruption is the appropriation of foreign symbols in order to enhance an agent's prestige within his or her local political network (e.g., Helms 1993, Peregrine 1999), redefining existing rules of political legitimization in the process.

Finally the spatial component of disruption involves social contrasts created by the process of cultural divergence. Disruptions typically originate at specific nodes within a regional network, and sometimes spread out to connected nodes. At the edges of these disruptions, however, social differences emerge among groups who may have previously formed a relatively homogeneous cultural territory. The edges of these spatial disruptions have been referred to as social boundaries (M. Stark 1998) and frontiers (Lightfoot and Martinez 1995, Venter 2008, Wells 2005).

The principle of cultural divergence refers to the contrasts that emerge due to differential positioning in regional and macroregional networks. Divergence is not a new concept either; it has been employed in cultural evolutionary frameworks for decades (e.g., Service 1968, Steward 1955) as well as biological theories of evolution (Darwin 2010). Here, divergence is defined as a historical differentiation of culture that develops from contrasting decisions made by agents who act beyond the local group. The investigation of divergence is inherently comparative because it deals with two or more groups that experience the world-system in different ways. The result may lead to divergent cultural evolution among groups that are historically connected (e.g., Flannery 2003).

What has been presented above is a very abstract critique of core-periphery models and a general conception for improving studies of ancient states through the archaeology of disjuncture. In the following section, and in Chapter 3, I apply these concepts to Teotihuacan's role in the Classic Mesoamerican world-system. The bulk of this dissertation deals with regional cultural evolution in the Tuxtla Mountains, but previous research suggests that an understanding of regional evolution cannot be achieved without consideration of broader macroregional concerns during the Classic period.

TEOTIHUACAN AND THE CLASSIC MESOAMERICAN WORLD-SYSTEM

The role of Teotihuacan in the Classic Mesoamerican world-system is an excellent example of the concepts introduced above. The impact of Teotihuacan on sites and regions throughout Mesoamerica (see Figure 1.2) ranged from military conquest and direct political control to the imitation of Teotihuacan symbols in the periphery with little direct interaction (cf., Arnold and Santley 2008; Bove and Medrano 2003; Braswell [ed.] 2003; Díaz Oyarzabal 1981; Fash and Fash 2000; Hirth 1980; Spence 1996a; Stuart 2000). Outside the Basin of Mexico, however, it was common that neighboring settlements and polities reacted very differently to Teotihuacan. A considerable amount of research has been undertaken to identify the hundreds of sites where Teotihuacan held some sway – whether political, economic, or purely symbolic – but the relationships among these interactive nodes and their neighbors have not been systematically examined.

The context in which evidence of Teotihuacan interaction is found is perhaps the most important variable to understand the nature of interaction. In some regions, like eastern Morelos, Teotihuacan influence was pervasive (Hirth 1980, Hirth and Angulo 1981, Smith and Montiel 2001, Montiel 2010). The central Mexican city affected the lives of both elites and non-elites in both urban and rural sites, and it touched sacred and mundane realms of society. Hirth (1980) argues that the central Mexican metropolis reorganized settlement in the Amatzinac and Frio Valleys to better extract surpluses. In short, Teotihuacan disrupted most aspects of local politics, economy, and culture. Elsewhere, like at Kaminaljuyú, Teotihuacan influence was confined primarily to symbolic emulation found almost exclusively in the tombs and architecture of a few elites (Braswell 2003a, 2003b; Cheek 1977; Demarest and Foias 1993). Outside Kaminaljuyú, few known sites in the Valley of Guatemala possess Teotihuacan-related materials or architecture (but see research conducted at Solano and Frutal [Brown 1977]. Recent interpretations of these data suggest that elite alliances with Teotihuacan were used to legitimate local authority – a mostly symbolic disruption (Iglesias Ponce de Leon 2003). South of the Valley of Guatemala on the Pacific Coast, however, Teotihuacan interactions began at Balberta through relatively symmetrical exchanges. Symbiosis radically transformed at a later date with the emergence of the Montana settlement complex (Bove and Medrano 2003). This shift transformed from exclusively elite prestige interactions to a more widespread adoption of Teotihuacan styles in both domestic and public domains. In the Valley of Oaxaca, Monte Albán elites monopolized local access to Teotihuacan and use of its symbols. Episodes of visits from Teotihuacan are documented on Monte Albán stelae (Marcus 2003), and ethnic Zapotecs lived in a barrio at Teotihuacan (Spence 1996a). This relationship may have been ambassadorial because warfare between these two polities would have been costly (Hassig 1992). Other powerful polities rejected relationships with the metropolis. Cantona, a very large and influential center situated along a major trade route, displays no substantial evidence for a relationship with Teotihuacan (García Cook 1998, García Cook and Merino Carrión 1996).

Each region of study in Mesoamerica has a unique history of Teotihuacan interaction or non-interaction. The variability seen from region to region appears to have been affected by several factors including distance from Teotihuacan, local resources available, and the power possessed by the interacting party. Moreover, different polities adopted different aspects of Teotihuacan culture. Within the Maya region, for example, there was an emphasis on the Teotihuacan-influenced Tlaloc-Venus warfare (Berlo 1984, Bove and Medrano 2003, Fash and Fash 2000, Schele and Freidel 1990, Stuart 2000). In fact, Teotihuacan war images may have been more important in the Maya region than at Teotihuacan itself. Furthermore, this warfare cult was used in very different ways. In the Maya region, Tlaloc-Venus warfare was used to enhance the prestige of individual rulers and their lineages (Fash and Fash 2000), but at Teotihuacan warrior sodalities served to cross-cut and deemphasize the importance of individual lineages (Headrick 2007). At Monte Albán, some of those same images, like the butterfly, were reinterpreted to deemphasize war and were instead blended with local religious styles (Berlo 1984). Still other regions, like the Gulf Coast and specifically the Tuxtlas region, rarely displayed the militaristic images associated with Teotihuacan (Ortiz and Santley 1998, Santley et al. 1987, Yarborough 1992). Teotihuacan and the Gulf Coast displayed a more symmetrical sharing of ceramic types, vessel forms, decorative motifs, and domestic as well as prestige goods (Daneels 2002b, Pascual 2002, Rattray 2001, Stark 1998). This brief discussion, which is presented in more detail in Chapter 3, demonstrates disjuncture among the flows of Teotihuacan political authority, identity, symbols, ritual, and economy throughout Mesoamerica. What is less clear in the existing literature is how this variation affected intraregional cultural landscapes (cf. Hirth 1980, Stark 1990).

The concern for characterizing Teotihuacan's role in the Classic Mesoamerican world-system has typically been addressed in radial fashion. That is, identification of Teotihuacan-style materials found outside the Basin of Mexico have been interpreted as direct interaction with the central Mexican city or through some intermediary. Where no Teotihuacan-related materials were found, no impact is thought to have taken place. This "black-and-white" treatment of systemic connections over the Mesoamerican landscape disregards the fact that sites and polities with and without Teotihuacan connections were often themselves linked through intensive regional networks. It is common to see closely situated sites and polities take very different stances with regard to Teotihuacan. Despite the various models used to explain Teotihuacan's influence, the most accurate descriptor may be "spotty". This raises the question: how did different reactions to Teotihuacan affect intraregional patterns of social, political, economic, and symbolic interaction? If all nodes within a regional network are connected, and one of those nodes experiences a disruption, does the network divide, intensify, become realigned toward Teotihuacan, or some alternative scenario? To what degree do these different decisions cause a cultural divergence within the regional system? These questions have not been systematically tested at a scale of analysis large enough to construct models for the impact of Teotihuacan on regional networks. A notable exception is conquest and dramatic settlement reorganization exemplified by research in eastern Morelos (Hirth 1980, Montiel 2010, Smith and Montiel 2001).

This limitation is due in large part to the restricted geographic foci of archaeological excavations and survey blocks. Over the past two decades, the Tuxtla Mountains of southern Veracruz, Mexico have seen an explosion in regional surveys yielding a large block of settlement data for the region (Borstein 2001, Killion and Urcid 2001, Kruszczynski 2001, Loughlin n.d., Pool and Ohnersorgen 2007, Santley and Arnold 1996, Stoner 2008). While there are small gaps between survey areas, coarse-grained and fine-grained settlement data exist for a relatively large part of the southwestern Tuxtla Mountains and its foothills. Of particular interest is a comparison of the survey conducted in the Catemaco Valley, which has demonstrated a special relationship with the central Mexican metropolis (Arnold and Santley 2008, Pool 1992a, Santley et al. 1987), and the current research in the neighboring Tepango Valley.

In 2007, I undertook an archaeological survey of the Tepango Valley with the explicit purpose of examining intervalley relationships. Part of this investigation focused on the broader impacts of how Matacapan's relationship with Teotihuacan affected the evolution of the two neighboring river valleys. Neither limited research conducted at the site of Totocapan (Valenzuela 1945b; elsewhere referred to as El Picayo), nor the current survey, which included Totocapan, yielded a significant frequency of Teotihuacan-related materials. This variable response to Teotihuacan seems typical of what we know about Teotihuacan's role in Mesoamerica writ large, making the Tuxtlas a good candidate for a controlled test of tensions among local, regional, and macroregional processes within the Classic Mesoamerican world-system.

THE ROLE OF TEOTIHUACAN IN THE CLASSIC TUXTLA MOUNTAINS

The Gulf Coast region, like others, displayed variable connections to Teotihuacan (Daneels 2002b, Pascual 2002, Stark 1990, Santley et al. 1987, Yarborough 1992). Matacapan displays the best evidence for interaction with the great central Mexican city on the Gulf Coast. Data that support this statement include architectural affinity with Teotihuacan in the administrative precinct of Matacapan, presence of *candeleros*, cylindrical vases with solid and hollow rectangular tripod supports, a small percentage of Thin Orange imports, Teotihuacan-style figurines, similar mortuary practices, and relatively high percentages of green obsidian (Arnold and Santley 2008). The highest frequencies of these indicators were found within the administrative precinct of Matacapan, but they spilled-out into surrounding communities as well. Pool and I, for example, argued that the small amount of Teotihuacan-style materials found at Tres Zapotes resembled a subset of those found at Matacapan and were executed in styles more similar to those found at Matacapan than at Teotihuacan itself (Pool and Stoner

2004). This suggests that Matacapan may have been the primary connection between various Tuxtla sites and Teotihuacan.

Several researchers have considered Matacapan to be a Teotihuacan enclave, a conclusion that has been debated and revised over the past 20 years (Arnold and Santley 2008; Cowgill 1997; Ortiz and Santley 1988, 1998; Pool 1992a; Santley 1994; Santley et al 1987; Spence 1996a; Yarborough 1992). The latest take on this phenomenon is that a disaffected group of Teotihuacanos who worshiped Quetzalcoatl fled religious persecution from the metropolis and settled at Matacapan (Arnold and Santley 2008). In any case, the leaders of Matacapan obviously deemed their connection to Teotihuacan as important. Teotihuacan symbols, in part, defined the identities of Matacapan's ruling regime and a segment of the upper Catemaco Valley population. The spread of this style into surrounding communities, albeit at low frequencies, suggests that Teotihuacan ideals permeated the common daily life of the Classic upper Catemaco river valley (Pool 1992a). Furthermore, comparison of settlement patterns, architectural style, and material culture style among the Catemaco Valley and surrounding regions demonstrates that the Matacapan polity diverged in many aspects from Gulf Coast cultural traditions. In brief, Matacapan deemphasized the ball game that was so important for negotiating politico-ritual authority elsewhere on the Gulf Coast, it ignored both "Standard Plan" and "Long Plaza Group" architectural layouts that symbolized political authority throughout much of the Gulf Coast, settlement was much more centralized in the Catemaco Valley, and the Matacapan polity developed a more commercial economy at an earlier date than other parts of the Gulf Coast (cf., Arnold and Stark 1997; Daneels 2002a, 2008a; Dominguez Covarrubias 2001; Killion and Urcid 2001; Koontz 2008; Stark 2003, 2008; Stark and Garraty 2004; Urcid and Killion 2008). All of these cultural differences co-occur with the affinity between Matacapan and Teotihuacan.

Regarding the argument that Matacapan was a Teotihuacan enclave, Spence (1996a:344) surmised that "it remains to be demonstrated precisely how different [Matacapan] was from both prior and contemporaneous communities in the region." It is in this quote that I defined my approach to the Classic Tuxtlas. The differences observed between the Matacapan polity and other polities on the Gulf Coast may have developed as basic idiosyncratic variations characteristic of the Tuxtla region writ large.

Alternatively, the link between Matacapan and Teotihuacan may have disrupted local systems of interaction leading the former to diverge from the course of cultural development seen at surrounding polities. Furthermore, what aspects (ritual, symbolic, political, economic) of Tuxtlas culture were disrupted? Was it a superficial appropriation of foreign symbols to legitimate political authority, or were local identities and political economies more profoundly affected?

To demonstrate the affect of Teotihuacan in the Tuxtlas, a comparative approach at a broader scale of analysis is called for. Perhaps the biggest gap in the archaeological data available for the Classic Tuxtlas is a site referred to as El Picayo (Ortiz 1975) or Totocapan (Valenzuela 1945b)[1]. Totocapan is situated in the upper Tepango Valley, which borders the Catemaco Valley to the west. Limited research conducted by Ortiz (1975) and Valenzuela (1945b) detected only two rim sherds of Teotihuacan-style cylindrical vases, a marionette-style figurine, and symbols engraved on a single plate that may represent a Late Classic echo of Teotihuacan's former influence in the region. In fact, Valenzuela (1945a, 1945b) conducted research at both Totocapan and Matacapan. While the Teotihuacan connections to Matacapan were obvious to Valenzuela, he noted that Totocapan materials evinced greater similarities to Maya[2] cultures.

Despite the differences in their foreign associations, both centers present similar sizes and architecturally complexity. Additionally, both centers grew and declined along similar trajectories during the Classic period. Totocapan and Matacapan were undoubtedly linked within a regional network. Linkages can be seen in ceramic forms, paste recipes, and decorative styles; the timing of their development and decline; and their proximity. I also present data in Chapter 9 that strongly suggests that the two centers were directly engaged in economic exchanges. I will elucidate throughout this dissertation, however, they were different in many ways. The rulers of Matacapan carried their polity along a path that diverged from more local cultural practices seen at

[1] I follow Valenzuela (1945b) and refer to this site as Totocapan because the overwhelming majority of monumental architecture occurs by the modern community of the same name. An individual district of the Totocapan site is named El Picayo.
[2] Archaeologists now know that Totocapan displayed cultural traits that fit well as a variant of the broader Gulf Coast culture in Veracruz.

Totocapan and various major sites in the region, such as Teotepec (Arnold personal communication, Santley 2007, Santley and Arnold 1996).

The current survey undertaken at Totocapan and its hinterland recovered only a handful of remotely Teotihuacan-style materials despite collection and analysis of over 65,000 artifacts throughout the valley. So why did these foreign symbols come to represent part of the cultural identity displayed by groups in the Catemaco Valley, while most groups in the Tepango Valley almost completely rejected them? This situation appears to have been typical of Teotihuacan's influence throughout Mesoamerica, so the Tuxtlas provides a case study to test and refine extant theories about Teotihuacan's role in Mesoamerica.

THE TEPANGO VALLEY ARCHAEOLOGICAL SURVEY

During the Spring and Summer of 2007, I conducted a systematic pedestrian survey of 120 square kilometers at Totocapan and its hinterland along the Tepango and Xoteapan rivers to the south[3]. Survey of this area was conducted to facilitate political, economic, and social comparisons among settlements in the Tepango and Catemaco valleys, and between Totocapan and Matacapan specifically. Accordingly, many of the methods employed in this dissertation were patterned, or modified, from those developed by researchers in the Catemaco Valley (Santley 1991, Santley and Arnold 1996).

Data was collected on basic settlement composition (size, location, and population of sites), architecture (number, size, form and distribution of mounds and formal architectural complexes), monuments and petroglyphs, and landscape modification. For each site[4] recorded, several surface artifact collections were made to cross-date the settlement to the established regional ceramic chronology (Ortiz 1975, Ortiz and Santley 1988, Pool 1990, 1995, personal communication, Venter 2008). Laboratory analysis classified ceramic materials according to this typology. Additionally, obsidian was characterized according to color, source, and technology (Barrett 2003; Knight 1999).

[3] The Xoteapan River is a tributary of the Tepango. For ease of description, I refer to these two rivers together as the Tepango Valley but call out the rivers individually where appropriate.
[4] The "site" terminology is discussed conceptually in Chapters 2 and methodologically in Chapter 5.

Ground stone tools (e.g., *manos* and *metates*), ceramic figurines, and special objects were all typed and described with reference to previous research (Follensbee 2000, Jaime Riveron personal communication, Kruszczynski 2001, Weiant 1943,).

Upon return to the United States, I entered an internship at the University of Missouri Research Reactor (MURR) to process and analyze a sample of Coarse Orange jar sherds using instrumental neutron activation analysis (INAA). This ware was produced in workshops at Matacapan and traded over much of the Catemaco Valley (Stoner 2003, Stoner et al. 2008). It is therefore an important marker of economic interaction. Additionally, a small sample of obsidian was analyzed using X-ray Fluorescence (XRF) to verify visual source designations.

The data collected by the Tepango Valley Archaeological Survey is compared to published data collected elsewhere in the Tuxtlas region and the Gulf Coast. This study is inherently spatial and amenable to a landscape perspective. To examine potential disjunctures, I employ methods and theory to tease apart interactions into four landscapes of interaction: symbolic landscape, political landscape, economic landscape, and ritual landscape.

ORGANIZATION OF THE DISSERTATION

Chapter 2 details the theoretical basis for studying the development of the Tuxtlas and the tensions between local and non-local forces of cultural evolution. The analytical framework is constructed based on a combination of institutional analysis and theories on space. I follow Giddens (1979, 1984) in conceiving of all social institutions as having three dimensions: signification, domination, and legitimation[5]. The combination of these three dimensions form institutions of symbolic orders, authority (political), allocation (economic), and legality/morality[6]. All of these institutions leave material signatures in space and time that are understood through the landscape perspective (Ashmore and Knapp 1999, Bender 1993, Hirsch 1995, Ingold 1993, Pool and Cliggett 2008, Tilley

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[5] Other institutional dimensions could be identified.

[6] While I do not have the data to speak of legality within the TVAS, moral order is imposed by religious ritual in the survey area. Ritual is a very accessible data set within the study region.

1994, 2008, Zedeño 2000). Landscapes are envisioned by Adam T. Smith to comprise three dimensions of landscape: experience, perception, and imagination. By cross-tabulating Giddens institutions and Smith's dimensions of landscape, I arrive at a holistic framework that consists of the symbolic landscape, political landscape, economic landscape, and ritual landscape. The concepts of disjuncture, disruption, and divergence are then examined in relation to this framework.

Chapter 3 examines the Classic Mesoamerican world-system with respect to Teotihuacan. In order to recognize the use of Teotihuacan-related symbols and behaviors across Mesoamerica, it is necessary to have a basic understanding of Teotihuacan culture. I begin the chapter with an overview of Teotihuacan, particularly focusing on how its symbolic, political, economic, and ritual institutions interrelated to form a coherent cultural package specific to the metropolis. From this baseline, I examine how groups in central Mexico, Puebla, Oaxaca, the Maya Highlands and Lowlands, Michoacán, and the Gulf Coast differently adopted, reinterpreted, or rejected Teotihuacan's cultural package.

Chapter 4 examines the natural setting and gives a brief history of archaeological research for the Tuxtla Mountains. The function of this chapter is not to provide a comprehensive discussion of archaeological findings, but instead to present a general literature review of the types of research undertaken in the region with a specific focus on a few particular studies. I also identify several important features of the Tuxtla landscape that become important elements of the spatial analysis in subsequent chapters. The structure of Chapters 7, 8, and 9 calls for a more detailed comparison of the TVAS findings to the Tuxtla region and the Gulf Coast macroregion. To avoid redundancy, detailed background research is delayed until the presentation of data.

Chapter 5 details field and laboratory methods. I begin this chapter with a general discussion of objectives for field and lab work. This is followed by an examination of material correlates and connecting arguments used to reconstruct the symbolic landscape, political landscape, economic landscape, and ritual landscape. It is realized that some sources of data transcend multiple landscapes. These are precisely the connective tissue through which landscapes are conjoined. Points of conjuncture and disjuncture among landscapes are discussed in Chapter 10, but during the presentation of data, I do my best to analytically separate different cultural flows.

Chapter 6 presents the chronology of the Tuxtla region. Chronological reconstruction is based principally on the ceramic typology that has evolved since 1975 (Ortiz 1975; Ortiz and Santley 1988; Knight 1999; Kruszczynski 2001; Pool 1995, personal communication; Urcid and Killion personal communication;). Ceramic types, variants, forms, and decorations are part of the symbolic landscape that is deeply rooted in the cultural evolution of the Tuxtlas, and I summarize the chapter with an evaluation of the Tuxtlas symbolic landscape. This discussion provides a baseline to assign collections to temporal periods and to identify regional and interregional interaction networks over the subsequent chapters.

Chapter 7 details the history of settlement within the TVAS from the Middle Formative through the Postclassic. Settlement hierarchies are reconstructed for each time period, along with a brief consideration of the degree of political centralization within the Tepango Valley. Following the presentation of each time period, I estimate polity boundaries for a broader segment of the Tuxtla region using geospatial models. These models generate alternative hypotheses for each phase of occupation that will be tested in Chapters 8 and 9. The central objective of Chapter 7 is to present a reconstruction of the experience of the political and ritual landscapes.

Chapter 8 compares architectural and stylistic data from the TVAS to other archaeological work conducted on the Gulf Coast. The purpose of this analysis is to draw cultural and political affiliations between the survey area and other groups on the Gulf Coast. Equally important is to identify architectural and stylistic differences among groups. These data are used to understand how the polities were imagined and conceived by regimes in both river valleys, and how they managed to promote social order through different politico-ritual ideologies. These data are also used to evaluate polity boundaries hypothesized in Chapter 7. In general, redundancy among architectural and material culture styles may indicate close social and political relationships while differences indicate possible sociopolitical boundaries. In Chapter 8, I emphasize the perception and imagination of the political, ritual, and symbolic landscapes.

Chapter 9 presents data on the production and exchange of ceramic and obsidian goods for the TVAS. It is a reconstruction of the economic landscape with a focus on how settlements were provisioned with basic tools. The discussion characterizes the experience of the economic landscape with respect to the degree of commercialization and economic centralization. Part of this analysis involves chemical analysis of Coarse Orange jars, which were produced at intensive workshops at Matacapan. The TVAS data are then compared to political economic research conducted at Matacapan and in the Catemaco Valley.

Chapter 10 seeks to identify points of conjuncture and disjuncture among the landscapes examined in the preceding chapters. Disruption and divergence affect relationships along different landscapes of interaction to different degrees and at different scales. The result is a complex interplay among distinct webs of interaction that define each node on the landscape in relation to their context within local, regional, and interregional networks. This chapter also highlights the contributions that this dissertation makes for understanding the regional archaeology, the role of Teotihuacan in the Classic Mesoamerican world-system, and theory of world-systems interaction in general. In particular, the role of Teotihuacan in the Tuxtla Mountains is revisited in light of this broader-scale analysis. Relationships between the Catemaco Valley and Tepango Valley settlements can be understood through the disjunctures formed by their differential connectivity to the "outside" world and among groups in the regional network. The result was partial disruption of institutions in both valleys and a situation of divergent evolution. I conclude with recapitulation of major points in the development of an archaeology of disjuncture.

CHAPTER 2: DISRUPTION, DIVERGENCE, AND DISJUNCTURE IN ANCIENT WORLD-SYSTEMS

Previous studies in the Tuxtlas have addressed the external contacts that Matacapan forged with Teotihuacan, but recent surveys and excavations in the region demonstrate that other large centers, such as Totocapan and Teotepec, fall more in line with Gulf Coast cultural currents. The differential integration of Teotihuacan influences into the cultural evolution of various Tuxtla groups, and the resulting impact on preexisting social, political, and economic networks, require more consideration.

One of the prominent themes featured in anthropological theory over the past few decades is how local groups interact at multiple scales of social integration (e.g., Appadurai 1996, 2001; Friedman 1994; Hegmon et al. 1999; Helms 1993; Kearney 1995, 2004). Local agents make different decisions with regard to broader-scale flows of cultural information. World-systems theory, in particular, is designed to explain the ways in which different regions are incorporated into global flows of people, goods, and ideas (e.g., Frank and Gills 1993, Hall 1999, Kardulias and Hall 2008, Wallerstein 1974). On the other hand, archaeologists have long studied *intra*regional relationships between centers and hinterlands (e.g., Blanton et al. 1993, Kolata 1987, Renfrew and Level 1979, Rowlands 1987, Sanders et al. 1979), and local relationships among elites and non-elites (e.g., Chase and Chase 2003, Cowgill 1992a, Earle 1997, Pauketat 1992). Agency perspectives are particularly useful for demonstrating how local agents draw upon foreign connections to enhance their power at home (e.g., Flannery 1999, Håkansson 2004, Helms 1993, Hirth 1992, Kohl 1989, Peregrine 1992, 1999). While archaeological research has been undertaken at different scales of analysis, it lacks a multiscalar framework to explain how local, regional, and macroregional linkages are layered together to create dynamic cultural forms at specific times and places.

In developing the framework for this research, three major themes stand out as important. First, it must incorporate multiple types of interaction without becoming too cumbersome. I begin with the concept of “institution”. Institutions are long standing sets of practices or behaviors that shape and are shaped by the relationships among social actors. There are many kinds of institutions within every social group, but they can be characterized based on three general dimensions of variation: signification, domination, and legitimation (Giddens 1979:96-103). These three institutional dimensions intersect to form symbolic orders, political (authoritative) institutions, economic (allocative) institutions, and legal/moral institutions. I add an aspect of morality to the final institution, where Giddens refers strictly to legal institutions. In many societies, morals instilled through by parents, schools, and religion establish social order in much the same way as law. Furthermore, religious doctrines, in many cases, more overtly dictate codes of behavior that are treated as law. In considering religion/ritual, I employ a more inclusive definition of law like that proposed by Hoebel (1954). "A social norm is legal if its neglect or infraction is regularly met, in threat or in fact, by the application of physical force by an individual or group possessing the socially recognized privilege of so acting (Hoebel 1954:28)." Together, the four institutions considered by Giddens encompass most types of structured relationships that operate within all cultures. Each institution binds a populace, to different degrees, into a cohesive social system. Religion supplies common belief structures, laws mitigate conflict, politics establish decision making apparatuses, systems of production and exchange provision material wants and needs, language provides a common medium of communication, and shared symbols express a mutual identity.

The second important theme is how these institutional configurations play out over space and time. Each institution possesses a spatial component, as networks of interaction unravel connecting people in different places throughout the system. The basic point of disjuncture is that the institutions described above develop into different spatial expressions that become increasingly complicated as groups with different cultural histories engage each other on the landscape. The spatial expression of these social relationships is a key element of landscape theory (Anschuetz et al. 2001; Ashmore and Knapp 1999; Bender 1993, Chapman 2006; Hirsch 1995; Ingold 1993; Smith 2004; Tilley 1994, 2008; Tuan 1977; Zedeño 2000), which provides a bridging argument to make archaeological data informative for the reconstruction of social processes. Adam T. Smith's categorization of space fits well within the broader goals of this dissertation. Smith conceives of space as comprising three dimensions: experienced space, perceived space, and imagined space. Most archaeological inquiries deal primarily with experienced space as it pertains to the movement of objects and people without regard to the higher level cognitive processes that guide the sensory interpretation (perception) and planning (imagination) of spatial order/disorder. Landscapes form through networks of interaction among people and places (Zedeño 2000).

The third major consideration is scale. Scale cannot be boiled down to a simple formula of the area covered by a social network. Scale has two facets considered here. Geographic scale refers to expanding pyhsiographies of inclusion, such as site, drainage, river valley, mountain range. These are increasing physiographic levels that remain stable regardless of the human movements, interactions, and imaginations that form within them. In the current study area, I refer to settlements within two neighboring river valleys, but I do not assume that each valley corresponded perfectly to social units. Relational scale, on the other hand, pertains to levels of human integration such as individual, household, neighborhood, city, polity, or empire. While geographic and relational scale often map onto each other, the concepts of disjuncture, disruption, and divergence all describe situations where macroregional networks transcend geographic boundaries to create very fluid landscapes of social interaction. Cultural traits become detached from their specific geographic origin as they are shared among groups situated within very different institutional contexts. Furthermore, social networks rarely occupy discreet spaces. A single individual may participate in multiple social networks, each with a different spatial expression.

THE ANALYTICAL FRAMEWORK

Table 2.1 is a cross-tabulation of four different categories of institutional behaviors enacted through the experience, perception, and imagination of space. The cells are essentially interdependent modes of analysis. As an analytical *framework,* my intent is not to apply it deductively to any particular case, but to proceed inductively and characterize the data with regard to each analytical mode (i.e., cell).

Table 2.1. Analytical framework.

	Symbolic landscape (Symbolic Orders)	Political Landscape (Authorization)	Economic Landscape (Allocation)	Ritual Landscape (Legal/Moral)
*	S-D-L	D-S-L	D-S-L	L-D-S
Experience	Signs employed by ingroups/outgroups patterned over space and time. ▪ cultural uniformity ↔ diversity ▪ ethnic segregation ▪ ranked identities ▪ social boundaries	Heterarchical and Hierarchical distribution of authority within and between polities. ▪ centralized ↔ dispersed ▪ political boundaries ▪ ranked segregation ↔ integration across space	Horizontal and vertical movements of materials, goods, and labor ▪ centralized ↔ dispersed wealth ▪ organization of production and exchange ▪ degree of commercialization ▪ socioeconomic segregation	Normalization of social orders according to legal and moral codes of behavior. ▪ sacred vs. secular space ▪ public vs. private space ▪ social disorder through competition and resistance
Perception	Perception of meaning in symbol communicates identity through interpretive schemes ▪ material expressions of ingroup/outgroup ▪ endogenous vs. exogenous identity formation	Signification of dominance and subordination in material culture and architectural configurations. ▪ architectures of power ▪ social structure embedded in spatial structure ▪ political symbols	Wealth differences displayed or concealed according to economic ideologies. ▪ conspicuous consumption ↔ hidden wealth Esoteric wealth/knowledge ▪ prestige associated with goods from certain groups or exotic materials	Ideological structuring of space to reflect the cosmos and/or civic structure. ▪ ritual processions ▪ cosmology in urban planning
Imagination	Conscious and subconscious negotiation of symbols sanctioned by the group. ▪ imagined communities ▪ preconditioned beliefs about outgroups	Political strategies/ideologies designed to naturalize and legitimate authoritative structure. ▪ how regimes relate to subjects ▪ rules of political succession ▪ collective ↔ exclusionary	Economic rationale that motivates accumulation and legitimates wealth differences. ▪ profit rationale ▪ communal benefit ▪ forceful appropriation	Formulation of laws and morals through legal and religious institutions to preserve inequalities in wealth and authority. ▪ sumptuary laws ▪ legitimation of authority

* S=Signification; D=Domination; L=Legitimation
↔ = Continuum

DIMENSIONS OF INSTITUTION

Institutions are "collectivities bound together by shared histories and interests that shape ingrained values and routines (A. Smith 2004:235)". They are deeply embedded structures of sociocultural reproduction that develop over long periods of structuration (Giddens 1979). Institutions can be very stable and they tend to maintain and reproduce social order rather than incite change (Weber 1978). Agents can produce change, however, either internally through the institution itself or by operating outside its parameters. Resistance to established social institutions can be achieved through radical social movements, such as revolution, or through more subtle means, such as painting graffiti in public places (Pearson and Richards 1994).

Giddens (1979:96-103; 1984:29-32) presents three structural dimensions that combine in different ways to produce institutional orders or forms. These are signification, domination, and legitimation. *Signification* is based in coding theory. Signs are the basic component of communication, but signification refers to the structural features that give signs meaning. Communication can only be successful if the actors possess enough knowledge of each other's signification to arrive at an interpretive scheme. Obviously, the principal interpretive scheme employed between two English speakers is the English language, but spoken language is assisted by many other signs, such as body language, gestures, pictures, symbols, or clothing. One of my goals in the discussion of the symbolic landscape below is to treat artifacts as signs that portray meaning as to how cultural groups signify themselves in ancient sociocultural systems. Architectural layouts and material culture styles communicate information about the interconnectivity among individuals or groups. Shared symbols represent direct or indirect social relationships. The expression of social identity through material culture is a longstanding, but much debated, topic in archaeological thought (Gosselain 1992, 2000; Lemonnier 1992; Sackett 1985; Wobst 1977, 1999; Weissner 1983, 1984, 1985).

Domination refers to the properties that structure resources of authority and wealth in the system. Authority is the capability of an agent or collectivity to generate command over persons, while allocation refers to the capability of an agent or collectivity to enact command over objects and materials (Giddens 1979:100). Authority and allocation are elements of structure that constitute relations of autonomy and dependence, which is highly dependent on the power one wields. Power is the transformative capacity of agents to intervene in the events of the world to produce a desired outcome. The relationship between domination and power is not one of directional cause and effect. It is enacted through a duality like that between structure and action. The application of power, which is itself composed of authority and allocation, serves to produce and reproduce relations of autonomy and dependence.

Legitimation refers to the structural properties of codes of conduct, which strike some balance between individual rights and social obligations. This balance is highly variable and has ranged through human history from the denial of individual rights (e.g., slavery) to egalitarianism where social differences are leveled. Legitimation, as the structural properties that guide social conduct, is engaged in a duality with sanctions (e.g., laws, morals, ethics) that enforce or encourage certain modes of conduct and threaten punitive action for veering from the specified path. Legitimacy is often contested because it is subjectively defined in the imaginations of different agents competing for power and resources.

These three dimensions of sociocultural structure are inextricably linked to produce institutional forms that exist in space and time. In short, institutions are legitimate mechanisms of social integration that define the relationships among actors and groups. As such, institutions are part of social structure because they set rules to guide interaction. There are many types of institutions, which generally fall into four categories: symbolic orders (modes of discourse); political (authorization of resources); economic (allocation of resources); and legal/moral (modes of sanction). I include religion in the final category because it establishes a moral code of conduct, and in ancient states religious legitimation was often necessary to sanction political authority. In the discussion below, I focus specifically on ritual institutions.

These four institutions form one axis of the analytical framework (listed in the columns across the top of Table 2.1). They are categories of qualitatively different human interrelationships that are never completely divorced in practice (Polanyi 1957). While the embeddedness of various social institutions is not disputed here, traditional approaches to political economy tend to lock political, economic, and ideological institutions into set modes of social relations (Saitta 1994, Wolf 1982) that do not adequately characterize the multiscalar nature of interactions in complex societies. Interinstitutional correlations are easy to describe when dealing with a single cultural group assumed to exist in isolation. Many traditional ethnographies, for example, paint a clear picture of how their subject cultures function in terms of their institutional configurations. Characterization of culture in this way disregards cultural process and external social interactions that contribute to the institutional forms observed in any slice of time. This is not a new critique, but it serves an illustrative point here. The collision of disparate cultural groups on a broad-scale field of interaction creates disjunctures in the formation, reproduction, and interrelationships among different institutions.

SPACE, PLACE, PATHWAYS, AND LANDSCAPE

Space is the primary medium for this analysis. The second analytical axis in Table 2.1 is populated by Adam T. Smith's (2004) characterization of space, which is more broadly couched within the landscape paradigm. The landscape paradigm has contributed greatly to archaeology, and archaeology has, in turn, contributed greatly to social sciences through its inherently spatial analytical nature. Anscheutz and associates classify the landscape approach to archaeology as a construct paradigm, which is a set of strategies and tools for approaching and interpreting scientific data (2001:160-161). The landscape paradigm unifies disparate approaches and theories employed in anthropology and other social sciences to understand human groups. Landscape has bridged the gap between contrasting perspectives, such as processual and post-processual, or scientific and humanistic approaches (Anschuetz et al 2001, Crumley and Marquardt 1990). This is due, in large part, to the reflexive relationship between human behavior and space.

Human action transforms space, leaving material traces such as buildings, roads, causeways, forest clearings, trash dumps, or religious shrines. The most extreme example of landscape modification that I have witnessed relates to the coal mining industry in the Eastern Kentucky Coalfields (Figure 2.1). Entire mountaintops are removed to gain access to a coal seam. The "spoil" from the top of the mountain is dumped into the valley in temporary storage called "hollow fills". Mines abandoned prior to the Surface Mining Control and Reclamation Act (SMCRA) of 1977 were not reclaimed, leaving broad flat land at the summit, often reducing the elevation of large ridge crests by several hundred feet. After SMCRA, abandoned mine lands have been reclaimed to varying levels of success. Reclamation involves grading the removed rock and earth back up the mountain to simulate the ridge crest. To hold this mine spoil in place, the mining company attempts to grow vegetation on the newly created hillside, sometimes without success. Mountain top removal mining potentially pollutes rivers with metals unsuitable for human consumption, dumps silt into streams killing a variety

Figure 2.1. Two views of coal mines in Leslie County, Kentucky (Stoner 2009).

of fish species, and dramatically alters drainage patterns and environmental stability. Every year in Eastern Kentucky, abandoned mine lands cause hundreds of serious problems with landslides, mine seepage, and pollution of water that must be monitored and rectified. This physical transformation of the landscape is at once awesome and terrible, depending on perspective. Reclaimed lands are the subject of both protests and pride. Transformations of space do not always leave physical traces, though. In ancient states, natural physiographic features were integrated into the worldviews and cultural memory of the humans that experienced them (Bender 1993). While prominent mountain peaks may remain physically untouched by human hands, human groups throughout history have imagined important roles for them (e.g., Williams and Nash 2006).

Beyond seeing space as a byproduct of social processes, the physical and cognitive structure of the landscape functions in much the same way as the structural properties of the sociocultural system. Agents construct space into imagined configurations that serve to structure movement, social distinctions, public and private space, sacred and secular domains, and the way subjects relate to regimes. The daily experience of these built spaces can reproduce or contest established social orders (e.g., Pearson and Richards 1994). One may speak of a duality of space similar to Giddens's duality of structure. Space is not merely the medium through which social practice takes place. The reproduction of relationships between social actors and the natural environment transforms space and time into the physical and cognitive properties that structure human social systems. Space becomes institutionalized.

All archaeological studies deal with space, but analytical approaches to space vary tremendously. Following Adam T. Smith's (2004) book, entitled *The Political Landscape: Constellations of Authority in Early Complex Polities*, space can be analytically separated into three dimensions with regard to how humans interact with each other and the natural environment: experience, perception, and imagination.

Spatial experience "describes the flow of bodies and things through space (A. Smith 2004:73)". Examples of experienced space include the flow of trade goods, segregation of diverse populations into neighborhoods or districts, differentiation of elite and non-elite space, or the organization of political authority into multiple administrative seats scattered throughout a region. Experiencing space does not require one to rationalize the existential realities of his/her movements. This is a similar concept to agents acting based on practical knowledge or historically conditioned dispositions. In this sense, the experience of space has been the subject of most archaeological inquiries throughout much of the history of the discipline . Humans, like all animals, are affected by basic spatial concerns within the natural environment such as the geographic distribution of resources and topography. The location of people in relation to sources of food, for example, requires some physical movement to satisfy basic economic needs. The most 'natural' illustration of this movement through space is the patterns that simple foragers follow to procure food from the natural environment (Binford 1982, R. Kelly 1995). However, unlike other members of the animal kingdom, humans also transform space into built-environments that suit their economic, political, and social needs. The built-environment influences the movements of people within the natural environment and their interactions with each other (Bender 1993, D. Sanders 1990, Tilley 1994,). Spatial divisions, such as walls around palaces or elite compounds, can actually function to perpetuate social inequalities (Topic 2003). On the other hand, maintaining communal space at the center of a village can enforce social equality (e.g., Kelly et al. 1989, Turnbow 1992).

At a higher cognitive level, how actors perceive space is a question that addresses their sensual interaction with the landscape (Bender 1993; Hirsch 1995; Ingold 1993; A. Smith 2004:73; Tilley 1994, 2008). The perception of space utilizes an interpretive scheme constructed from the actor's situational knowledge of his/her culture's rules of signification. Interpretive schemes communicate to the viewer deeply ingrained values and norms that associate certain prescribed actions with different spaces. The perception of space therefore serves as a filter between the mental and material domains of landscape (Pool and Cliggett 2008). The designation of public versus private space, for example, can be signified by walls, doors, or closed window blinds. The conceptual designs that draw this distinction in space are imagined in the mind of the architect and experienced through physical barriers. A closed door at the front of a house only serves its imagined purpose, however, if the viewer properly perceives and interprets it as a sign to knock and wait for an answer.

Finally, spatial imagination is expressed through maps, models, and philosophy about space. It is a discourse of space using abstract representations (drawings, blueprints, titles, deeds, property laws) rather than concrete formal characteristics. Urban street grid systems and redundant architectural layouts are the result of deliberate spatial planning that preceded the actual transformation of space. Significance and meaning of space is negotiated in the imagination. It is also through the imagination that ideologies of space are constructed.

The relationship between experience and perception of space is similar to that between system and structure. Experience describes movements and interactions while perception provides the structural properties that shape experience. However, the imagination of agents leads to the reproduction and change of both spatial perception and experience.

Any location either physically transformed or otherwise given cultural meaning by humans becomes what anthropologists and cultural geographers have referred to as "place" (e.g., Hirsch 1995; Tilley 1994, 2008). Place and space are codependent features of the landscape. As Hirsch (1995) argues, space is the background or the setting for human action where place is the foreground or the subject in focus. The action that takes place in the foreground is shaped, permitted, or restrained by the background. Agents negotiate the relationship between space and place daily through social practice. Places may consist of any physical transformation of space, such as that seen in the built-environment (D. Sanders 1990). Alternatively, cultural meaning attributed to natural features on the landscape may also create places as they fit into human perception of the world. Places can therefore be natural mountain peaks, a house structure, a palace, the confluence of two rivers, a city, or the location of a natural resource (Pool and Cliggett 2008, Tilley 2008).

In this research, I divide place into geographic and relational components. The geographic component of place is referred to as "site"[1]. A site is the physical location within the natural environment that has been transformed physically or conceptually by

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[1] In Chapter 5, I define a more specific system of site categorization, along with methodological considerations of using the site concept (cf., Dunnell and Dancy 1983, Pool and Ohnersorgun 2007, Stark 1991).

human action. While sites are fixed in space, they can change form, size, number, and function over time and in different situations, depending on the actions that agents take within space.

The relational side of place refers to the social, economic, political, or ritual connections within or among sites. While a city with well-defined limits is a site, its relationships with other cities and towns become integrated into the meaning of place. For example, cities and towns throughout the United States advertise their associations with neighboring places through street names. Lancaster, Pennsylvania, the place of my birth and childhood, has a moderately dense downtown occupation that sprawls over a very large area so that the city limits are not well defined. Radiating out from the nucleated city population are roads that bear names like Manheim Pike, New Holland Pike, Lititz Pike, Marietta Avenue, and Harrisburg Pike. Each of these routes connects Lancaster City to neighboring places that match the names of the roads. They are paths through space (Tilley 1994, 2008) that were not originally intended to be places in their own right, but conduits linking places into a landscape or network. Many of these same roads are named according to perspective. Manheim Pike, for example, changes to Lancaster Road about half way between Lancaster and the town of Manheim. Paths can be roads, dirt trails, lines of sight, view sheds, or kin relationships reckoned among different actors residing in disparate sites. Space that links places does not necessarily have to be physically traveled to be considered a path. Furthermore, the nature of the relationship that links places can serve either material or ideological purposes.

When a site becomes integrated into a network of interaction, it becomes a network node. Not all sites are nodes within any given network, and not all nodes are sites fixed in space. Network nodes can be highly mobile individuals (e.g., traveling merchant) and groups (e.g., a circus) that move in and out of the geographical spaces occupied by sites. The movement of nodes among sites establishes pathways, like itinerant merchants traveling their trade route. Nodes may selectively participate in different networks. For example, one site may be a central node on the economic landscape, but remain outside a popular symbolic network. This would exemplify a disjuncture between the economic and symbolic landscapes. The same nodes also may play different roles in local, regional, and macroregional realms of interaction.

Landscapes come into being through networks of interaction among people, places (sites and nodes), and nature (modified from Zedeño 2000:107). In defining landscape this way, emphasis is placed on agents and the meaning they create in space and time through their interactions with each other and the natural environment. Landscapes have no predefined shape or function. The space that a landscape occupies is defined by the relationships among its constituent parts. While geo-spatial models, such as central place theory (e.g., Blanton 1996, C. Smith 1976, M. Smith 1979) are useful analytical tools, they impose an objective, positivist, and static view of diverse imaginations and experiences of space. The landscape concept, on the other hand, facilitates identification of very amorphous and dynamic uses of space (A. Smith 2004, Zedeño 2000).

THE EFFECTS OF SCALE ON INSTITUTIONS AND LANDSCAPES

Disruption and cultural divergence are components of the broader concept of disjuncture that result specifically from the multiscalar nature of cultural interactions. I employ two conceptions of scale in this dissertation. The first is geographic scale – nested physiographic units that expand to increasing levels of spatial inclusion. Geographic scale is akin to the geographic aspect of place described above. For example, the local geographic scale may conform to a natural feature such as a river valley, where the regional geographic scale refers to a number of different contiguous watersheds that form a mountain range, and so on. Network scale, however, deals with the social interactions developed by agents at different geographic scales. In this way, network scale is akin to the relational aspect of place described above. In some cases, network scale perfectly maps onto geographic scale. Such would be the case where a polity conforms to a river valley. However, network interaction frequently transcends the local geographic scale.

I consider three scales of network interaction in this research (Figure 2.2). The local network is the level of social integration that unites individual cities, villages, and hamlets into a cohesive system. On the political landscape, for example, the local

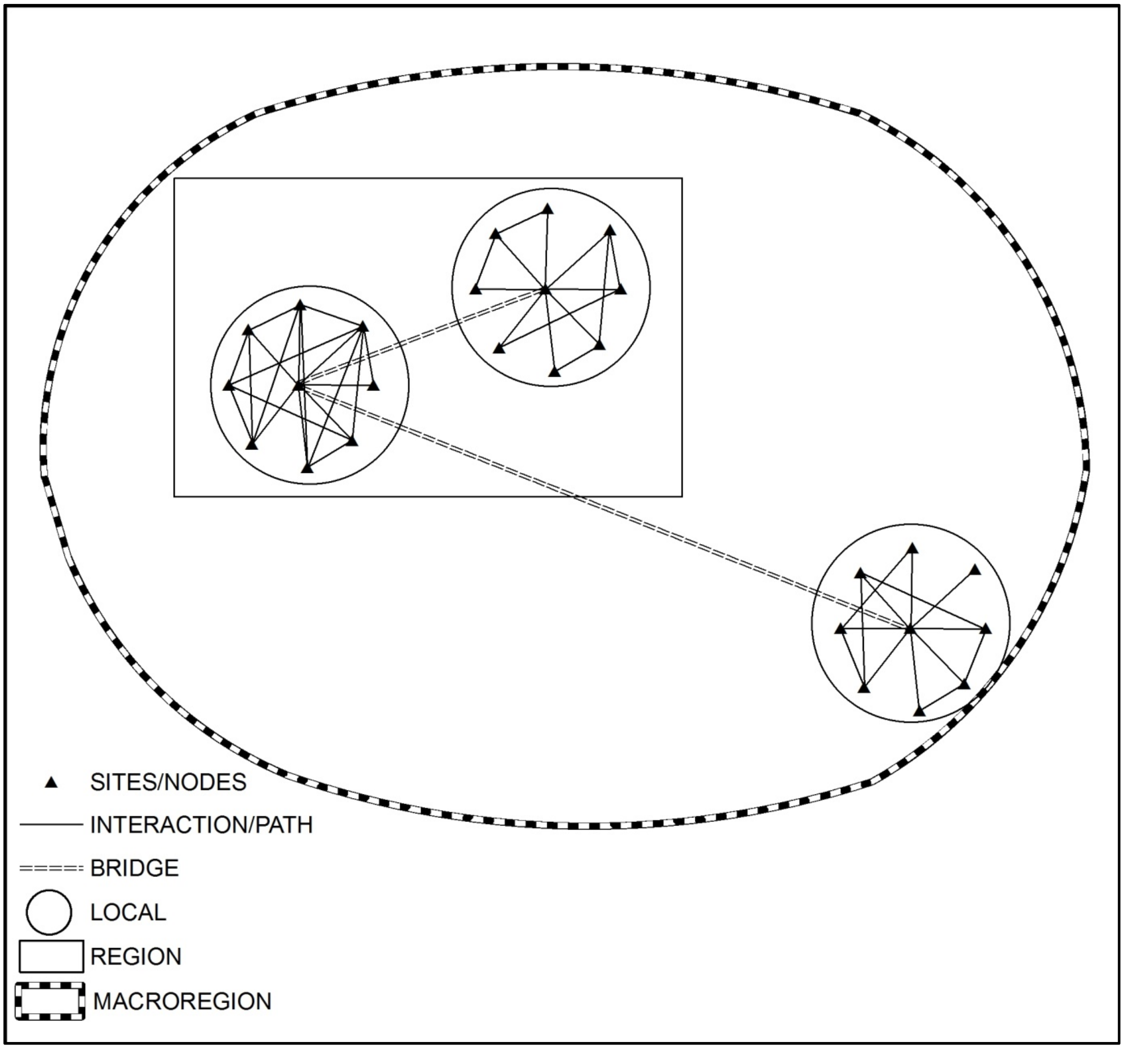

Figure 2.2. Simplified diagram of network scales and the interconnectivity among them.

network conforms to center/hinterland configurations. Alternatively, on the economic landscape, 'local' corresponds to an individual market territory. Regional network scale is the level of social inclusion that encompasses multiple local networks, such as multiple neighboring polities or market territories. The world-system is the highest level of inclusion. Bridges integrate different network scales. For example, a regional market can integrate, or bridge, multiple local market territories by providing a greater diversity of goods than any individual local market (C. Smith 1976). Imperial conquest is another example of multiscalar integration, where local and regional networks become linked to a powerful core.

The most important aspect of scale in this research is the recognition that broad-scale interaction networks are negotiated primarily through local groups possessing different histories and institutions. The first layer of negotiation takes place at the macroregional scale between two or more distant nodes, creating a bridge. In ancient states, this negotiation usually took place among polity regime leaders or elites who were seeking to enhance their prestige at home (e.g., Helms 1993). More complex interactions involved professional merchants, ritual specialists, conquest, colonization, and migration, all of which were present in most ancient states (e.g., Trigger 2003).

The second layer of negotiation takes place between the local bridging node (e.g., regime, entrepreneur, ethnic enclave) and other social actors within the local network. Local elites receive too much credit for dictating the course of sociocultural reproduction and change. Regimes have a special relationship with their subjects. A political leader's use of foreign symbols will only result in greater prestige, for example, if their subjects recognize those symbols as legitimate sources of authority. The success of such an endeavor depends on the abilities of regimes to constitute the imaginations of their subjects (A. Smith 2004).

The final layer of negotiation pertains to the regional network. It would be an extremely rare case where neighboring polities in a region did not share some type of interaction, hostile or friendly. At the very least, neighboring polities usually share certain structural and/or symbolic homologies that can be detected through their material culture and architecture (see Renfrew 1994). If local cultures interface world-system flows through bridging nodes, then how do other nodes within the regional network react to the introduction of these new cultural inputs? If Matacapan represents a direct link to Teotihuacan (whether ethnic, political, economic, or purely symbolic), then how did other settlements within the Catemaco Valley and the neighboring Tepango Valley react to the spread of those ideas, materials, and behaviors from Matacapan? Did they adopt certain elements of Teotihuacan culture? If so, how did they employ those symbols within the local context? Did their reaction enhance existing relationships between the Tepango and Catemaco valleys? Did they become hostile or did they interact in a cooperative manner? Did intervalley relationships change or stay the same because of the foreign disruption in the Catemaco Valley? How did the preexisting relationships between settlements in the Tepango and Catemaco Valleys influence the adoption of Teotihuacan cultural traits at Matacapan?

INSTITUTIONAL LANDSCAPES

Now that I have introduced the basic components of the analytical framework, I turn to the task of explaining each institutional landscape individually. Table 2.1 above is a cross-tabulation of Giddens's (1979:106-111) institutions and Smith's (2004:73-75) dimensions of space. Issues of scale are included in the descriptions below. I do not pretend to study everything listed in these cells, but the framework leaves room to expand into future projects. I briefly describe here each institutional landscape focusing primarily on the conceptual features of each. While methods are introduced here, I reserve most of the bridging arguments between data and theory for Chapter 5.

Symbolic Landscape

Symbolic orders are institutionalized means of signification, but obviously, signs also communicate the domination and legitimation aspects of institutions. Language, dialect, clothing style, symbols, and culturally specific behaviors all fall into institutions of symbolic order or modes of discourse that communicate meaning. What significance do the artifacts recovered by archaeologists have for reconstructing the symbolic landscape, and in turn the political landscape, economic landscape, and ritual landscape? This is a thorny question that has been debated in archaeological literature over the decades (e.g., Hegmon 1998; Gosselain 2000; Lemonnier 1992; Sackett 1985; Sillar and Tite 2000; M. Stark [ed.] 1998; Weissner 1983, 1984; Wobst 1977, 1999). Appadurai (1996), in his study of modern globalization, coined the term 'ethnoscape' to describe the flow of people throughout the global system that possess different cultural identities. The materials with which archaeologists typically work, however, do not necessarily represent the ethnicity of their producers. This problem harkens back to culture history approaches that treated cultures as all-encompassing, intact units that display a perfect correlation with the material left behind. Culture certainly does affect the style of artifacts (Dietler and Herbich 1998, Gosselain 2000), but it requires a conceptual leap to suggest that the stylistic boundaries archaeologists reconstruct demarcate discrete cultures. I draw upon social boundary (M. Stark [ed.] 1998) research conducted through technological choice (Sillar and Tite 2000) or *chaîne opératoire* (Gosselain 1998, 2000; Lemonnier 1992) to explore spatial and temporal patterns of symbolic order at different scales.

Material culture communicates messages, both intentionally and unintentionally, about the producer's social identity. As a medium of communication, material culture becomes a mode of discourse that symbolically identifies its wielder as part of one or more collectivities. At the core of social identity is a basic recognition of the ingroup versus the outgroup, a distinction referred to in social identity theory commonly employed in the discipline of social psychology (Tajfel and Turner 1986). The ingroup can be defined in many ways depending on context. A woman from Mexico living in the United States, for example, may consider herself Hispanic in contrast to "white" or "black", but Mexican in contrast to Peruvian or Guatemalan. In completely different situations, her salient ingroup may shift to female in contrast to male. An agent's ingroup in different situations will also affect how they experience the political, economic, and ritual landscapes.

For archaeological cases, reconstructing ingroups and outgroups is not simple. It is irrefutable that the things people make display different aspects of the producer's broader cultural identity (Emberling 1997, Gosselain 2000, Jones 1997). Handicrafts portray aspects of the producers' identities and the social context of manufacture. Industrial goods may not display the individual identity of the assembly line worker, but they definitely reference a broader social identity. The question addressed by the symbolic landscape in this research is to what extent can archaeologists distinguish social groups over space and time based on the materials typically recovered by their research?

Any class of archaeological material (e.g., stone tools, ceramics, metals, architecture) retains stylistic idiosyncrasies infused in the product throughout the production sequence. Research conducted under technological choice (Sillar and Tite 2000) and *chaîne opératoire* frameworks (e.g., Gosselain 2000, Lemonnier 1992) demonstrates that every step in the production process involves a choice among many alternatives. This choice, though, is heavily influenced by technological limitations, social pressures and norms, and desired function. Taking ceramics for example, potters create variation from how they choose to procure raw materials, mix temper and clay, form vessels, treat their surfaces, fire the pots, decorate them, how they are 'marketed' to reach the consumer, and finally how they are disposed. An additional source of variation is how meaning encoded within the pots translates through different interpretive schemes (e.g., Appadurai 1986, Helms 1993).

Social identity can effectively be broken into two layers: consciously negotiated identities and the more deeply rooted *habitus* of the individual or group that produces material culture. My ideas about this division are greatly influenced by Gosselain's (2000) ethnoarchaeological research in western Africa. Using West African ceramics from groups over a broad geographic region, Gosselain (2000) was able to determine that decoration and decorative technology was readily shared/imitated among groups speaking different languages. Vessel form was also found to be imitable. Decoration is perhaps the most visible aspect of social identity infused into a pot. It is the first thing that a member of an outgroup may notice about the vessel (Wobst 1977, 1999). Decoration is also the most flexible characteristic of pottery, the most easily *changed* trait. Therefore, a potter, or her client, can employ different designs in a conscious negotiation of his/her identity. Selection of highly visible ceramic decoration is one of many social practices that define the individual's ingroup. Of course, membership to that ingroup can be *real* or *imagined*. Similar inferences can be made about the art one displays within their home, the music they listen to, or just about anything

Gosselain (2000) found, however, that vessel forming techniques and, to a lesser extent, paste recipe were more stable characteristics of the pots that correlated with more specific social groups that varied across local and regional scales. This more deeply buried layer of the symbolic landscape is historically conditioned by the *habitus* of groups situated on different parts of the landscape. *Habitus* (Bourdieu 1977, 1990) refers to the deeply rooted conditions of existence that structure the lives of social agents. Social actors do not consciously negotiate *habitus*, but it instead guides behavior through the practical application of knowledge. Staying with the same example, the potter's experiences condition how they perform the different steps pottery production. While the potters are not completely constrained by structure, they typically adhere to what seems natural to them (*doxa*) within a socially acceptable range of variation. Potters learn a particular way of performing a step in the production sequence from their teachers. Though the conditions within which pottery is passed from one generation to the next are considerably complex and varied (e.g., DeBoer 1990), one's historically conditioned dispositions about pot making tend to reproduce less consciously negotiated technological aspects such as paste recipe and forming techniques (though this is not true for all cases: see Arnold 2003).

Habitus also greatly influences decorative style, but these highly visible symbols are more subject to conscious emulation or rejection among different groups. Identity politics, for example, may lead agents to enhance their power by appropriating the political symbols of a powerful foreign polity (e.g., Helms 1993). The agent claims association with another's ingroup, whether the link is real or fictitious, thereby disjoining the traditional associations between symbols and political authority defined historically within the local group. Alternatively, competing factions within a polity may reject, modify, or even seek to disempower the symbols of their rivals.

I seek to identify meaningful spatial and temporal patterns signified through material culture with the idea that these patterns reflect different aspects of sociocultural identity. This is very similar to the investigation of social boundaries (M. Stark 1998), but with the added analytical separation of signification from domination and legitimation in the identification of different institutional forms. The analysis of the symbolic landscape is a comparative endeavor. Methods for comparing material styles and delineating social boundaries are detailed in Chapter 5. In general, the symbolic landscape can be characterized in the archeological record based on the items listed in the "symbolic landscape experience" cell of Table 2.1. Collectivities employing unified symbols can vary in space according to the size of the group, their distribution over space, the type of boundaries between groups, permeability of those boundaries, and the movements of ideas, people, and materials over long distances. Another useful measure is a continuum between cultural uniformity and diversity over space.

The consciously negotiated aspects of identity are generally drawn from a much broader realm of possibilities than the more stable unconscious aspects of identity. It may therefore be expected that the subconscious aspects of identity are more likely to be grounded at the local geographic scale, while highly visible and politically charged symbols are tied to larger scales of network interaction. Perhaps the most interesting situation with regard to multiscalar interactions is how local symbols and goods become infused with foreign symbols (e.g., Pool 1992a). This involves renegotiation of the symbols that represent local culture, which could result in an imagined community.

Political Landscape

The political landscape describes the spatial and temporal structure of authority within the system, where authority is the legitimate possession of power by an individual or group that permits the successful realization of their goals usually at the expense of another (Giddens 1984, Roseberry 1988, A. Smith 2004:108). Defined so, the political landscape is employed to study relations of domination and subordination over space and time. Adam T. Smith (2004:107) writes that legitimacy and power are both necessary to constitute authority. It must be stressed that there are different avenues to power in the system (e.g., Earle 1997). Legitimacy refers to the ability of a regime (defined below) to reproduce itself through the support of its subjects. However, authorities often constitute interests, and define their significance, among their subjects to parallel their own objectives (Baines and Yoffee 2000, Smith 2004: 108). Because legitimacy is granted to a regime by a specific population of subjects – and those subjects reside, work, live, vote, and reproduce within a given geographic location – authority is very much tied to the sites inhabited by its subjects. Remove that person from their territorial context and their power may lose its legitimacy. Smith examines three components of the political landscapes – polity, regime, institution – which I will briefly explore through the remainder of this section.

Political institutions are collectivities integrated by shared histories and interests that structure authority in the system (Giddens 1984, A. Smith 2004: 235). Political institutions "recursively shape their members and, over time, can provide the foundations for governmental stability (or ossification) and transformation (A. Smith 2004: 235)".

Governmental stability in Smith's definition refers to structural stability. A system that experiences frequent regime transitions (e.g., through revolt, democratic elections, or death) does not necessarily constitute an institutional transformation. Institutions are structural properties that work upon the system, and it may be that such frequent regime changes are part of that structure itself. One must therefore distinguish between institutional (i.e., structural) offices and the agents that hold them.

All sociocultural systems have institutions of authorization. They range in complexity among relatively simple examples of status inheritance (Clark 1994, 1997a; Lesure and Blake 2002) to very complex bureaucracies (i.e., Topic 2003). Some types of authority need not be permanent facets of social structure, as situational authority arises in different circumstances (Johnson and Earle 1987). Many anthropologists/archaeologists focus on the initial emergence of status inequalities as the first step to more complex forms of society (J. Arnold 1993, 1994). Even within relatively simple hunter-gatherer groups, there exist internalized rules that determine which members of the group are revered above others. Other researchers believe that the moment in time status becomes hereditary marks a tremendous shift in relations of dominance and subordination that indicates more complex forms of political integration (e.g., Clark 1994). At the other end of the complexity spectrum, rules of legitimacy that structure authority in state societies can depend on a great number of variables (e.g., skin color, ethnicity, gender, religion, genealogy, personal accomplishment and image). In contrast to the focus on inequality and centralization, Blanton (1998) and Crumley (1995) remind us that political behaviors can emphasize egalitarianism and/or variable systems of ranking in both simple and complex societies (discussed further below).

At the broadest scale of political integration, individuals and collectivities experience political institutions through polity. A polity is "a spatialized set of political practices dedicated to producing and reproducing authority in relationships between subjects and regimes (A. Smith 2004:148)". Polities exist in space and time as autonomous territorial units that have definitive boundaries (whether hard lines drawn on a map or buffer zones between two or more hostile polities) (Hare 2004, Parker 2006). The size of polities in complex societies can range from the small city-state to expansionistic imperial empires (Nichols and Charlton [eds.] 1997, Renfrew 1994, Trigger 2003:92-119). Chiefdoms also range tremendously in size from simple chiefdoms to large expansive paramount chiefdoms (Anderson 1994, Earle 1997). In the larger more complex polities, tiers of administration help to allocate and enforce authority throughout the political system.

Polities can be reconstructed through a variety of means in archaeological contexts. At the polity-wide scale, the distribution of sites across a region has traditionally been used to reconstruct political organization (Fowler 1978, Johnson 1972, Sanders et al. 1979, Willey 1956, 1965), but economic, physiographic, and transportation concerns also shape settlement patterns (Drennan 1988; Hassig 1985). In this research, rank in the regional settlement hierarchy is determined by site size, material density, and architectural size and complexity. Settlement size and material density provide relative measures of population (Johnson 1972, Sanders et al. 1979; Santley 1991), though I do not attempt to calculate absolute population figures for the survey region. Population nucleation is important from the perspective of labor mobilization: more labor commanded by regimes translates to more power. A more direct expression of the power regimes wield is the complexity and monumentality of administrative architectural features. Administrative buildings are sites of authority fixed in space on the political landscape. They are therefore useful for both quantitatively and qualitatively characterizing regional political configurations. A quantification of number, complexity, and size of monuments and monumental architecture is integrated into the reconstruction of local and regional political hierarchies. The qualitative examination of architectural configurations is detailed further below.

Within each polity, authority is structured vertically and horizontally. Vertical political structure is enacted through administrative offices at hierarchically ranked settlements throughout the polity's territory. These offices are populated by regime members, but those same officials may be a source of intrapolity competition. Hierarchical political authority can vary from centralized to dispersed (or fragmented) (Blanton et al. 1993, Fox *et al.* 1996, Kowalewski 1990). Centralized polities have few seats of power and clearly developed political hierarchies (Santley 1994, McAndrews *et al*. 1997). Fragmented political systems exhibit dispersed authority spread over several centers of roughly equal size. A political landscape of dispersed authority is typically composed of relatively small spheres of political control, similar to what Renfrew (1994) described as the early state module. The dispersal of authority among several political seats is one example of heterarchy (Crumley 1995). The other form of heterarchy, "the relation of elements … when they possess the potential for being ranked in a number of different ways (Crumley 1995:3)" is subsumed under my general approach of examining four institutional landscapes in separation. For example, power can be expressed through economic institutions, religious institutions, control over symbols, and through established administrative hierarchies. Each of these sources of power (Earle 1997) may have a different geographic seat within the regional settlement system: an example of the horizontal structure of political authority within a polity.

Polity boundaries can be difficult to reconstruct in the archaeological record. In the past, archaeologists have used physiographic features, fortifications, garrisons, uninhabited buffer zones, or statistical cost-distance calculations (Hare 2004) to draw polity boundaries (Trigger 2003:94). Beyond these logistically-based inferences of polity boundaries, the signification of regimes provides a qualitative assessment to differentiate polities. Political agents use symbols to shape the perception of space within their territories and to communicate their authority to outsiders. These symbols are commonly found on image laden material culture or built into monumental architecture and urban plans (A. Smith 2004:225-231). Inka imperial expansion, for example, utilized a very distinctive architectural style that symbolically unified conquered lands. As Inka kings spent a lot of time away from Cuzco, the cosmological center of the empire, they established "new Cuzcos" at strategic places throughout the empire (Hyslop 1990, Trigger 2003:132). Provincial administrative centers were built to resemble Cuzco. These architectural symbols include trapezoidal windows, an imperial road system, warehouses, food storage structures, garrisons, and outposts (D'Altroy 1992, Hyslop 1990, Protzen 1993, Trigger 2003:132-133). The quality of architecture itself became a symbol of the imperial polity, as multi-ton boulders were seated so a razor blade could not fit between them. The standardization of architecture served to unify the empire symbolically and to provide a visual reminder of provincial subjugation (Moore 1996). In this case, imperial symbols in architecture and other material culture have been used by the archaeologist to reconstruct polity boundaries.

Polities do not always display a unified set of symbols, though. Competing factions often employ contrasting symbols (Brumfiel 1994, Pool 2008:151). Regimes in this research are considered to be collectivities that possess ruling authority within polities. Regimes are not to be understood as synonymous with "upper class" or "elite". Social elites possess power (e.g., wealth or religious power) but may lack the legitimacy to constitute authority. Nor do all members of a regime possess the same degrees of power. At the polity scale, low ranking representatives of the ruling regime, for example, may not be considered "upper class".

A regimes cannot be defined without reference to its subjects, which, as Smith states (2004:155) are very difficult to define. Regime and subject are not exclusive social positions because subjects themselves reproduce the authority of regimes. Subjects are expected to recognize the legitimacy of regime authority and obey its command, but the reality of the relationship between the two is not always so. Resistance to a regime's authority is a common feature to all polities (Miller et al. [eds.] 1995). Here it is also important to consider that there are many 'potential regimes' (i.e., factions or parties) competing for supremacy within any polity (e.g., Brumfiel 1994). Factions represent different political ideologies made up of like-minded individuals. It is the prerogative of the subject to recognize, resist, or reject the legitimacy of the ruling regime. Grassroots organizations, for example, are collectivities initiated by subjects to change the political system from the bottom-up. Grassroots organizations often hold up their own members to compete for political office, thereby becoming part of the regime if successful. Alternatively, active regime representatives may align themselves with grassroots movements in order to expand their support base. In the end, I employ Smith's definition of regime as "coalitions of critically located authorities sited in relation to both intra-elite ties (such as king to temple priesthood) and links between sovereign and more grassroots organizations… (A. Smith 2004: 230)".

The success of a regime greatly depends upon its ability to appropriate existing symbols of authority, define new symbols, or alter the rules of legitimation. Political symbols are those perceived by regimes and subjects to represent legitimate political authority. Authoritative symbols are almost always negotiated primarily through local systems of understanding. Capable agents can reach beyond the local system, though, to draw upon the symbols of more powerful authorities. Networks of elite alliances, often covering great distances, bring non-local symbols into the local system. These symbols can be exotic materials, designs borne on material culture, people (e.g., marriage partners, slaves), or ideas. Because they are not commonly available to the local subjects, esoteric symbols are easily controlled by regimes. Wielding them creates a perception of far-reaching influence. Elites are seen to be connected socially, economically, and politically to worlds unfamiliar to the common person (Helms 1993). Blanton (1998:156-157) rightly argues, however, that when prestige goods or their technologies become more widely available they cease to be a source of exclusionary political power (discussed further below). Markets, for example, circulate goods of all kinds throughout the general populace unless sumptuary laws are in place (Hicks 1994, Hirth 1998)

Differentiating regimes in space requires identification of spatial and temporal patterns in the distribution of politically charged symbols. Authorities belonging to the same regime, or allied regimes, display similar symbols. The distribution of politically charged material culture and architecture over time and space therefore provides the basis to associate or differentiate regimes. For example, regional standardization of administrative architectural styles, or other political symbols, has been used to infer political incorporation or close political alliances (Ashmore and Sabloff 2002). Conversely, architectural differences among contemporaneous settlements may represent competing factions within the same polity (Pool 2008:151) or distinct polities (Schortman and Nakamura 1991). The analyst must consider several lines of evidence to avoid overestimating a center's authority in areas that display common architectural styles. Many subregions of the Gulf Coast of Mexico, for example, display highly standardized architectural plans, but may have been organized into small segmentary or independent political spheres. A combination of quantitative and qualitative variables may be the best approach (Borstein 2005).

Regimes also can be distinguished by the political strategies or ideologies they employ. Kurtz (2001:128) defines a political ideology as "ideas that justify the exercise of power and serves to mobilize people for action around a system of beliefs." Political ideologies are closely tied to the legitimation of political authority. In most of the cases examined in this dissertation, religion was a major component of regimes' political ideologies. A political strategy is somewhat different because it is not as heavily invested in the legitimation dimension of institutions, though it certainly can serve to legitimate political authority. Political strategies can be thought of as styles of leadership. It is a philosophy that guides the decisions made by regimes, and, more importantly, how regimes relate to their subjects. I find Blanton and company's (Blanton et al. 1996; Blanton 1998) corporate/exclusionary political dimension useful here. They envision a continuum between two types of political authority: exclusionary and corporate. I substitute the term 'collective' for corporate. The latter term has specific meaning in anthropological literature; a corporate group is a social group that collectively holds 'legal' rights to property (e.g., lineages, modern corporations). As Pool argues (2008), though, corporate and exclusionary strategies can be employed simultaneously. The head of a lineage, a corporate group, can act in an exclusionary way to promote their lineage over others. Blanton et al. (1996) really intend to emphasize power sharing on a much broader, collective scale.

The exclusionary political strategy emphasizes a deep fissure between regimes, usually a small number of hereditary elite, and their subjects. Exclusionary political strategies emphasize the individual above the collectivity: authorities are usually seen as empowered by certain divine forces that the common person lacks. This is frequently seen in the individualizing emphasis in art and history. Classic Mayan kings, for example, enlisted artisans to write themselves into the deepest religious beliefs of their subjects, creating a conjuncture between the political and ritual landscapes. Perhaps the most pervasive symbol of kingship in the Mayan world was the image of king as *axis mundi*: the conduit that links the world of living humans to the heavens and the underworld (e.g., Schele and Freidel 1990). Maya kings were believed to be the reincarnation of the Hero Twins who outwitted the lords of Xibalba (the watery underworld) (Tedlock 1996). The Mesoamerican ball game is a central element used to reenact the journey of the Hero Twins. Kings legitimated their authority by playing the ball game, as well as enacting rituals centered on temples, such as bloodletting, and entering trance states to communicate with ancestors (Schele and Freidel 1990). Temples and ball courts are two architectural features easily identified on the landscape.

Furthermore, the art of Classic Mayan centers depicts individual kings, who even in death are lavished with elaborate displays of conspicuous consumption.

On the other hand, the collective dimension of political behavior has been referred to as "egalitarian" or "faceless" political behavior. This is not to suggest everyone was a social equal possessing the same levels of wealth and power. Power can be highly centralized in collective political strategies. Its key feature is a higher degree of discourse between regimes and subjects. A sense of morality, inclusivity, and responsibility for subjects are parts of the ideology that guides regimes in collective-based polities. Where the subjects have no voice in exclusionary political domination, collective strategies, in theory, bridge the actions of regimes and needs of subjects through reflexive communication. The Age of Enlightenment, for example, marks the transition from aristocracy, a relatively exclusionary political institution, to the nation-state that emphasized the rights of the people and that the state as a collective representation of the people. For the past two centuries, key concepts such as freedom, individual rights, liberty, and democracy have guided the political philosophies of many western nations (Appadurai 1996). These are collective political ideals, and regimes are no more than representatives of the people (again, in theory). In fact, in this example, the ability of a regime to uphold the rights of its subjects legitimizes its authority. As Blanton argues (1998), archaeologists have been too involved in defining different forms of political centralization to recognize collective behaviors in ancient states. Teotihuacan is among the most cited examples of a collectively governed polity (Blanton 1998: 161-162, Pasztory 1997) and will be discussed in the following chapter.

The two political strategies may coexist within the same society (Blanton et al. 1996, Pool 2008). While prototypical examples have been employed (Blanton et al. 1996), there is no such thing as completely exclusionary or collective governance. It is a relative comparison.

In addition to the utility of art, writing, and monument styles for discerning collective and exclusionary political behaviors, one may use the configuration of space itself. At the site scale, the formal characteristics of administrative buildings and their arrangement in space relative to one another creates a spatial experience that structures the interactions between political authorities and their subjects. Middle and Late Horizon

Andean cities of Tiwanaku, Chan Chan, and Cuzco, as Kolata (1997) describes them, acted much like elite playgrounds occupied only by political authorities and their retainers. In these cases, the political institutions that linked regime and subject were defined by an exclusionary political ideology. The experience of urban space within these capitals was not intended to invite the common person to participate. These cities held no apparent civic functions, such as marketplaces or public ceremonial space. In contrast, many Mesoamerican capitals frequently displayed highly public spaces where public markets and rituals abutted private royal spaces and administrative structures. While one may see this as a relatively inclusive political ideology, subjects were only incorporated to a certain extent. Raised temples and elite compounds stood above the public space drawing vertical contrast between regimes and subjects, reproducing the existing structure of authority.

Economic Landscape

My separation of political and economic landscapes here should not be interpreted as an affront to Polanyi's (1957) argument that economic institutions are embedded within other social institutions. To the contrary, this point is very important to my approach. However, in the characterization of institutions employed in this research, political institutions consider the distribution of authority over space and time while economic institutions handle the distribution of goods and material resources. Obviously these two institutions are interdependent, as any political economic theorist will attest (Hirth 1996). My interest is to analytically separate the economic and political landscapes to permit the identification of disjunctures as well as to more accurately characterize the conjunctures between them.

Economic institutions are structures of resource allocation (Giddens 1979:108; Polanyi 1957). In the spatial experience of the economic landscape, institutions integrate producers and consumers through a network of horizontal and vertical interactions where goods, materials, and services change hands. Agents are differentially enabled to accumulate resources by their position within these institutions (Hirth 1996, Robotham

2005, Roseberry 1988, Wolf 1982). The focus of accumulation, however, depends on the structural properties of the institutions in question. That is, an economic ideology determines what constitutes a legitimate resource of accumulation (discussed below).

My framework for studying the economic institutions begins with Polanyi's generic model of the economy, which Halperin (2007) has pieced together from his various works. This model separates economies at the most general level into two types of movements: locational and appropriational. Locational, or horizontal, movements are the forces of production where human labor is a transformational tool that acts on the natural environment. These movements are thought of as resources changing places and form (Halperin 2007:178). Locational movements include transfers of resources, goods, or people from place to place, physical changes in the materials used in the production process, and energy transfers such as relocation of surplus to storage facilities or productive labor itself (Halperin 2007:178). Locational movements are motivated by a desire or need for goods and materials not physically within proximity of the consumer or not in the desired form. Locational movements are therefore tied to the experienced space of the landscape. Humans must engage in locational movements to transport objects to where they can make use of them. Such movements may take place in terms of meters, kilometers, or hundreds of kilometers. In the desert environments of the southwest United States, for example, wood used for construction of buildings was transported up to 75 kilometers (Betancourt et al. 1986). Basalt boulders used to carve portraits of Olmec rulers were transported similar distances through dense tropical forests (Williams and Heizer 1965). Also in Mesoamerica, obsidian was used to create the overwhelming majority of cutting tools for most groups. The sources of obsidian, however, were restricted to the volcanic regions of central Mexico and Guatemala (Glascock et al. 1998). Due to the separation of consumers from resources in these examples, a need arose for economic interactions to transport basic materials that serve both utilitarian and prestige purposes. Once acquired, artisans transform the materials into products[2], also considered a locational movement.

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[2]In the case of obsidian, the material was often worked at the source before transporting it to artisans.

Appropriational, or vertical, movements refer to resources changing hands (Halperin 2007:178). All humans are capable of creating a surplus above and beyond what is required to sustain life. The production of surplus is a concept discussed in depth by Marx (1967) and neo-Marxist scholars (e.g., Fried 1967; Gledhill 1984; Sahlins 1972; Saitta 1994, 1999; Wolf 1982). Surplus labor can be thought of as latent energy that can be harnessed to create surpluses of food, crafts, monuments, technology, ideas, or just about anything. This surplus is the focus of appropriational movements. Marxist theorists suggest that it is the mode of production that creates power differentials in society, but Kurtz (2001, drawing upon Polanyi [1957]) asserts that exchange relationships are more important for structuring wealth and power. Appropriational movements include organizational changes such as a shift from kin-based control of labor to state control, transfers of use rights or ownership of surplus resources, or the alienation of producer from product through exchange. While locational movements are the transfer of things through experienced space and time, appropriational movements are a wholly social phenomenon.

The degree of commercialization is a useful concept with which to compare ancient state economies (M. Smith 2004). Commercialization refers to related economic processes such as price-making market systems of allocation, independent craft specialization intended for exchange, entrepreneurial activity, money or a system of equivalencies, marketplaces, and credit. Commercialization can be thought of as a continuum from uncommercialized to modern capitalism, the most highly commercial economy thus far known to humankind. Smith (2004:79), however, identifies several points along the continuum (low, intermediate, and advanced commercialization) based on research by Carol Smith (1976a).

In relatively uncommercialized systems, surplus may be produced for many reasons. Households may be encouraged to increase agricultural production, for example, to minimize the risk of subsistence shortfall (e.g., Halstead 1989, Halstead and O'Shea 1989, Nichols 1987), for communal ritual feasts (e.g., Blitz 1993, Dietler and Hayden 2001, Jennings et al. 2005, Pauketat et al. 2002), or to pay a bride price (Friedman 1994:18-19). These are economic ideologies that legitimize appropriational movements of resources. The generation of surplus food has long been thought to be a key component of the evolution of complex societies (Sahlins 1972) because it can be appropriated by aggrandizing individuals to sponsor feasts or to gift out to other members of society thereby appearing as the benevolent provider (e.g., Clark and Blake 1994, Hayden 1990). Again, as Kurtz (2001) argues, the key to power differentials here is not in the mode of production but the exchange, that is, the chief's redistribution of stored wealth back to the general population. Stores of resources are given away, or redistributed, creating symbolic capital or social prestige.

In uncommercialized systems, the primary mechanisms of exchange are different forms of redistribution (e.g., taxation, tribute, resource pooling) and reciprocity (e.g., gift exchange, social debt) (Halperin 2007, Mauss 1967, Polanyi 1957). I will only provide brief description of these mechanisms here. Reciprocity is a dispersed, interpersonal form of exchange in which there may be a delay between the giving of a 'gift' and the reciprocation of that gift. This creates social obligation that can be accumulated in the form of prestige. Redistribution is a more centralized form of exchange in which a central agent (e.g., chief, king, manager) or collectivity (e.g., state, government, temple) appropriates a portion of surplus created by its subjects. It then redistributes these stores through various infrastructural improvements, communal feasts, tax returns, or other provisioning mechanisms in lean times. Prestige is a major benefit of centralized management, but some of these pooled resources also find their way into the coffers of accumulating agents. Redistribution allows the centrally positioned agent to appear as providing an indispensible benefit to the general population. Redistribution is an important institution in both exclusionary and collective political strategies.

These ideals contrast greatly with the profit rationale that may guide economic interactions in commercialized systems, where the principal goal is accumulation of real or abstract capital. Real capital is monetized currency as well as equipment, real estate, and machinery, or in general the means of production. Abstract capital can be any material or manufactured good that possesses inherent or socially attributed value and functions as a unit of accumulation. Reciprocity and redistribution are also very important parts of commercial systems. The distinction is that uncommercialized systems lack commercial traits. Friedman (1994) argues that core-periphery structures only exist among global systems that are at least partially commercialized. Exotic goods, crafts, and "primitive money" may fall into the category of abstract capital. An often criticized, shortcoming of Wallerstein's (1974) original model of world-systems is that it overemphasizes exploitation of bulk goods from the periphery and too easily dismisses the external economic linkages forged by non-capitalist world empires through the exchange of luxury goods (Hall and Chase-Dunn 1993, Kardulias [ed.] 1999, Kohl 1989, Schneider 1977, Peregrine 1992). Coupled with this commoditization of goods is the ability to own property privately, which is essential for the accumulation of capital.

Accumulation in more commercialized societies leads to great differences in wealth, which calls for different legitimizing functions to sanction those differences. Kurtz (2001) argues that the ideology of work is an important motivator of production surplus, a concept that he applies to Teotihuacan (1987). An example of the ideology of work can be found in Weber's concept of the "Protestant Work Ethic" (2002). The Protestant Work Ethic was directly responsible for the financial success of many western European nations in developing global capitalism. Calvinists, in particular, believed that in the beginning God selected a subset of humans for salvation while the remainder was destined for damnation. The problem was that no one could change their destiny and no one knew for sure who was saved. This gave rise to a search for signs of salvation: the principal sign of which was wealth accumulation. Worldly success was correlated with salvation, which gave the wealthy the self-confidence that they were favored by God and the poor were predestined to damnation.

"Pulling yourself up by the bootstraps", another example, is a common modern idiom that suggests one can improve his or her socioeconomic condition through hard work. The flip side of this statement is the implied assumption that the poor are responsible for their own poverty because of individual sloth, ignorance, or lack of will.

Both of these ideas ignore the structural properties of socioeconomic system. Rather than recognizing institutionalized stratification, they place the onus of poverty on the poor or God's disfavor and legitimize the differential economic status of the wealthy. Divine sanctioning of wealth differentials is a theme common to most ancient state societies. Some, like the Aztec, even install legal restrictions preventing certain social classes from displaying wealth or prestige goods (Hicks 1994).

The processes of surplus generation, appropriation, and accumulation are replicated at every level of abstraction from the household through the world-system. As Friedman (1994) argues, the ability of a core to accumulate wealth in a world-system, for example, requires that this process of wealth accumulation either is already in place in the periphery or can be put into place by restructuring local economies. In world-systems, wealth tends to cycle between periods of centralization and dispersal (Hall and Chase-Dunn 1993), which may itself be an essential component of sociocultural evolution. Eventually, the most politically centralized and technologically advanced region can emerge as an interregional center of accumulation that attempts to exploit the less developed, more politically fragmented, groups (Frank and Gills 1993, Wallerstein 1974). It is therefore pertinent to examine the structure of the local and regional systems of accumulation in all parts of the macroregion to understand the world-system as a whole.

When studying the economic landscape, my goal is to reconstruct patterns of distribution for basic economic resources along horizontal and vertical axes of integration at multiple scales of interaction. Horizontal integration refers to interdependence among social units within the same social stratum: exchanges among equally ranked individuals, households, cities and towns, and even regions that specialize in the production of a particular product. Horizontal integration assumes that the unit of social analysis is not completely self-sufficient and relies on interactions with others to satisfy their wants and needs. At the level of the individual, for example, a peasant who produces nothing but food must rely on artisans who manufacture tools and crafts to conduct their daily business. Some of these needs may be satisfied by other members of the peasant's household, but others will require horizontal exchange relationships that interconnect a population of relative specialists. The greater the level of specialization and commercialization, the greater the need for economic mechanisms to integrate social actors (Childe 1950, Durkheim 1964, M. Smith 2004). Horizontal integration is not restricted to material goods, as services and ideas are the wares of many specialized professionals in the system. Reciprocity is a mechanism of horizontal integration, but the low volume of goods that cycle through the hands of agents makes it inefficient as a provisioning mechanism in commercial societies. Market exchange, on the other hand, is not so limited. Market exchange in its various forms (e.g., barter, itinerant merchants, long-distance traders, marketplaces, direct workshop procurement) is rather efficient at integrating a society full of occupational specialists because it permits high volumes of exchanges and does not require central administration.

Control over aspects of production and exchange can restructure material interaction vertically. In vertically integrated economies, goods flow up and down a hierarchy through centralized economic institutions (e.g., redistribution, marketplaces), often administered by political regimes. The location of a regional marketplace at an urban center, for example, encourages merchants, producers, and consumers from different social classes and ranks of towns in the regional settlement hierarchy to meet in one place to conduct transactions. Such centralized exchange makes it easier for administrators to appropriate a percentage of each transaction as a tax or fee. Horizontal and vertical economic integration operate simultaneously. A lack of economic integration in a region would indicate self-sufficient households and sites (Blanton et al. 1993:16; Stark 1992).

I discuss methods for examining different forms of integration through the distribution of producers, goods, and consumers on regional and macroregional scales in Chapter 5. The majority of artifacts one finds in the archaeological record are in the context of consumption, assuming that disposal does not remove the object far from where it was consumed. Therefore, by identifying the loci where products were produced in comparison to where they were consumed one can deduce horizontal and vertical exchange relationships. Once these basic economic data are known, it will be possible to characterize local and regional systems according to the centralization/dispersal of wealth and the relative level of commercialism. The mechanisms of exchange are not so easily identified, however. The data recovered by this study do not permit a full evaluation of mechanisms of exchange in the Tuxtlas region, but I consider this matter further in Chapter 9.

Ritual Landscape

The ritual landscape is a phrase used frequently in archaeological research conducted within the landscape paradigm (e.g., Bender 1992, 2002). The ritual landscape is more than the position of temples and sacred locations in the environment. It also invokes ritual processions that involve differently situated social actors that experience ritual space in different ways (e.g., Joyce 1992, 2005). The enactment of crucial rituals defines a relationship between the congregation and the ritual specialists. Ritual order in space therefore corresponds to and reproduces social order.

Religious ritual in most ancient states serves a legitimizing function that sets laws, morals, and norms within society. These ritual institutions naturalize relationships among social actors so that differences in wealth, power, and authority are not continuously challenged. Legal institutions serve a similar function by enforcing laws and doling out punishment for breaking them, but they are not easily detected in the archaeological record without written records. Behavioral norms may prove even more elusive because they are internalized by the general public and rarely recorded in writing. Religious institutions, however, produce one of the most accessible categories of material culture found in archaeological contexts. Rituals surrounding religious beliefs establish cosmological and moral order through an emotional appeal. It moralizes principles of virtue versus vice, good versus evil, and right versus wrong. While many modern nations attempt to separate secular laws from religious morals, such an institutional disjuncture is never fully realized. In most ancient states, religious and political institutions were fully interdependent, even if they were staffed by distinct ritual and political specialists.

Aside from the intangible roles of religion in society, one of the most important functions of religion in states is the legitimation and maintenance of differential possession of wealth and authority. One of the most famous examples of the church legitimizing political authority is the ties between the king of England and the Roman Catholic church in the first half of the second millennium CE Approval of the Church of England, which was directly under the control of Rome until Henry VIII revoked the Pope's power, was required to legitimize the authority of England's king. Henry VIII broke with Rome in 1534 through the Act of Supremacy. He passed the Treasons Act in the same year that threatened death for anyone failing to recognize the authority of King. Although there was a conjuncture between kingly authority and the church before and after the Act of Supremacy, Henry VIII's actions demonstrate the potential for agency to disjoin interinstitutional conjunctures and reform them into new configurations.

Carrying the example of church-state a little into the future, the legal separation of church and state by the founders of the United States constitutes a purposeful disjuncture between the two institutions. This disjuncture exists in the imaginations of many, and is even enforced by legal institutions, but in practice many points of conjuncture remain. Contrasting the separation of church and state, the Classic Maya provide an example where the king was seen as divine, wielding power over the gods themselves (Schele and Freidel 1990). The king did, however, employ professional shamans who themselves possessed a certain amount of political power.

In addition to their political importance, religious institutions are often holders of extensive tracts of land, major resources, and considerable wealth (Trigger 2003:326-328). In ancient Mesopotamia, the temple was the first institution to have a substantial architectural expression beginning before the third millennium BCE (Trigger 2003:328-329). Population nucleation occurred around temples at Ubaid period sites like Eridu by 4700 BCE, which likely also served as a ritual pilgrimage site. Given that temples appear before palaces in monumental architecture expressions it is probable that the region's first elite gained status through their positioning within the emerging religious institutions. Later, the core of Uruk around 2800 BCE was occupied by a large ziggurat complex and satellite temples that were the center of Uruk life (Yoffee 1995). The temples were storehouses of wealth and redistributive centers of food, and they owned vast expanses of land which they managed for agricultural production.

With regard to the spatial experience of ritual institutions, several variables can be distinguished. First and foremost, the development of ritual institutions distinguishes sacred and secular space. Temples, household altars, mountaintop shrines, and ritual processional space are examples of sacred space, which is encoded with messages that dictate certain behavioral norms. Attendance at social rituals reinforces deeply held beliefs about the world, and may even define the participant's role within the system. Rosemary Joyce (1992), for example, presents an argument that Maya centers (e.g., Copán, Palenque, Piedras Negras) incorporated caches of jade, obsidian, chert, marine shell, stingray spines, animal bones (specifically owl, monkey, and jaguar) among other ritual objects into architectural space to delineate ritual pathways. Each cache likely marked a bloodletting ritual or other ritual action along the pathway. The movement of priests or kings up the stair cases of temples reproduced their role as the conduit linking the three Maya worlds: underworld, earth, and the heavens. Parts of these processions were probably intended to be viewed by subjects, while others were not. In either case, the marginalization of subjects during important rituals, or their complete exclusion, reproduced their subordinate role to the ruler.

Religious rituals can be further divided into public (state) and private (domestic). Joyce's example of Maya ritual pathways is a good example of state sponsored ritual. State ceremonies are those enacted in highly visible, and usually very central, locations to reproduce some of the grandest ritual processions. This is not to say all space involved with public ritual is communal. Ritual processions are highly structured and exclusive by definition. Religious professionals orchestrate the movement of objects and people through space to create a perception of divinity. The general public in such rituals may experience these ceremonies in different ways in their own space. Some public rituals encourage congregational participation, like consuming the body and blood of Christ during Catholic communion. Public rituals take place inside or in direct association with temples or other sacred spaces.

Domestic ritual, on the other hand, pertains to individual religious practices often conducted within a residence or some other private space. Throughout Mesoamerica, all households engaged in some form of frequent, if not daily, ritual. Paraphernalia used to support such domestic ritual included figurines, censers, braziers, and other objects. Some residences contained small altars, such as those found in Teotihuacan apartment complexes (Manzanilla and Ortiz 1991). At Teotihuacan, members of all social classes performed domestic rituals featuring the same symbols, gods, ritual objects, and configurations of space employed during public state rituals. In this case, personal domestic religious concerns reflect the same themes put forth by the state. Religion can therefore be a major component of state control. In other cases, state and folk rituals remain quite distinct (e.g., Daneels 2008a).

Like political authority and the allocation of wealth, ritual space may be ordered into systems of vertical and horizontal integration. Different sacred sites at the local and regional scales may be ranked by their importance. The rank importance of ritual ceremony often, but does not always, correspond to the regional settlement hierarchy.

Most towns and villages in ancient states employed some form of community ritual to integrate their inhabitants. Some ritual may consist of pilgrimages to a site of sacred importance. This sacred site might consist of a mountain top or the central plaza of the regional center. In Santiago Tuxtla, for example, older children and young adults journey to the summit of nearby Volcán San Martín Tuxtla at midnight on Ash Wednesday, or late Tuesday night, to collect branches of the *arrayán* tree. These branches are presented at church services on Ash Wednesday. The tree grows only near the crater of the volcano. It is not necessarily the plant, but the pilgrimage itself that is important. Different sacred sites may fulfill different roles on the ritual landscape, therefore constituting parts of a horizontally integrated ritual landscape.

DISJUNCTURE, DISRUPTION, AND DIVERGENCE IN THE MULTISCALAR LAYERING OF ANCIENT NETWORKS

The four institutional landscapes detailed above are the nuts and bolts of my analytical perspective. Such a framework permits an examination of institutional, temporal, and spatial disjunctures among multiple groups that employ different strategies within the world-system. It unlocks the "modes" of core-periphery interaction to examine the variability of world-systems linkages. Because of the variable strategies employed by agents across the landscape, the flows of political interaction, economic exchange, symbols and their meaning, ideas and beliefs, and technology take on their own distributions that do not necessarily follow the same paths through time and space. These disjoint flows intersect at specific places on the landscape, forming cultural agglomerations that comprise information, people, and materials from many different whens and wheres. To the benefit of archaeology, these interactions leave material traces useful for mapping the local, regional, and macroregional networks to which each place belongs.

Archaeologists frequently make assumptions about the cultural associations of the things they study. When distinctive material culture of a particular style or technology is recovered, it is intentionally or unintentionally territorialized and associated with a particular time and space. All groups studied archaeologically have been intentionally or unintentionally treated this way. In fact, one goal of the Tepango Valley Archaeological Survey was to territorialize the Classic Tuxtla culture to evaluate the degree and extent of non-local cultural influences previously observed at Matacapan and the Catemaco Valley.

Material and information exchange, warfare, migration, conquest, colonization, and communication over long distances bring groups with very different cultural histories into contact across the world-system. Due to these broad-scale processes, cultural information loses its exclusive historical association with a specific place. It becomes deterritorialized and exposed to groups with no historical precedent for employing those cultural traits. As different groups adopt foreign symbols, goods, and ideas into their own cultures, stylistic and structural homologies appear across the landscape that gives the world-system a degree of coherence (Renfrew 1994). These are the homogenizing effects commonly emphasized by core-periphery analyses. Underlying those similarities, though, is an increasing cultural diversity that archaeologists have only recently begun to examine (e.g., Lightfoot and Martinez 1995, Wells 2005). Agents across the world-system act on 'global' flows of information from their specific local and regional cultural contexts. Because of this, different groups rarely use or understand non-local symbols, goods, or ideas in the same ways. The variable interpretations of the same cultural inputs that travel a world-system creates disjunctures that greatly alter the form and composition of local cultures and the world-system as a whole. As a complement to theories that emphasize the homogenizing cultural effects of world-systems, disjuncture supplies a way to conceptualize the parallel process of diversification.

My application of disjuncture to an archaeological case is rather different from Appadurai's (1996) own studies. First and foremost, Appadurai recognizes the existence of disjuncture in the distant past, but proposes that it has become a defining characteristic of globalization since the 16th century. The difference between modern and ancient worlds with regard to disjuncture is of degree rather than type. Disjunctures that took place in ancient world-systems have largely gone unrecognized due to a lack of focus in archaeological theory and method. I write this as I near completion of the dissertation, and I can state that it is not a concept easily applied to archaeological contexts where knowledge of different types of interaction is limited. However, the process of looking for disjunctures in the Tuxtla region has facilitated the identification of a very dynamic social landscape influenced by social, economic, and political connections to other regions within the Mesoamerican world-system.

A second major departure of the current analysis from Appadurai's conception of disjuncture is in how institutions are seen. To Appadurai, institutional forms only exist in a state of flux that shift rapidly as they are experienced by agents from different perspectives. In fact, he uses the term landscape to escape the stability implied by institutions. Institutions in ancient states were potentially more stable than in the modern world, but not in all cases. Local institutions altered dramatically in ancient states as groups collided on a macroregional field of interaction. These transformations do not necessarily consist of the mechanical substitution of one institution for another. Each institution described above is embedded within the others. It is not only the nature of each institution that defines the cultural group in question, but also the way they interrelate. Change one institution, and the cultural whole takes on a new form. Institutions, as elements of social structure, must adapt to the increasing diversity spawned by world-systems interactions. As long distance interactions become more fluid, so do the institutions affected by it. The fluidity of institutions means more to archaeology than rapidly changing social forms. Social structure itself became more accommodating to entertain the diversity of cultural inputs that took place over the 2400 year time period that I examine.

Culture never travels among groups in complete packages. Even in the modern global context, mass media and global exchanges broadcast select, stereotyped images disjoined from their cultural context. Further contributing to this disjuncture are the deeply structured local schemes of understanding employed to interpret the incoming messages. Groups interacting on a 'global' field of existence selectively appropriate external cultural inputs and combine them with traditional sociocultural traits. This process creates variation in how non-local goods and information are assimilated into existing social institutions at the local and regional scales. The negotiation process continuously challenges institutional stability.

At the broadest scale of interaction, the initial negotiation process among different groups involves bridging nodes situated in otherwise discrete networks. Here is a third major difference between the modern and ancient worlds. In the modern world-system, there can be numerous bridging nodes in every local group. The dissemination of knowledge through mass media and new technologies decentralizes control over non-local cultural and material inputs so they can essentially be appropriated by anyone. For example, it is common to hear English music being played and sung in Mexico by teenagers who may not know the meaning of the words. This cultural appropriation is not controlled by any centralized political institution, and economic institutions are increasingly losing control over the music industry due to piracy and file sharing web servers. Decentralization of intergroup linkages is a key component of Appadurai's (1996) approach to the modern global situation. In many ancient world-systems, though, the bridging of distant networks most often took place among influential elites who were very much part of centralized institutions (e.g., Brumfiel and Earle 1987, Helms 1993). A major task of archaeological pursuits, therefore, is to retrace the spread of foreign cultural influence from the node of disruption through the regional network. It was my initial expectation at the onset of this research that Matacapan acted as the initial node of disruption for the Tuxtla region (e.g., Pool and Stoner 2004). Following concept established by Pool (1992a), who modeled the timing and spread of Teotihuacan-style materials at Matacapan and other sites in the upper Catemaco Valley, the TVAS was intended, in part, to provide a proxy to evaluate the timing and spread of this disruption over a broader segment of the Tuxtla region.

World-systems – whether hierarchically structured empires or relatively non-hierarchical or differentiated systems – are never characterized by a blanket of influence where all groups interact in a uniform or predictable way. Political subjugation does not necessarily result in the pervasive adoption of core symbols (e.g., Wells 2005). Resistance to political domination may be expressed by the rejection of core symbols. Long-distance economic exchange takes place between independent political peers (Stein 1999). Groups that remain outside the core's political and economic reach may emulate core symbols and create fictitious associations (e.g., Filini 2004). How those symbols are used locally, though, often disjoins their form and design from the intended meaning (e.g., Berlo 1984).

Mapping the influences from any core, modern or ancient, will reveal non-isomorphous distributions of symbols, political influence, materials and goods, and ideologies. That is, macroregional cultural flows diverge by selective appropriation and modification of core traits at different places on the landscape. While widespread adoption of a single core symbol creates some semblance of homogeneity within the world-system, what significance does that have for understanding ancient states if every group employs the symbol in a different way? Homogenization is not unimportant, but equally important is determining how the *variability of interaction* affects the configuration of the system.

To understand how foreign influences are employed by local groups I focus on the concept of disruption. Disruption is one dimension of disjuncture that refers to the interruption of the historical process of local cultural evolution. That is, the willing or forced adoption of foreign cultural practices can alter deeply structured local and regional institutions and how those institutions are layered together to form coherent sociocultural systems. Disruptions usually impact limited aspects of local institutions, but not their entirety. Each group within a world-system experiences different kinds and intensities of disruption based on their position within multiple networks of interaction.

At the local scale, nodes that bridge local groups into broader-scale networks must negotiate with the local populace what role the novel information will have on existing institutions. Institutional change requires justification. In the Aztec Empire, local elites often made arrangements with imperial officials that benefitted them politically and economically, but came as a detriment to the lower elites and the local populace who were faced with tribute demands (Smith and Montiel 2001, Smith 1992, Stark 1990, Venter 2008). Political and economic institutions were altered to a form that was not beneficial to local producers, and resistance was the result in many cases. Local regimes in this case were backed by the power of the Aztec military that would help to maintain order and compliance (Hassig 1988). In the cases where local elites lacked core support, instituting the use of core symbols took more convincing. Such an act threatens to disrupt established political symbols and ideologies employed by the extant regime. In cases of hereditary political succession, for example, it may be the intent of competing factions to adopt non-local symbols in effort to break the chain of authoritative inheritance. Such a process may have happened at Tikál with respect to Teotihuacan (Stuart 2000).

Disruption highlights the tensions between local cultural reproduction and change. Agents that shape local institutions are situated within a realm of cultural possibilities defined by their natural and social environments. Expanding interaction networks, therefore, broaden the possibilities that local agents can draw upon to build their worlds. However, the tensions between agency and structure (Giddens 1979, 1984) create filters that must be negotiated prior to institutional disruption. As a result, most information circulating through a world-system does is not absorbed into local institutions. The rejection of culture change in favor of reproduction is not necessarily a conscious decision, but a conditioned response informed by deeply rooted sociocultural structures.

This leads to the third concept explored in this research. It is quite common for neighboring groups who are historically connected through a regional network to react differently to foreign influences. The case of Teotihuacan influence throughout the Classic Mesoamerican world-system is an excellent example of this (see Chapter 3). Given the varied responses to potent cultural influences, closely situated peoples often develop along divergent trajectories. There are many intentional and unintentional reasons for such divergent evolution that must be explored on a case-by-case basis. The overly radial focus of core-periphery models has made it difficult to address how differential integration into world-systems cultural flows affects existing regional networks. Every node connected to the world-system is itself embedded within local and regional networks and entrenched within local traditions. An example of this cultural divergence is how Mexican immigrants replicate barrios in United States cities. Over time, the demographics, spoken language, restaurants, groceries, and clothing stores across entire neighborhoods take on a dominant Mexican character. While the barrio and surrounding neighborhoods become demarcated by a number of social contrasts, Mexican businesses thrive and provide cultural diversity that attract non-Mexican clientele.

Archaeologists have focused mainly on the difficult task of identifying nodes of disruption and types of disruption with respect to broad-scale influences, but have not typically addressed the intermediate, regional level of negotiation surrounding that node. Each node exerts some amount of influence that reaches out into the network to different extents. This can be analogized by throwing a handful of different-sized pebbles into a pond and measuring the amplitude of the ripples (i.e., strength of influence), the distance they travel (i.e., their reach), and the borders where they intersect (i.e., flow and resistance). The regional scale of interaction is particularly interesting where equally influential groups display very different strategies with the external world. In the Tuxtlas case, relatively equally powered polities displayed very different strategies: one emphasized Gulf Coast traditions while the other deemphasized common Gulf Coast institutions in favor of those found at Teotihuacan. Consequently, Totocapan and Matacapan may have developed along divergent trajectories.

Part of the process that leads to divergent evolution is how novel information spreads through a regional network. Above, I discussed how disruptions in ancient states typically are restricted to relatively few bridging nodes. The spread of those disruptions depend largely on the conditions under which they were first adopted. If a local regime initiates an alliance with a foreign polity in order to gain greater control over its own region, appropriated cultural information, symbols, and goods may be closely guarded and restricted to members of the ruling regime. Intentional contrasts are drawn between the regime, its subjects, and other regimes in the region. Alternatively, goods and materials brought into a region by a merchant may circulate unimpeded through the regional market system.

The result of divergence ranges a continuum between competition and cooperation. Darwin (2010) spoke of the principle of divergence in his *Origin of Species*. Different groups of a single genus may alter their behaviors to avoid direct competition. For example, two species of birds within the same genius may "specialize" in procuring food from difference sources: one may focus on trees and flowers while the other gathers seeds from the ground. By specializing in different strategies, the two species can coexist within the same environment. Given sufficient time, the species will diverge as they adapt to their new habits. This is an example of divergence resulting in a situation of cooperation through different specializations of closely related species. A similar argument can be made for closely situated political groups within a region. For example, by drawing upon different sources of political legitimation (i.e., foreign vs. local) two neighboring polities can co-exist within the same cooperative environment, avoiding direct competition over the same sources of authority. A closely related example of cooperation caused by divergence is heterarchical specialization of multiple centers within a region. One center may hold administrative importance while another functions as a ritual center and a third specializes in commerce. Despite their different foci, all three organically fit into a single cooperative and codependent system. Divergence also may result in competition, on the other hand. For example, irreconcilable cultural and religious differences can result in dramatic transformations of the regional landscape, as seen with the partitioning of India and Pakistan during the violent post-colonial transition between 1947-1950.

Some research pertaining to frontiers has successfully addressed these topics. Peter Wells (2005), for example, investigates relationships among communities within the Roman imperial frontier zone using a model inspired by network theory (Barábasi 2002). Wells shows that Roman integration of his study area along the Danube River in Bavaria had some predictable effects, like the establishment of bases and forts, and reorganization of some local villas around the large Roman fort at Regensburg. However, there was also a parallel process of continuing local material culture styles throughout the region, and some settlements rejected Roman style materials completely.

> Key to understanding how the culturally heterogeneous and dynamic frontier zone was created is the network of Iron Age communities that persisted, adapted, and transformed themselves during the disruptions of the conquest period and into the centuries of Roman occupation. Through this network, goods and information flowed between communities that accommodated or resisted, to varying degrees, the economic and political transformations that the Roman administration introduced to its new province. The dynamic cultural landscape that developed along the Danube was neither more Roman nor more pre-Roman in character but fundamentally new and heterogeneous in nature. Some places, especially Roman bases and towns, as well as villas established by veterans, look more "Roman" (but not just like Roman settlements elsewhere). Others were more like Late Iron Age settlements in the region yet not exactly like them either. Many communities adopted new styles and practices from other regions of temperate Europe, including new types of fibulae, shapes of pottery, and burial rituals. The archaeological evidence from settlements and cemeteries of immediately preconquest times and of the first two centuries of the Roman period makes clear that terms such as "Romanization" and "assimilation" are far too simplistic to represent the complex, and continually shifting, interplay between the groups interacting in this dynamic region (Wells 2005:72).

This quote from Wells nicely describes the processes of disjuncture, disruption and divergence where interrelated nodes within the Roman frontier reacted differently to the political, economic, and cultural influences of the expanding Roman Empire. The continued local traditions and the new links to other regions in Europe contributed to the heterogeneity seen within the regional system. Roman conquest and control, therefore, supplied only one perspective within the diversified network of interactions that developed during the last two centuries BCE

Several conditions limit the applicability of the Roman example to a more general framework of cultural divergence. First, divergence is not restricted to the edges of some broad-scale process like imperial expansion. Cultural divergence can take place at any scale of social interaction, from the household to the globe. Second, there does not necessarily have to be an imbalance of power for groups to develop along divergent paths. Third, largely missing from this example were the motivations for adopting, transforming, or rejecting the various cultural flows that came through the region, that is, beyond conquest and forced assimilation. This would be difficult or impossible to establish in the archaeological record, but it is part of what archaeologists should strive to answer. Also lacking is an analysis of the implications that diverse reactions to non-local forces have for nodes within regional network. For example, did adopting certain imperial symbols open economic opportunities within the region? Alternatively, did rejection of imperial styles result in ostracism or exclusion from the mainstream economic network, or perhaps result in political pressures from neighboring communities?

Through this dissertation, I develop an *archaeology of disjuncture*. This approach seeks to highlight the diversity of interactions and cultural forms that result from expanding world-systems in addition to the already well-described homogenizing tendencies. The archaeology of disjuncture depends on a systematic comparison of nodes on the landscape that display different levels of involvement within the world-system. Only through such a data-intensive approach can disruptions, disjunctures, and divergences be examined. The result is a perspective that characterizes nodes (i.e., households, groups, cities, regions) based on their interconnectivity to other nodes on the landscape, rather than viewing them as holistic culture groups. Only then can archaeologists begin to see the effects of the diversity of world-systems linkages behind the veil of homogeneity that core-periphery approaches to the topic have employed.

CHAPTER 3: THE CLASSIC MESOAMERICAN WORLD-SYSTEM AND THE ROLE OF TEOTIHUACAN

The Classic Mesoamerican world-system provides an example of the concepts introduced in the preceding chapter. Teotihuacan was without a doubt the single most influential polity in the Classic Mesoamerican world-system, but the extent of its economic, political, and symbolic sway has been greatly debated. The data suggest that thousands of sites throughout the world-system engaged in relationships with Teotihuacan, either directly with the metropolis or through bridging nodes in the periphery (see Filini 2004). Classic period settlements scattered over much of southern Mexico, Guatemala, Belize, and Honduras display Teotihuacan-related materials and symbols of different types and quantities.

Over the decades, interpretations of these data have ranged from a Mesoamerican-wide empire (Bernal 1966) to little more than symbolic interaction (Braswell 2003a, Demarest and Foias 1993). Others have gone the opposite direction to suggest that Mesoamerica's different cultures, such as the Zapotec and Maya had a strong influence on Teotihuacan that commonly goes unrecognized (Marcus 1983), a point which I would not dispute. My point of departure is that little attention has been paid to how Teotihuacan-related disruptions throughout the Classic Mesoamerican world-system played out over space and time in relation to existing regional interaction networks. Sites that negotiated relationships with Teotihuacan were themselves situated within local and regional networks that did not directly depend upon interaction with the central Mexican city. Differential incorporation into Teotihuacan's expanding network created cultural differences among groups which have not yet been systematically examined.

I seek to elucidate the evolution of Tuxtlas groups through a perspective that emphasizes not only local developments but also how they tied into broader cultural flows. Previous research on the Classic period within the Tuxtla region has identified several institutional configurations that seem anomalous when compared with the extended Gulf Coast region. Many reasons exist to explain the divergent evolutionary trajectory that settlement in the Catemaco Valley demonstrated, but it was perhaps more than coincidence that Matacapan displayed a closer connection to Teotihuacan than any other polity throughout the Gulf Coast. By researching settlement in the neighboring Tepango Valley (and surveys to the south [Borstein 2001, Killion and Urcid 2001] and west [Kruszczynski 2001, Loughlin n.d., Pool and Ohnersorgen 2007]) data are now available to situate those previous studies within a broader regional perspective. I argue that the Tuxtlas regional perspective is necessary to understand the differences previously noted between the Catemaco Valley settlement and other areas of the Gulf Coast.

TEOTIHUACAN POLITY AND LOCAL GOVERNANCE

Teotihuacan was the largest city in Mesoamerica during the Early and Middle Classic periods, covering a maximum of 20 km^2 (Headrick 2007:8; Cowgill 1997:130; Millon et al. 1973) (Figure 3.1). Millon (1992: 344) calculates, based on 2000 apartment compounds of different sizes, that the total population of the city reached an average estimate of 125,000 during the Xolalpan phase (CE 350-550), with a maximum estimate of 200,000. It came to rule the Basin of Mexico earlier during the Tzacualli (CE 50-150) phase following the volcanically precipitated decline of Cuicuilco in the southern Basin (Sanders et al. 1979). Populations exploded at Teotihuacan as a result. Nearly the entire population of the Basin moved to within a few kilometers of the architectural center of the site. This very primate settlement pattern, where one center is much larger than and more populous than any other settlement in the region, continued throughout the life of the city until the beginning of its decline in the Metepec (CE 550-650) phase. It is unquestioned that Teotihuacan was *the* site of authority that expanded throughout the Basin of Mexico during this period, but a few of the larger sites in the region, like Azcapotzalco, played administrative roles. Judging from the primate settlement pattern, authority in this region was very centralized (see Blanton et al. 1993, Sanders et al. 1979).

The internal layout of the city, however, presents a conflicting picture of how the polity was experienced by local Teotihuacanos. From the Miccoatli Phase onward, The entire population of the city lived in apartment compounds constructed in similar styles, floor plans, and all were oriented according to the central axis of the site defined by the

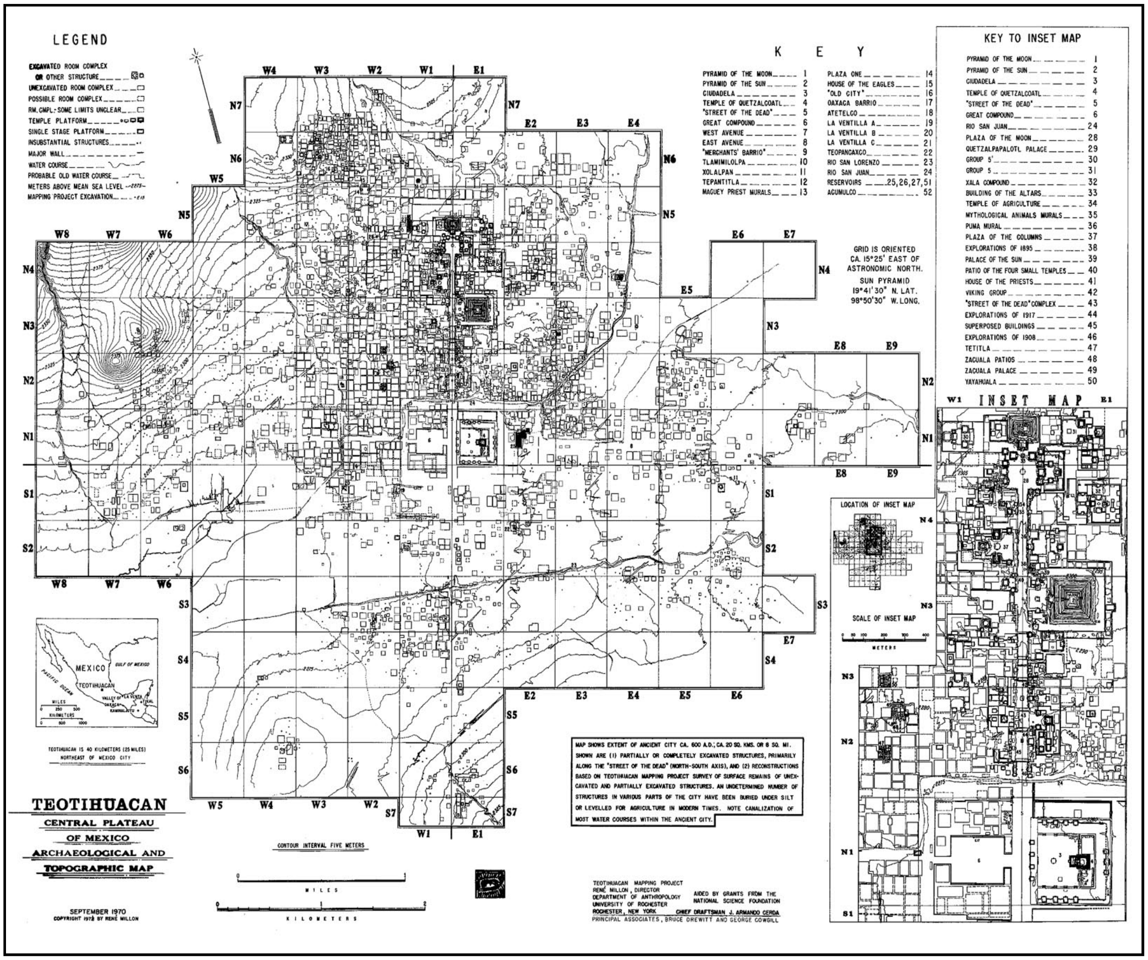

Figure 3.1. Map of Teotihuacan (Millon et al. 1973: Map 1).

Street of the Dead and the city's largest monumental architecture (Cowgill 2003, Millon et al. 1973). This is the paramount example of architecturally imposed urban order in Mesoamerica. Each compound ranged in size and quality of construction, but most were constructed in the standard *talud-tablero* architectural style. The origins of this architectural style have been debated (Braswell 2003b, Daneels 2002b, García Cook 1981), but it became an unmistakable symbol of Classic Teotihuacan as they became more influential throughout Mesoamerica (Cheek 1977, Fash and Fash 2000, Stuart 2000, Valenzuela 1945a). The relative standardization of residential dwellings at Teotihuacan portrays the treatment of the population as equal parts of the whole that is not seen elsewhere in Mesoamerica. This is an architectural analogy for the political ideology espoused at Teotihuacan, but recent work on lineages associated with the apartment compounds may indicate a different political experience.

Each apartment compound housed individuals of different statuses as evidenced by the differential possession of wealth in grave offerings, but status distinctions tend to increase over time (Cowgill 1997, Headrick 2007, Sempowski et al. 1994, Storey 1992). Each compound may have been a lineage descent group that organized the population of Teotihuacan into sociopolitical units (see Cowgill 1997; Headrick 1999, 2007). Centrally located burials within the compound were more richly lavished with grave goods. These individuals may have been lineage founders. Headrick (2007) creates a convincing argument that the central patios of the apartments held mortuary bundles. Mortuary bundles, which are the bundled remains of deceased ancestors, have a long history of widespread use in Mesoamerica. Headrick (2007) draws parallels to mortuary bundles depicted in the Mixtec Codices, and Aztec depictions of their founder, Huitzilopotchtli being carried on the backs of human porters. Significance of the mortuary bundle is interpreted in part from the stone masks that they wore. Stone masks were likely designed to be fitted over the heads of mortuary bundles, giving the semblance of life. Headrick (2007) interprets the open mouths of the masks as speech, indicating an oracular function. She deduces, again from parallel comparisons, that the bundles were on display within the temples along the Street of the Dead and on alters within the central patios of apartment compounds. The multiplicity of temple and apartment compound altars and the stone masks known to have come from Teotihuacan, which number in the hundreds, suggests that the site was composed of many lineages.

The primogenitors of Teotihuacan were likely located in the most central and elaborate temples that lined the Street of the Dead (Headrick 2007:51-71). Sub-lineages periodically fractured off and established their own apartment compound, a situation Headrick describes as downward social mobility because increased social distance from the primogenitors resulted in decreased status. Political authority at Teotihuacan therefore appears to have been either shared by several founding lineages, or the ruling regime cycled among these lineages fostering an atmosphere of intense political competition.

In recent years a great deal of the literature regarding the city has emphasized the "corporate" (or collective) political ideology that Teotihuacan leaders seemed to promote (Blanton et al. 1996). Pasztory (1997, 1992) argued that Teotihuacan promoted a 'faceless' utopian society. She argued that this political rhetoric emphasized the group, or state unity, over the individual in a way that is comparable with socialist state ideologies. She suggests that every citizen enjoyed high status and material benefits of the group, though there were obviously great differences in wealth among members throughout the city. Her point was that, in contrast to the Maya who glorified individual "divine king[s]" and a "warrior aristocracy" over farmers, Teotihuacan promoted a political ideology of equality. "Sharing the wealth" so to speak would have been a great motivational tool for encouraging participation in state projects.

One unmistakable symbol of self-promotion at Teotihuacan, however, was the elaborate Feathered Serpent Pyramid (FSP) located in the *Ciudadela* complex (Sugiyama 2005). Recent excavations in this pyramid demonstrate the ritual sacrifice of hundreds of humans. This was undertaken presumably to glorify one individual, although no individual ruler was found in the central tomb. Cowgill (1997:155-156) argues that the FSP was an early example of individualized rule at Teotihuacan that met with a fiery demise some time before 300 CE The temple was burned and looted at this time. Later, rulers of the city constructed an *adosada* platform in front of the pyramid. This *adosada* obscures the view of the temple from the Avenue of the Dead. These actions may mark the end of autarchy and a shift toward a more oligarchic government (*ibid*.).

Two other early possibilities of individualized glorification at Teotihuacan are the Pyramids of the Sun and Moon. Recent research at the Moon Pyramid has generated similar mortuary findings to those in the Feathered Serpent Pyramid (Sugiyama 2007). These massive pyramids are among the earliest constructions at the city. Later construction activities at Teotihuacan turned to focus on the apartment compounds, which would support the interpretation of a shift toward corporate governance.

Teotihuacan's art as depicted on murals, ceramics, and other media also provide clues as to the nature of political authority at Teotihuacan. Rather than the naturalistic art depicted by most other cultures in Mesoamerica, the art of the city is executed in an abstract two dimensional style that emphasizes sameness among humans and superiority of deities over humanity (Pasztory 1992, 1997). The rejection of idiosyncratic features that would identify individuals in Teotihuacan art again supports the corporate political ideology proposed for the city (Blanton et al. 1996). However, Headrick (2007) recently suggested that there are several mentions of rulers in the art found in the city. She suggests that several figures depicted on murals in Tetitla, Atetelco, Tepantitla, and other apartment compounds present images of rulers. She also suggests that some front facing figures that have been previously lumped into the category of the "Great Goddess" imagery are actually deceased rulers. She convincingly demonstrates that these are depictions of leaders as the *axis-mundi* or world-tree, better known from Maya art. These conclusions do not, however, counter the corporate reconstruction of Teotihuacan governance (Blanton et al. 1996, Blanton 1998; see also Feinman 2001). If these are images of rulers, they are executed in an abstract, non-indivdualizing manner. The abstract presentation of rulers in Teotihuacan art may relate to either power sharing among lineages or frequent regime changes that are not linked to a single dynastic line.

ESTABLISHING A LEGITIMATE SOCIAL ORDER

Two components served to sanction and preserve social order at Teotihuacan: the military and religion. Teotihuacan's military force is depicted in the iconography of the city and in many places throughout the Mesoamerican symbolic landscape. It is assumed that this is the primary means by which Teotihuacan expanded its political authority into and beyond the Basin of Mexico (Smith and Montiel 2001). This was, of course, not the only means by which Teotihuacan influenced Mesoamerica. Both the official state ideology and more private rituals practiced at Teotihuacan spread to different groups in the world-system. In the process, Teotihuacan symbols and beliefs became integrated within the ritual landscapes that sanctioned local sociopolitical and economic structures of different groups.

The emphasis on the military began early at Teotihuacan (Cowgill 1997:144-145). Over time, militaristic themes in art first decreased during the Tlamimilolpa phase and then increased again during the Xolalpan and Metepec. Of more than 200 individuals found sacrificed within the Feathered Serpent Pyramid, many were cloaked in military garb and possessed accoutrements of war (Sugiyama 2005). Some of these victims were bound with their hands behind their backs. It is reasonable to assume that these individuals were sacrificed in association with the death of a ruler, but the central tomb was looted anciently. If there was an individual ruler entombed in the center of the FSP, the looting of his body by later Teotihuacanos is consistent with the promotion of a corporate ideology. Christine White and others (White et al. 2002) have conducted oxygen isotope analysis on some of the sacrificial victims from the FSP and found that many were born in foreign areas of Mesoamerica. Of the soldiers interred, they either lived at Teotihuacan all of their lives or were foreign born and lived at Teotihuacan for some time before their deaths. She suggests that this indicates either soldiers acting as mercenaries or foreign recruitment by Teotihuacan. The women in her sample show a similar pattern. Most of the 14 individuals tested from the central tomb were foreign-born, which was likely intended to demonstrate the power of Teotihuacan in the broader Mesoamerican world. The same procedures were applied to sacrificial victims found in the Moon Pyramid. These geographic identities of these burials overlapped considerably with those in the FSP: most were foreign-born coming from the Gulf Coast, the Maya lowlands, Oaxaca, Michoacán, or Guatemala (White et al. 2007).

Many of the symbols found in art at Teotihuacan are related in some way to military themes. Headrick (2007) creates a rather detailed account of the military iconography found on apartment compound murals. She argues that there were several orders of military that took prominence over the history of occupation at Teotihuacan. The Serpent Order was perhaps one of the earliest to hold superiority over the others. This would accord well with the images found on the Feathered Serpent Pyramid (Sugiyama 2005). Interestingly, this also agrees with recent arguments for Matacapan being initially settled by an exiled group from Teotihuacan who were members of the Feathered Serpent Order (Arnold and Santley 2008). Just as the FSP was burned and desecrated prior to 300 CE, the Serpent Order of the military lost favor at Teotihuacan. There is striking evidence for this at the West Plaza Complex along the Street of the Dead. The lower balustrades lining the staircase possessed sculptures of decorated serpent heads, but these were later paved over and replaced with feline heads (Morelos 1993:102-116).

Headrick (2007) suggests that the dog and bird orders became more important during later phases. Canine and bird images with military connotations are repeated throughout the city, but Headrick (2007:96) uses the murals in the White Patio of Atetelco to reconstruct their relation to Teotihuacan's office of the ruler. There are three structures in this central patio, which opens to the west. The images associated with the central structure depict a ruler, but the two flanking buildings are replete with military symbols: bird warriors to the south and canine warriors to the north. A similar opposition of bird and canine imagery is seen on the Portico 25 murals within the Tetitla compound. The Atetelco White Patio presents an interesting relation that suggests the ruler's two favored military orders were canine and bird, which could be used as the fist of the ruler his/herself. Interestingly, this tripartite architectural organization is seen in apartment compounds and temple complexes throughout the city. If the three-temple complex architectural scheme can be associated with the ruler and the top two military orders, as suggested by the White Patio murals, the state political ideology can be seen replicated from the uppermost tiers of society through the lowest tier. This is an argument based on very few data, but it presents an interpretation that potentially explains how social order was maintained within this large city. Furthermore, it provides an example of how architectural order and use of space reproduces social order within Classic period Mesoamerica.

The political power of the ruler therefore seems to be enforced by military association. All evidence at Teotihuacan points to this conclusion, from the tombs through the art. This is hardly an earth-shattering conclusion because a similar argument could be made for most ancient empires (Smith and Montiel 2001, Trigger 2003). However, there is one more important function of the military orders that related to their corporate organization and the different lineages. The imagery of different military orders are found within apartment compounds of all different statuses, suggesting that membership in these orders was not restricted to any one lineage. The crosscutting role of the military would have been a unifying organization, which would serve to reduce interlineage tensions at all ranks. This may have been central to the collective ideology promoted. If this social mechanism was not installed to minimize, at least in a symbolic way, the differences among lineages, more emphasis would have been placed on lineage differentiation in the art of Teotihuacan. This is especially true if Teotihuacan possessed several lineages competing for position as the ruling regime. Therefore the military orders can be seen as a mechanism to normalize the sociopolitical order established at Teotihuacan.

Another mechanism of sociopolitical order was the state religion promoted by the city. Teotihuacan state religion can be seen in the layout of the city all the way through the configurations of individual apartment compounds. The establishment of the urban grid early in the construction of the city has cosmological significance. The Moon Pyramid mimics Cerro Gordo, which appears in the background as one approaches it along the Street of the Dead. From the center of the Moon Pyramid, the Sun Pyramid appears in a similar fashion in the foreground of Cerro Patlachique. Headrick (2007:116) argues that a third orographic alignment can be seen from the Sun Pyramid looking west, but that axis does not quite line up with either Cerro Malinalco or Cerro Colorado.

The religious images promoted by the Teotihuacan state were adopted by some other polities throughout Mesoamerica and is one indicator of interaction with the metropolis. One of the earliest deities to have been favored by Teotihuacanos was the Feathered Serpent, whose head and segmented body wraps around the façade of the Feathered Serpent Pyramid (Figure 3.2). The Feathered Serpent was associated with the military, as discussed above, but also appears in the context of vegetation and fertility (Cowgill 1997: 148). Another deity is depicted as alternating with the Feathered Serpent around the FSP. This crocodilian head and scaled body is frequently associated with the god Tlaloc, but others (e.g., Sugiyama 1989) associate it with the Aztec Cipactli (Cowgill 1997). The Cipactli was the Primordial Crocodile upon whose back the world and the beginning of time was spawned (Cowgill 1997). Teotihuacan imagery does frequently display the god Tlaloc – who is identified by his fangs, the snarled upper lip, receding lower jaw, and goggles around the eyes (Cowgill 1997). Tlaloc frequently is associated with other imagery, like lightning, rain, hail, vegetation, and weapons. He is therefore a god of many things, but storms and warfare are the most prominent.

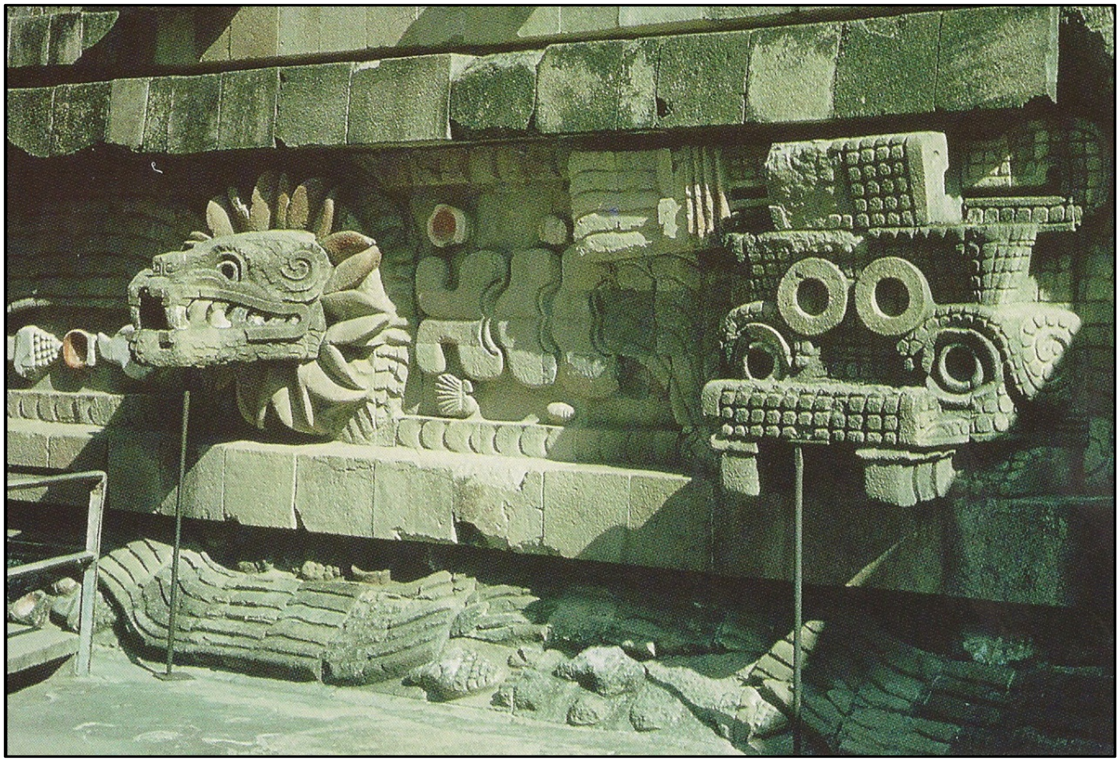

Figure 3.2. Façade of the Feathered Serpent Pyramid, showing the Feathered Serpent (left) and saurian (right) deities (Pasztory 1997:127).

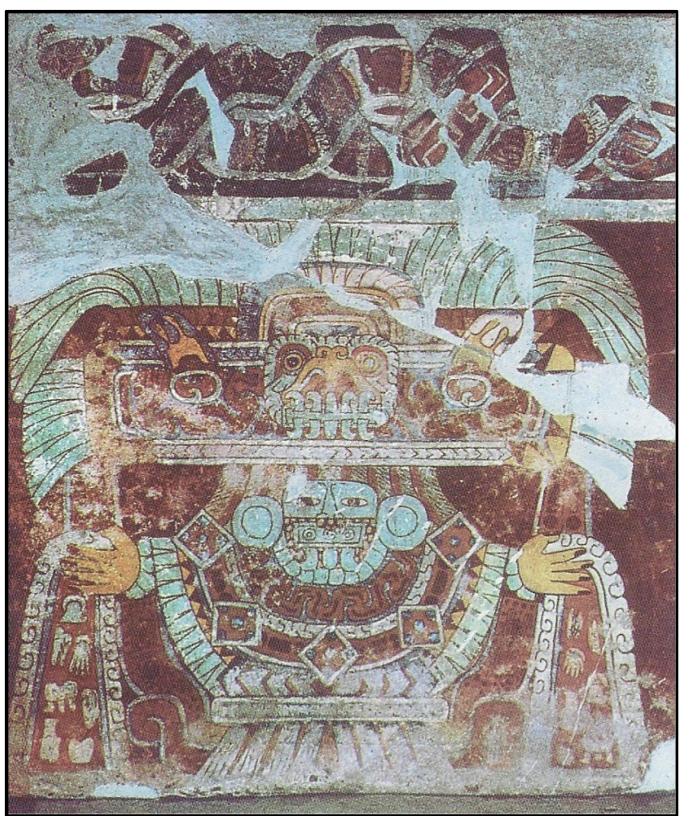

Figure 3.3. "Great Goddess" image on mural painting at Tetitla, Teotihuacan (Pasztory 1997:125).

The “Great Goddess” is also discussed as a major aspect of state religion, but recent discussions tend toward seeing this front facing figure as a symbol of political office rather than a deity (Cowgill 1992, 1997: 150-151; Headrick 2007) (Figure 3.3). Headrick (2007) draws an association between some aspects of the Great Goddess and Maya images of the *axis mundi*. Aside from this possibility, this potential deity is not closely replicated at any other location outside the city.

Private, or household, religious beliefs often have undertones of state control. The worship of lineage ancestors through mortuary bundles placed centrally to each apartment compound is an example of household concern that validates the overarching sociopolitical structure at Teotihuacan. Associated with this ancestor worship are censers, which are ubiquitously associated with households. These censers were likely used to commemorate the dead (Berlo 1984, Cowgill 1997:141-142). As Cowgill (1997:142) notes, a state-related workshop attached to the north side of the Ciudadela dedicated itself to the production of censer ornaments and molds for their manufacture (Múnera 1985). The state sponsorships of such an industry indicates an interest in standardizing private ritual involving ancestor worship, which in the context of the above discussion is of obvious benefit to the most powerful lineages in the city.

Although not produced by state workshops, the double chambered *candeleros* that were recovered in great quantities at Teotihuacan did not outlast the collapse of the city, though they did at Matacapan (Pool 1992a). The rise and fall in use of these ritual objects may therefore have been tied to state ideology (Cowgill 1997:142), though they were used for minor household and individual rituals. *Candeleros* are therefore one of the better indicators of Teotihuacan interaction throughout Mesoamerica. They are rarely found at Maya sites and variant forms have been recovered at Morgadal Grande. Despite their rarity over most of Mesoamerica, *candeleros* are relatively common at Matacapan and other sites in the Tuxtlas (Santley 2007, Santley et al. 1987).

Perhaps the most pervasive household rituals revolved around the Old Fire God, who some associate with the Aztec god Huehueteotl (Figure 3.4). Old Fire God imagery comes most commonly in the form of standardized braziers where the firebox is poised atop the hunched back of the god. These braziers are typically found in or near the principal patios of most apartment compounds, some directly associated with the central

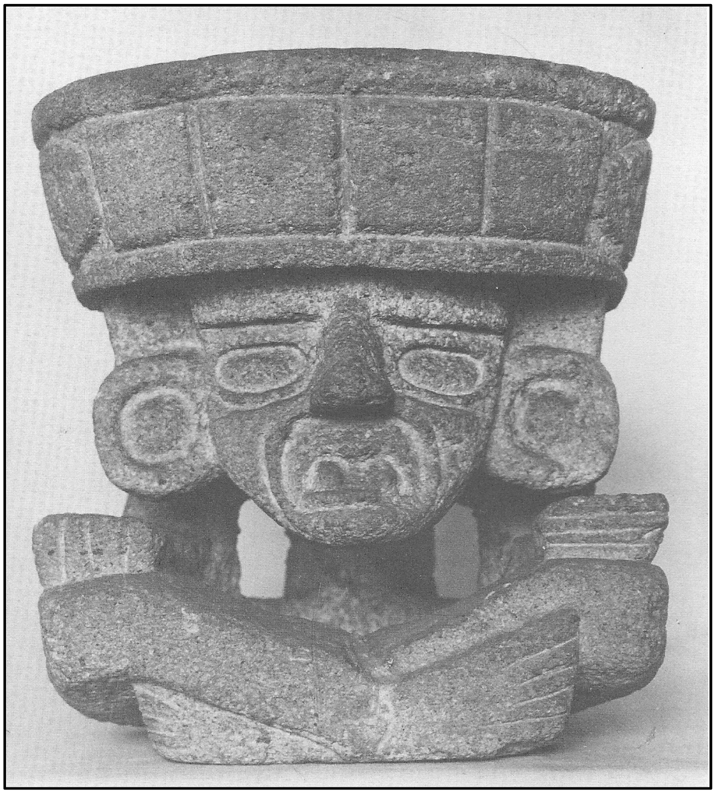

Figure 3.4. Old God brazier (Pasztory 1997:163, Figure 10.1).

altar (Headrick 2007:118). This pervasive artifact was probably used in important household rituals given their context. They seemingly have nothing to do with state religion, but Headrick (2007:104-118) suggests that the Old Fire God was generally associated with Teotihuacan's three-temple complexes that are replicated from the largest pyramids down to the principal patios of most apartment compounds. State religious ceremony taking place in front of the Sun Pyramid, for example, is replicated at individual apartment compounds. This integration of inhabitants into the state would serve a unifying function, such that household reproduction of state rituals would reproduce the ritual and sociopolitical hierarchy of the city.

PRODUCTION, APPROPRIATION, AND ALLOCATION OF WEALTH

The nucleation of a large population into an urban environment raises many problems, the most basic of which is how to ensure a food supply sufficient to feed the inhabitants. Sanders's (1976) study of the agricultural history of the Basin of Mexico provides one example where economic concerns can enhance state control over such a large population. The Teotihuacan Valley is a semi-arid environment where rainfall shortage and risk of frost could devastate crops, leading to famine. The state, which employed imagery and a state religion that showed a preoccupation with rainfall and agricultural fertility, helped to mitigate this risk through large-scale irrigation projects. These projects were organized by the state using a labor force drawn from the general population who were obligated to participate. As important as agriculture was for the evolution and maintenance of the Teotihuacan state, I turn to questions of production and exchange of manufactured goods that more directly affected broader Mesoamerica.

The obsidian industry was one of the first specialized economies of Teotihuacan to gain attention (Santley 1983, 1989; Santley and Alexander 1996; Santley and Kneebone 1985; Spence 1981, 1984, 1996; cf. Clark 1986). The state directly controlled two obsidian sources: the Pachuca obsidian from Sierra Hidalgo and Otumba obsidian located closer to the city. The latter was consumed locally and is not found in great abundance outside the Basin of Mexico. Pachuca obsidian, on the other hand, was exchanged over much of Mesoamerica in varying quantities. Where this green-gold obsidian is found in Classic contexts, an economic and symbolic connection with Teotihuacan is indicated. The norm for the Classic period outside Pachuca and Teotihuacan, however, is to find blades made from this obsidian in the absence of production indicators (i.e., cores, early stage reduction, manufacturing errors, or other blade production related debitage). This suggests that blades were manufactured within the city for exchange over long distances.

Spence (1981, 1984, 1996) and Santley (1983, 1984, 1989) have done much to characterize the production and exchange system for Teotihuacan controlled obsidian. Spence (1981, 1984, 1996) suggests that there were a large number of state controlled workshops producing Pachuca blades for exchange, but Clark (1986) provides a cautionary tale that downwardly revised the earliest estimates. Pachuca obsidian is important to the rise of Teotihuacan no matter how many workshops operated under state control because it was the only known valuable resource available locally that could be controlled and exchanged over long distances. Thin Orange ceramics were not exchanged in sufficient quantities throughout Mesoamerican to account for accumulation of but a small portion of the wealth within the city (Kolb 1986). Beyond the quantity of trade, Thin Orange vessels were produced in southwest Puebla (Rattray 1998) and probably arrived in Teotihuacan through tribute (Hassig 1992, Smith and Montiel 2001). Santley (1983, 1984, 1989) proposed that the rise and fall of Teotihuacan was wrapped up in the control and loss of control of the obsidian market. Part of this explanation is that Teotihuacan elite directly oversaw local production, but also that their merchants were responsible for distributing other types of central Mexican and Guatemalan obsidians. He also argues that differential pricing outside the Basin, which includes a cost-distance function to figure in transportation and the exotic nature of obsidian in many areas of Mesoamerica, led to huge profits at Teotihuacan (cf. Santley and Pool 1993). Clark (1986), on the other hand, argues that Teotihuacan's export of green obsidian took place through a system of elite prestige exchange and had more of a political function than economic. Drennan et al. (1990) demonstrated with data from the Tehuacán Valley that exchange at certain nodes was much higher than could be explained by the political model, but did not conform to the monopolistic model either. He suggests that the imports into Teotihuacan would have been prestige goods, but that the demand for such non-local goods in the huge city would have been so high that Teotihuacan exported significant amounts of utilitarian and prestige items as well as ideology and iconography (see also Filini 2004).

Recognizing the variability of Teotihuacan interaction outside the Basin of Mexico, Santley and Alexander (1996) examined the city's role in the Mesoamerican world-system using three world-systems models. Since I discuss Teotihuacan influence within several different regions below, I do not dwell on these models here. Their conclusions suggest that interactions with the world-system involved a series of nested peripheries centered on Teotihuacan, but they also recognized the presence of secondary cores (i.e., interactive nodes). Santley and Alexander (1996) characterize the Classic world-system as a dendritic world economy, which involves exchange of goods in the absence of political domination.

Beyond obsidian, Teotihuacan hosted a wide range of specialized production of other products. Ceramics were made in independent specialist contexts within different apartment compounds (e.g., Sheehy 1992, Sullivan 2006). Using Sheehy's (1992) excavations of a San Martin Orange ceramic workshop at Tlajinga 33, and surface reconnaissance within the district, Sullivan (2006) argues that production was undertaken at the apartment compound level, but organized at the community level. Hopkins (1995) studied burnished wares and San Martin Orange production and found that the former was likely produced in very small-scale contexts, while the latter was manufactured in larger workshops, corroborating Sheehy's research. Widmer (1991) studied lapidary production within the same compound and found that evidence of production outweighed consumption, suggesting the finished products made from slate, basalt, and greenstone were sold in the Teotihuacan market (discussed below). Lapidary working at Tlajinga 33 was independent of state control, but Turner (1987) provides a case on the eastern outskirts of the city where fine stone and shell working was state-sponsored.

The sum of all evidence suggests that Teotihuacan was among the most commercialized cities in the Classic Mesoamerican world-system. Its involvement outside the Basin would have brought in high quantities of foreign materials that were reworked within the city by craft specialists. The list of known or suspected imports includes cacao, cotton textiles, marine shell (which appears to have been bulked at rural sites such as Maquixco Bajo [Widmer 1996]), colorful feathers, chert, Granular Ware, Thin Orange ware, Fine Orange pottery, liquidambar and honey (Arnold et al. 1993), among other goods. The state obviously benefited directly from its sponsorship of certain industries for production of lapidary objects, obsidian blades, and ceramic censers, but the diversified economic activities, many of which operated independently of state or elite control, suggest that a market system operated in the Classic Basin of Mexico (see Hirth 1998). This market system was probably not as commercialized, or as large, as the later Aztec system (Blanton 1996, Durán 1994), but it would have efficiently integrated such a diversified economy of independent and state-sponsored specialists where goods flowed into the city from all over Mesoamerica and certain goods also were traded out.

Widmer (1996) proposed a model by which Teotihuacan elites would have benefited from a system of double taxation on imports and exports as well as the local exchange of goods through the market. A proposed function of the Great Compound at Teotihuacan, located directly to the west of the *Ciudadela*, was a marketplace (Cowgill

1997). While it seems that Teotihuacan was a commercially developed city, Blanton et al. (1993) argue that the Epiclassic period, following the decline of Teotihuacan, experienced a Mesoamerica-wide commercial boom. This was in part precipitated by the collapse of powerful states, like Teotihuacan and Monte Alban.

FOREIGN INFLUENCE AT TEOTIHUACAN

As I will demonstrate below, Teotihuacan had variable impact on settlements throughout Mesoamerica. This was not a one-way process as there is substantial evidence for foreigners living within the city. The difference is that the foreign identities present at Teotihuacan were not well incorporated into the local sociocultural fabric. Foreigners living at Teotihuacan maintained their own cultural practices, and the broader city's population did not commonly absorb non-local traits. This shows that while foreign ties were economically important for Teotihuacan, there was little interest in adopting foreign symbols or ideologies. However, this view may also be biased by limited research focusing on foreign influence at Teotihuacan (but see Rattray 1977, 2001; and Spence 1996).

There were at least two enclaves established at Teotihuacan. The Merchant's Barrio was situated along the Rio San Juan around the northeastern limit of the city. It was inhabited by people culturally belonging to the Gulf Coast region (Rattray 1977, Spence 1996). About 9-12 percent of the ceramics from the Merchants Barrio were stylistically affiliated with Gulf Coast ceramic types or Maya wares (Rattray 1988:173). Compositional analyses suggest that they were imports, and not local copies (Cowgill and Neff 2004, Rattray 1979). These ceramics consisted of fine paste wares found throughout the Gulf Coast from the Huasteca to the western Maya territories, so it is difficult to identify the precise geographic origin of the enclave. Also suggestive of the Gulf Coast interaction were circular buildings with a ramp extending to one side and mortuary practices (compare DuSolier 1945, Sempowski and Spence 1994, Spence 1996). The circular structures, which also appear in western Mexico, clearly contrast with the grid plan and rectilinear structures that defines the Teotihuacan urban area.

However, the majority of materials found in the area were native to Teotihuacan, suggesting that some assimilation took place.

The Oaxaca Barrio, or Tlailotlacan, located in the western flank of the city was inhabited by about 600-1000 Zapotec individuals. The ethnic heritage of the Oaxaca Barrio was inferred by the extended burial program and the use of tombs, both of which were much more Zapotec than Teotihuacano (Spence 1996), and an abundance of ceramic tubes, urns, and censers in the Zapotec style. Like the Merchant's Barrio, Zapotec offerings were often paired with Teotihuacan-style materials, indicating some degree of assimilation. However, some common elements of the Teotihuacan ceramic assemblage, like San Martin Orange, are rare at Tlailotlacan. Also like Gulf Coast style pottery in the Merchant's Barrio, there is a sharp drop-off of Zapotec style materials outside the Oaxaca Barrio. This latter point demonstrates that local Teotihuacanos were not interested in appropriating foreign styles into the local culture.

SUMMARY

The city of Teotihuacan integrated the Basin of Mexico into a highly centralized political unit, where a disproportionate amount of authority was nucleated within the city center itself. This is evident from the primate settlement pattern established early in Teotihuacan's rise to prominence and the fact that Teotihuacan dwarfed other Early to Middle Classic settlements in the region. Despite the strong political centralization displayed by Teotihuacan throughout its occupational history, settlement patterns show a subtle dispersal of political authority through time. Teotihuacan maintained such centralized power through promotion of a corporate political ideology during later time periods, and central location of founding lineages within the city. These lineages may have shared or competed for power in the city center, but military sodalities cross-cut lineage membership and socioeconomic class providing a strong unifying principal. Another integrative function was the promotion of a state ideology that was practiced from the highest levels of Basin integration down to individual households. One cannot argue with certainty that the state controlled all religion, public and private. However, as

Cowgill (1997) notes, there is no evidence for resistance to state ideologies. One possible exception is the desecration of the Feathered Serpent Pyramid, which may have been enacted by members within the state administrative structure to quash any individualistic expression of power. The architectural and material culture symbols that Teotihuacan employed spread through the Basin at the larger rural sites like Maquixco Bajo. Finally, Teotihuacan developed a relatively commercialized economy that mobilized surpluses of local and foreign goods through long-distance exchanges, local market exchange, and state sponsorship of several craft industries. The surpluses raised through these economic endeavors would have fed and provided some form of remuneration to laborers who built the state's massive monumental architecture. One problem with this assertion is that Teotihuacan's largest monumental architecture was built early in its history, prior to its Mesoamerican-wide involvement. As Kurtz (1987) argues, the city attracted large populations through its capacity to provide work. Those seeking employment as artisans, soldiers, priests, farmers, general laborers for state projects, and possibly merchants would have been attracted to the city due to the opportunities it presented.

TEOTIHUACAN IN THE CLASSIC MESOAMERICAN WORLD-SYSTEM

In the discussions to follow, I consider the data in specific regions of Mesoamerica to illustrate how elements of Teotihuacan culture traveled through space and time. Prior to focusing on specific regions, however, I turn to a few general models of Teotihuacan's role in the Mesoamerican world-system. I do not summarize here past theories that have largely been disproven, such as Bernal's (1966) reconstruction of a Pan-Mesoamerican Teotihuacan Empire, or Sanders and Price's (1968) suggestion that states throughout most of Mesoamerica were secondary developments that evolved due to their exposure to the primary development of a hydraulic state at Teotihuacan.

Smith and Montiel (2001), writing to establish whether or not Teotihuacan controlled an empire, have provided one of the most comprehensive overviews of the political, economic, and cultural roles of Teotihuacan in the Mesoamerican world-system. They concluded that Teotihuacan controlled an empire with a territory reaching beyond the Basin of Mexico to surrounding highland areas in the modern states of Mexico, Hidalgo, Tlaxcala-Puebla, Querétaro, and Morelos (Smith and Montiel 2001:254). These regions all possess sites with strong evidence of Teotihuacan-related themes, such as architectural affiliations, a grid-plan urban layout, possible reorganization of settlement, presence of ceramic affinities and green obsidian from the Pachuca source in Hidalgo. Material correlates of political domination are discussed further below. Smith and Montiel argue that to qualify as an empire, using Doyle's (1986) definition, the state needs to control a territory beyond its immediate hinterland. Teotihuacan seems to have done this as evidence of conquest and political control into Morelos, Hidalgo, and parts of Querétaro and Puebla-Tlaxcala. The other part of their argument indicates that empires should also have an economic and cultural impact beyond their core territory, which has long been argued for Teotihuacan. As for imports and exports that Teotihuacan controlled, Smith and Montiel (2001:265) summarize the following:

> Teotihuacan had commercial contacts throughout most of Mesoamerica. Imports found in Teotihuacan include stone masks and Granular ware from Guerrero, shell and cacao from the Pacific coast, Lustrous ware from El Tajín, Polychromes from the Petén, and other fine wares from the Gulf Coast (Rattray 1979). Pachuca obsidian, whose distribution was almost certainly in Teotihuacan hands (Sanders and Santley 1983; Santley and Pool 1993; Spence 1987, 1996), is a rare but consistent commodity at Classic Maya sites (Spence 1996; Moholy-Nagy 1999) as are Teotihuacan ceramics … Teotihuacan-type decorated censers have been found with local censer types in Escuintla and Lake Amatitlan, Guatemala (Berlo 1984). Cylindrical tripod vessels, a hallmark of Teotihuacan, appear in sites throughout Mesoamerica, although many are locally made variants.

While not a comprehensive list, this passage obviously displays the economic importance of Teotihuacan for the developing Classic Mesoamerican economic landscape. They were probably the single most influential city on the flow of goods and materials throughout the Classic world-system. The more distant sites that engaged Teotihuacan show some evidence for economic exchange, but not in large quantities. Rather, sites like Tikál and Copán show an ideological disruption to the legitimation of local authority due to links with Teotihuacan (discussed further below). According to Smith and Montiel's (2001) reconstruction, therefore, the Teotihuacan Empire generally adheres to the distance parity model (Stein 1999) in that transportation limitations affected the types of influence exerted throughout Mesoamerica, with several exceptions.

Santley and Alexander (1996) also describe a condition resembling distance parity in their analysis of the Classic Mesoamerican world-system. They describe the Teotihuacan political economy as being "largely confined to central Mexico, but nested within three concentric rings of peripheries characterized by different levels of political and economic integration with Teotihuacan (Santley and Alexander 1996:181)". Teotihuacan constituted the core where most of the secondary good manufacture took place. Around Teotihuacan was an "inner primary periphery, which comprised most of the area within a 40-60 km radius of the city (Santley and Alexander 1996:181)". The authors argue that the inner primary periphery was responsible for supplying primary products, which would support the city and its crafts producers, but some secondary manufacture of both utilitarian and high status goods also took place. The inner primary periphery was surrounded by an outer primary periphery that extended 100-150 km from Teotihuacan (Santley and Alexander 1996:182). They argue that this zone was the primary consumer of crafts produced at Teotihuacan, particularly obsidian tools. Primary goods from the outer primary periphery also found their way to the metropolis, but in lower quantities. Finally, they conceive of a second periphery beyond central Mexico which encompassed "most of Mesoamerica" (Santley and Alexander 1996:182). They recognize that economic interaction with the secondary periphery was of relatively low volume, but other types of cultural interaction took place. Militaristic imagery was adopted by Tikál, Uaxactún, Copán, and many other sites (see below). Outside the Maya lowlands, however, military symbols are not typically found. Rarely, Teotihuacan-related materials are found in domestic contexts, such as at Matacapan and the site of Montana in Guatemala. In general, Santley and Alexander (1996:183) note the variability with which Teotihuacan materials are found in the secondary periphery.

In the end, the authors find that Teotihuacan's role in the Classic Mesoamerican world-system resembled a dendritic political economy, as opposed to a hegemonic or territorial empire. Dendritic political economies are systems with low levels of commercialism outside the core city, and the periphery is organized to extract raw materials to be manufactured into secondary goods in the core. Dendritic political economies also operate on an economic principal in the periphery and do not politically dominate a territory larger than their immediate hinterland. Furthermore, goods produced in the hinterland flow directly into urban centers with little exchange between centers of equivalent rank, a radial model. Santley and Alexander apply Wolf's (1982) tributary mode of production to understand this process, but suggest that core relations with the secondary periphery were probably limited by transportation efficiency. Rather, they draw upon Clark's (1986) argument that these distant relationships involved political emulation and low volume prestige trade.

Another recent application of world-systems theory to Classic Mesoamerica comes from Filini (2004). Filini (2004) was working from the perspective of the Cuitzeo Basin in Michoacán, but provides perhaps the most comprehensive review of Teotihuacan's role in Mesoamerica ever published. Her use of world-systems theory is not so different from my own analytical framework. Filini (2004:9) argues that "the world-system perspective is a heuristically useful model of *analysis*, but it should proceed outside a core-periphery framework [emphasis original]". She rejects the core-periphery framework because it assumes *a priori* dependency of the periphery on the core that must instead be proven using archaeological materials. Filini adds to previous research on the Teotihuacan-related world-system by building an argument that Teotihuacanos employed their state ideology as an exchangeable good to be projected all over Mesoamerica. In effect, they convinced disparate groups of their own importance, and were successful in establishing relations in distant lands, but this does not necessarily constitute "influence" or "dependence". Such tenuous interactions are only successful for a short while. More importantly, the system logic can only be understood through the local contexts where the appropriation of Teotihuacan's state ideology was negotiated. This is essentially the premise of the current study in the Tuxtla Mountains.

It is not my goal in this dissertation to come up with new overarching explanations of a Teotihuacan-centered world-system. Rather I use it to frame my own research. The Catemaco Valley experienced a Teotihuacan-related disruption to local evolutionary trajectories. There is no evidence of political domination and economic exchange was conducted at low volumes. Teotihuacan-inspired domestic and civic materials and symbols are found, however, in elite and non-elite contexts at Matacapan and surrounding sites, suggesting that the evolution of Classic societies in the Tuxtla Mountains cannot be understood exclusively through a localized model. The

Teotihuacan presence at Matacapan and the Catemaco Valley must be understood through a perspective of how different elements of Teotihuacan culture were interwoven into the local sociocultural fabric. The accomplishment of this goal is limited, though, by the lack of knowledge of the regional sociocultural landscape outside Matacapan and settlement in the Catemaco Valley. The research in the neighboring Tepango Valley provides a case to: 1) provide a local baseline for comparison to the Catemaco Valley; 2) provide a systematic evaluation of the institutional differences observed previously between Matacapan and the rest of the Gulf Coast macroregion; and 3) monitor the impact on intervalley political, economic, symbolic, and ritual networks as a result of the Teotihuacan-related disruption at Matacapan. To set an archaeological precedence I more closely evaluate the data of Teotihuacan's role in the Mexican highlands, the Maya highlands and lowlands, the Gulf Coast, and several more regionally focused studies such as Filini's (2004) examination of the Cuitzeo Basin in Michoacán.

CLASSES OF TEOTIHUACAN-RELATED SYMBOLS

Several classes of information inform the reconstruction of Teotihuacan's role on different Mesoamerican landscapes, I discuss these here.

Context

The following categories of material indicate different types of interaction with Teotihuacan, but successful interpretation requires a contextual analysis. At the site-level, contexts of use are public versus private, elite versus non-elite, ritual versus secular, household versus community. At the regional scale, it is also advantageous to characterize presence or absence of different Teotihuacan symbols and materials at different levels of the settlement hierarchy. Were such symbols restricted to regional centers or dispersed throughout the general population?

Military

Incorporated in this category are depictions of warriors executed in Teotihuacan style; images of atlatls and atlatl darts; back mirrors (polished pyrite mosaics backed by slate); Teotihuacan-style headdresses; the Teotihuacan year sign; warriors dressed as or transformed into animals; eagle, owl, or butterfly imagery; shields (often depicting Tlaloc or the *cipactli*); and Tlaloc goggles on soldiers (Figures 3.5 and 3.6). Teotihuacan's military iconography was among the most frequently appearing elements at Maya sites. It is tempting to interpret presence of these images outside the Basin of Mexico as military intervention, but such iconography was adopted at many sites with no evidence of direct conquest.

The significance of this military iconography depends on context. The ruling regimes of Copán (Fash and Fash 2000) and Tikál (Stuart 2000), for example, appear to have legitimated their authority by establishing ties to Teotihuacan and drawing upon their more developed iconographic system pertaining to war. The relationship did not make the Maya more prone to warfare, but they used the symbols to enhance existing militaristic propensities (Fash and Fash 2000). The selection of that particular aspect of Teotihuacan's culture reflects existing local concerns. In fact, warfare among groups in the Maya region long predates interaction with Teotihuacan. The exact nature of interaction between the two regions has been debated (discussed below) but it is improbable that Teotihuacan directly exerted political authority over these distant regions. Stuart (2000), though, uses epigraphic evidence to support an argument for Teotihuacan military conquest over Tikál. While distant groups were participating in the ritual and symbolic landscapes that served to legitimize authority at Teotihuacan, the spread of ritual behaviors and symbols was disjoined from actual Teotihuacan political authority and reconfigured to serve localized purposes.

Another category of military artifact involves evidence of actual conquest, which may include fortified settlements, destroyed settlements (e.g., burnt houses and temples), or dramatic settlement reorganization associated with Teotihuacan symbols. In eastern Morelos, for example, there is evidence of Teotihuacan influence throughout the region at regional centers and rural settlements alike (Smith and Montiel 2001). Hirth (1980)

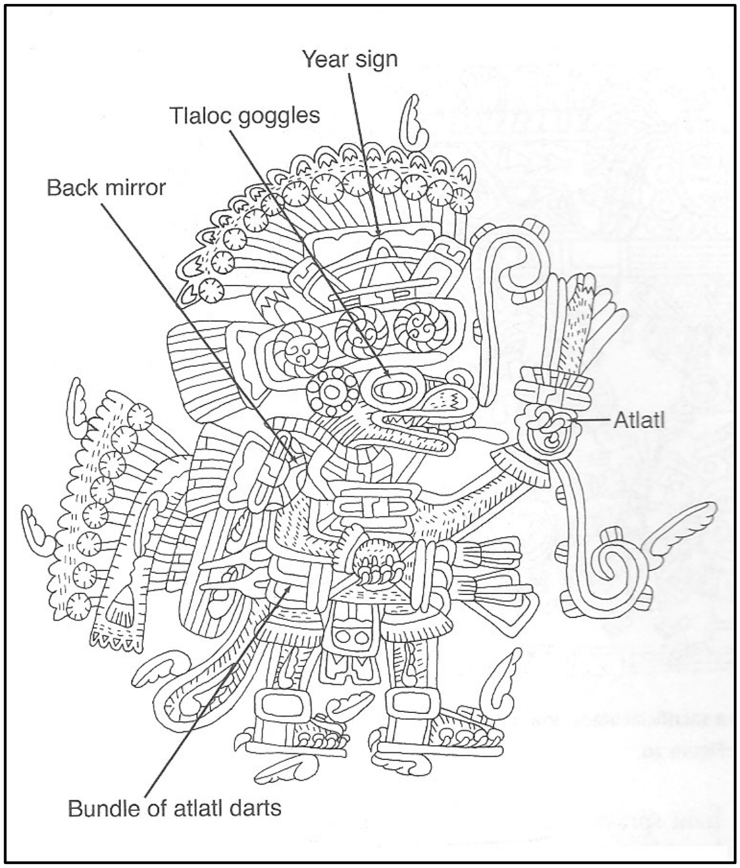

Figure 3.5. Mural depiction of a canine warrior on Portico 1 of the White Patio, Atetelco (Headrick 2007:Figure 4.2 [drawing by Bongard after von Winning 1987:Figure 3c])

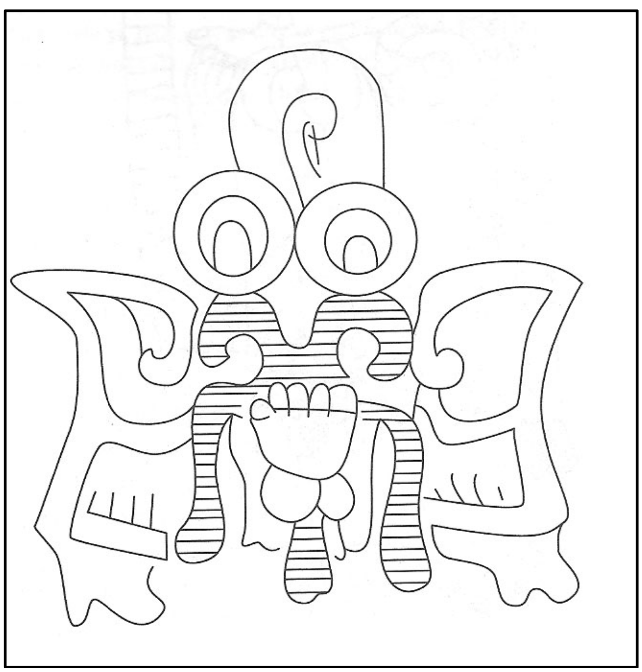

Figure 3.6. Depiction of a Butterfly from a mural in Room 12, Zone 5-A, Teotihuacan (Headrick 2007:Figure 7.3 [Drawing by Bongard after von Winning 1987: Volume 1, Figure 3]).

argues that contact with Teotihuacan was accompanied by dramatic settlement centralization around San Ignacio and diversion irrigation in the southern Amatzinac and Frio river valleys. This region represents a more complete Teotihuacan-related disruption than experienced in most regions, but certain elements were missing. Apartment compounds, for example, were absent. De-emphasis of this standard architectural plan could represent an internal disjuncture within the political landscape that separated Teotihuacan authority from the corporate political ideology that guided it.

State Religion

The second and related category of Teotihuacan symbols is its state religion. This category includes depictions of feathered serpents, Tlaloc, possibly the Old Fire God, butterfly iconography (in contexts not associated with warfare), and three-temple complexes (Figures 3.7 and 3.8). Teotihuacan's state religion was an aspect of the ritual landscape that served to legitimate political authority at the great city. While these images frequently are found at sites elsewhere in Mesoamerica, their inferred meaning and use often differs dramatically. While references to Teotihuacan's state religion are used to legitimate political authority at sites like Tikál, these images are conjoined to a very different style of political authority.

Perhaps the most pervasive use of Teotihuacan state religion comes in the form of Tlaloc (or Storm God) depictions in sculpture and ceramic decorations. In the Maya region, Tlaloc is associated with the god Chac. Storm God vessels are found in many locations. Depictions of Tlaloc, which are usually front-facing, are also found painted on cylindrical tripod bowls in tombs at Monte Alban and many Maya centers (e.g., Berlo 1984, Caso 1932, Caso and Bernal 1965, Cheek 1977). References to Tlaloc are probably most commonly featured in warrior costumes in the iconography and actual burials at several Maya sites (e.g., Fash and Fash 2000). Feathered serpent imagery is an interesting case, as this god lost favor at Teotihuacan about the time the Feathered Serpent Pyramid was razed. Use of feathered serpent iconography is found painted on Fine Orange plates and dishes at Matacapan, though, after its popularity waned at

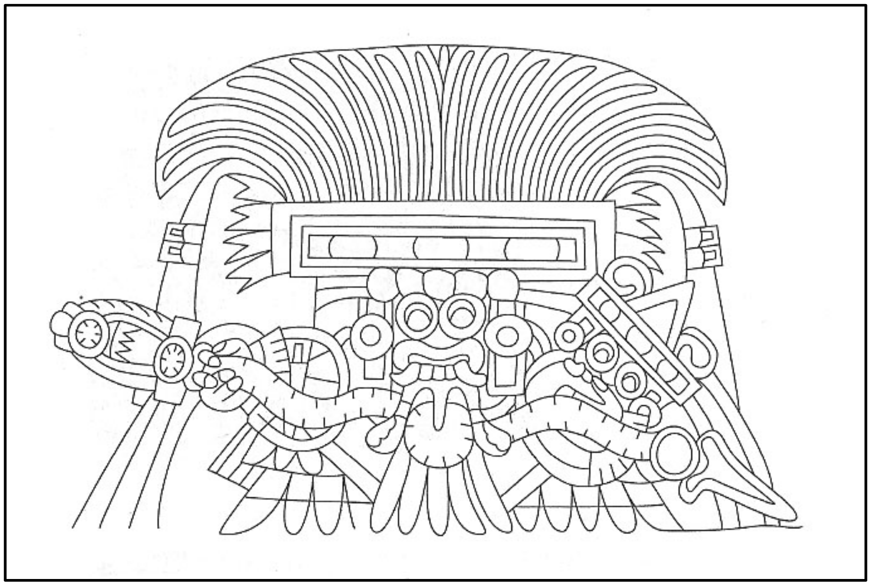

Figure 3.7. Mural depiction of Tlaloc from Corridor 21 at Tetitla, Teotihuacan (Headrick 2007:Figure 7.2 [Drawing by Bongard after Séjourné 1966:Figure 160]).

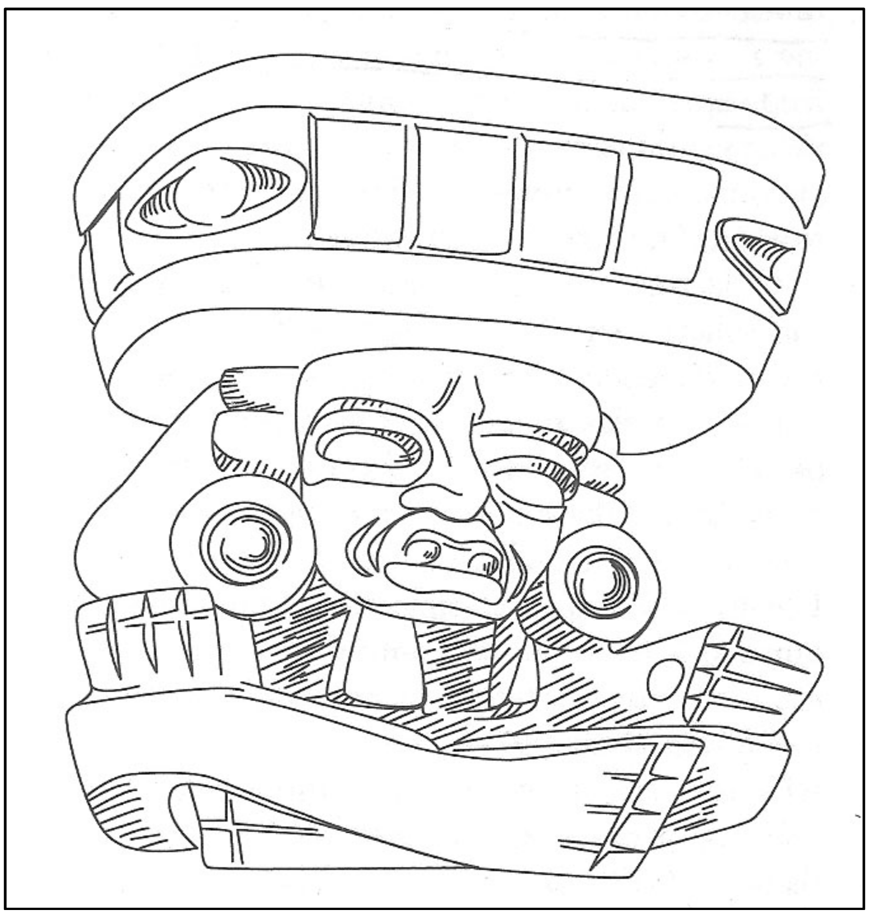

Figure 3.8. Drawing of an Old Fire God brazier (Headrick 2007:Figure 6.16 [Drawing by Bongard after von Winning 1987:Volume 1, Figure 1)

Teotihuacan. Arnold and Santley (2008) use this to suggest the presence of an exiled group of Teotihuacanos in the Tuxtla Mountains.

Private/Domestic Religion

Private religious paraphernalia employed at Teotihuacan that has been found outside the Basin of Mexico includes candeleros, Teotihuacan style censers, mold-made figurines, stone masks (used in ancestor worship), and Old Fire God images. Most of the artifacts that pertain to this category are not commonly found outside the Basin of Mexico, but examples do exist. The rarity with which Teotihuacan *candeleros* and figurines are recovered outside their core region pertains to the fact that they are used for personal and private rituals. Most foreign groups claiming association with Teotihuacan made those connections explicit by flaunting Teotihuacan-style materials in highly public contexts. If a regime hoped to use the connection with Teotihuacan to further its local agenda, why would it employ the more private elements of the city's ritual system? Furthermore, why would the common man or woman want to adopt it unless it is part of their *habitus*? The presence of private/domestic ritual paraphernalia at a site is, therefore, very important to identify the type of relationship with Teotihuacan.

Candeleros are small single and double chambered vessels that were probably used to burn incense, as carbonized remains of *Bursera* genus tree resin has been identified on the inside of some (Séjourné 1966:32) (Figure 3.9). The burning of incense in these simple, but often decorated, *candeleros* was likely associated with daily rituals of the domicile.

Also used to burn incense were the highly distinctive hour-glass shaped censers produced in state workshops at Teotihuacan (Figure 3.10). Poised atop the conical lid of many of these censers was a highly decorated clay mask with tasseled headdress, called a Theater-type censer. The use of these state-produced ritual items in domestic contexts is an interesting example of the state invading the homes of its residents. Some regions (e.g., Escuintla region of Guatemala) of Mesoamerica have produced many of these objects, executed in styles that vary in degrees of similarity to those produced at

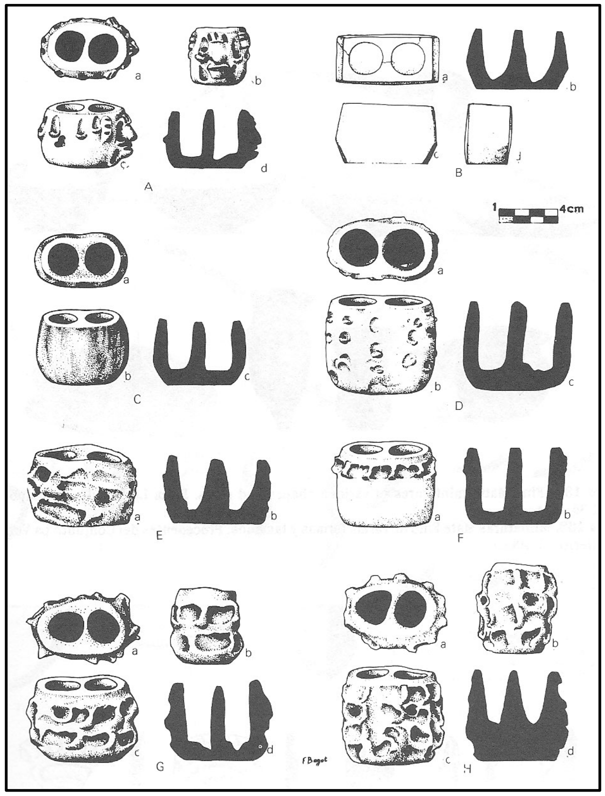

Figure 3.9. Late Xolalpan *candeleros* from Teotihuacan (Rattray 2001:Figure 137).

Figure 3.10. Theater-type incense burner from Teotihuacan (Rattray 2001: Figure 131).

Teotihuacan to actual imports (e.g., Berlo 1984, Smith and Montiel 2001). However, this artifact category is completely absent at some sites that otherwise have very strong associations with the central Mexican city.

Diagnostic features of Teotihuacan-style figurines found abroad are mold-made triangular heads with thin, flat profiles and narrow elongated eyes and mouths (Figure 3.11). At Matacapan (Pool 1992a) Teotihuacan-style molded heads were found on more local style bodies, demonstrating a degree of indigenization. Also at Teotihuacan, common figurine types include the "Portrait Figures" which were poised as if to throw a spear with one hand and holding a shield in the other (Cowgill 1997), and marionette type figurines that were made in pieces (arms, head, legs, and torso) and strung together. The joints of the latter figurines present holes where string would have been threaded. The marionette figurines are also found on the Gulf Coast executed in both Teotihuacan and local styles (Pool and Stoner 2004, Weiant 1943). Figurines are found primarily in domestic contexts and represent aspects of cultural identity and private ritual.

Also used for domestic rituals were *braseros* with the image of the Old God. At Teotihuacan, these were frequently associated with the central altars of each apartment compound. The Old God imagery is also found outside the Basin and is thought to indicate interaction with Teotihuacan.

The stone masks used at Teotihuacan, best known from the work of Pasztory (1997), are found in very restricted distribution outside the Basin of Mexico (Figure 3.12). They are rare at sites with the most intensive purported connections to Teotihuacan, but present in the Michoacán (Filini 2004:25) and the Maltrata region that links the central Highlands to the Gulf Coast (Daneels 2004). The masks appear to have been fastened to mortuary bundles, which probably represented lineage founders, located on or near altars in Teotihuacan apartment compounds (Headrick 1999).

Architecture

I take the perspective in this dissertation that architectural affinities are strongly indicative of political alliances. Architectural layout and style are therefore instrumental

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Figure 3.11. Marionette-style figurines from Xolalpan phase Teotihuacan (Pasztory 1997:Figure 14.6).

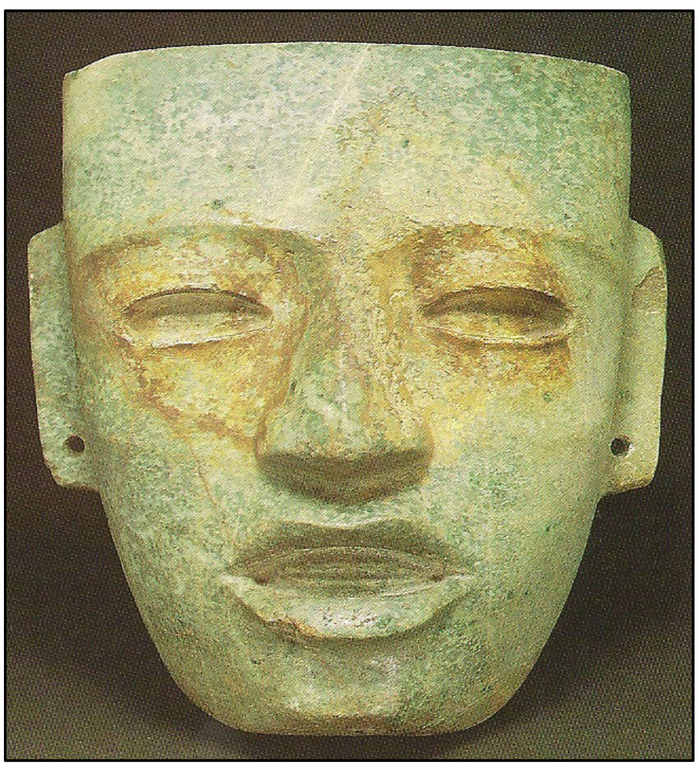

Figure 3.12. Teotihuacan-style stone mask (Pasztory 1997:130).

in reconstructing the political landscape. While it is not very useful or meaningful to use ubiquitous architectural styles to reconstruct political relationships, certain styles may become synonymous with the authority of a particular regime. It has been argued in various places that *talud-tablero* architecture found outside the Basin of Mexico during the Middle Classic may signify intense interactions with Teotihuacan (Figure 3.13). This stance has been critiqued, however, based on the fact that the earliest instances of this architectural style are found in Tlaxcala/Puebla (García Cook 1981). The *talud-tablero* architectural style consists of vertical rectangular frames (the *tablero*) that project from the building's façade, with a sloped element (the *talud*) positioned beneath. Similarities of size proportions between the *talud* and the *tablero* are often used to argue for the strength of relationships with Teotihuacan (Charlton 1991, Santley et al. 1987). At Teotihuacan, the *tablero* was frequently two or three times the height of the *talud.* Epiclassic examples at Xochicalco and El Tajín, however, reverse that relative proportion. Kaminaljuyú displays the two architectural elements at roughly a 1:1 ratio (Cheek 1977), like that identified at Matacapan (Santley et al. 1987, Valenzuela 1945a), and Tikál (Laporte 2003). Cowgill (2003:321-323), however, disputes the utility of using *talud-tablero* as an indicator of a close relationship. He suggests that the proportions of each architectural element was not important to Teotihuacanos except on structures were multiple stacks were built on top of each other, like with large temples. Furthermore, the range of variation in proportions was far greater at Teotihuacan than some have previously argued (Santley et al. 1987). At Teotihuacan, *almenas* are architectural ornaments, or merlons, often placed on the upper areas of buildings. These are better indicators Teotihuacan architectural emulation, but they are very rare outside the city.

Beyond the style of the façade, the apartment compound architecture that defines the urban environment at Teotihuacan, is found at several sites within and outside the Basin of Mexico. Apartment compounds are standardized multi-roomed residential buildings that housed all Teotihuacanos, both elite and non-elite. Varied economic and ritual tasks were undertaken within the walls of each compound. As mentioned above, these residential units probably functioned to organize society into social units, such as lineages. Because the apartment compounds were not necessarily an imperial symbol of Teotihuacan, their presence at sites outside the city could have variable meanings

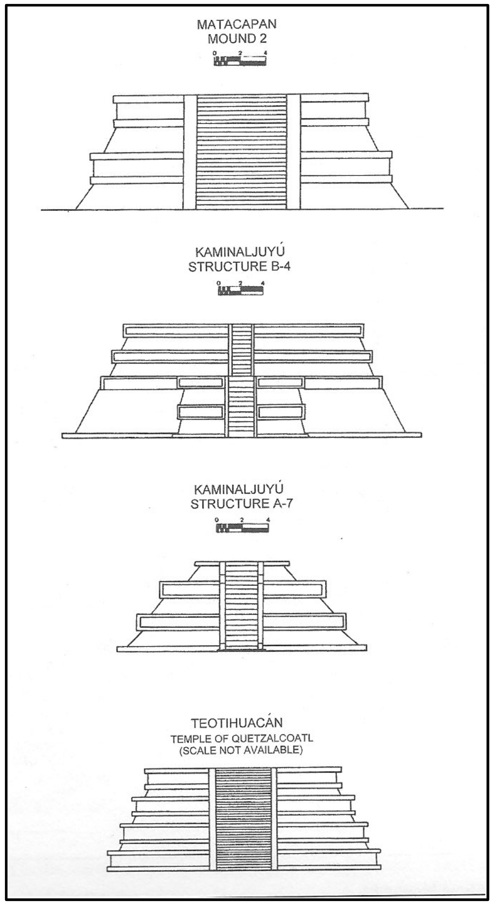

Figure 3.13. *Talud tablero* architecture (Santley 2007:Figure 6.2)

depending on the context. If used in elite contexts, they may be symbols of political authority and alliance with Teotihuacan. If identified in non-elite contexts as well, Teotihuacan-related disruptions may have been more pervasive.

The grid plan of Teotihuacan is another architectural element of the metropolis. This indicator has been used by Charlton (1991) to suggest intensive interactions with Teotihuacan where supported by other evidence of interaction. However, not all grid plans can be attributed to interaction with Teotihuacan.

Mortuary Treatment

Teotihuacan-style burials have been claimed at places like Matacapan (Arnold and Santley 2008), Chac II (Smyth 2004), and Copán (Fash and Fash 2000). Interment of the dead at Teotihuacan varied considerably. The overwhelming majority of burials within the city were of "intermediate status" individuals, who were buried in the floors of their apartment complexes (Storey 1991). Spence (Sempowski and Spence 1994) does, however, identify several crematory and cemetery areas outside these residential contexts. Newborns and infants were placed in ceramic vessels (urns) and buried in walls and altars. Interestingly, infant burials in urns was also observed at Matacapan, but not burial in altars or walls (Arnold and Santley 2008). Daneels (2002b) points out that infant burial using funerary urns is widespread on the Gulf Coast and predates that of Teotihuacan. The majority of Teotihuacan burials were simple interments in unlined pits under the concrete floors of apartment complexes. Body position was overwhelmingly flexed (95.1%) and range from seated, lateral, dorsal, or ventral orientations that were usually aligned on an east-west axis (Sempowski 1992:31). Wrapping the body in textiles was a frequent practice. This may have been a more common practice than is evident in the archaeological record. Sub-adults were often buried in the dorsal position, while adults were most often seated facing east. Goods interred with individuals as offerings varied considerably. Ceramics were the most common offering, occurring with 80 percent of the burials (Sempowski 1992:31). Within each apartment compound there occur burials that have more elaborate grave construction that are interpreted to be "founders' burials" (Sempowski 1992:31). These are most frequently adults of higher inferred statuses. The founders' burials were interred in highly public areas of apartment compounds near the central altars. Their burial shafts were typically excavated deeper than normal and more care went into preparing the burial chamber and body itself. High status adults also received more lavish grave offerings, and were treated with red ochre or cinnabar. This is a somewhat circular argument for status, though. High status individuals were also more commonly cremated than lower status individuals (Sempowski and Spence 1994).

Mortuary treatment reflects an individual's cultural identity perhaps more than any other indicator. However, a distinction must be made between the style of a burial (burial chamber, body position, treatment of the body) and the style of the goods interred with them. Teotihuacan-style goods placed in a local-style grave may attest to the individual's political connections, rather than their underlying cultural affiliation. This puts into focus the contrast between the consciously negotiated aspects of identity and the more deeply ingrained, subconscious identity (see discussion of the "Symbolic Landscape" in Chapter 2). The use of Teotihuacan-inspired mortuary treatment and grave goods may be a strong indicator of ethnic enclaves. This argument has been used for Chac II (Smyth 2004) and Matacapan (Arnold and Santley 2008, Santley et al. 1987).

Pottery

Pottery includes Teotihuacan controlled distribution of Thin Orange ceramics, cylindrical jars with rectangular tripod slab supports, *floreros*, negative resist decoration, copa forms, a variety of glyphs and design motifs, and other ceramics (Figures 3.14, 3.15, and 3.16). Also used as a potential indicator of Teotihuacan interaction are cover plates with three tripod loop handles (Figure 3.17). As Stark (1990) notes, it is difficult to compare these artifacts from survey because the loop handles almost always are found detached from the plate. In the Tuxtlas, a similar type of loop handle is found on the *cazuela* form, a broad flat pan with short vertical walls. Color may be one way to distinguish the cover plate loop handles from the others. *Cazuela* handles tend to be light brown in color with coarse quartz temper, while cover plates and their handles tend to be yellowish-red to dark red.

Most of these ceramics found outside the city potentially signify prestige as they were probably used as serving wares announcing a connection to Teotihuacan. They can therefore be used in conjunction with other indicators to reconstruct the political landscape, but context here is very important. If these objects were used to enhance prestige during feasting occasions, for example, they should be found primarily in elite and/or public contexts. Identification of culinary implements of the Teotihuacan style in non-elite contexts could signify a much more pervasive role of Teotihuacan in defining local cultural identities.

Thin Orange is a special type of pottery, for which Teotihuacan controlled the distribution. This ware is characterized by "egg shell" thin walls, a bright orange color, and diagnostic schist temper (Rattray 2001:305-307) (see Figure 3.14). The forms are

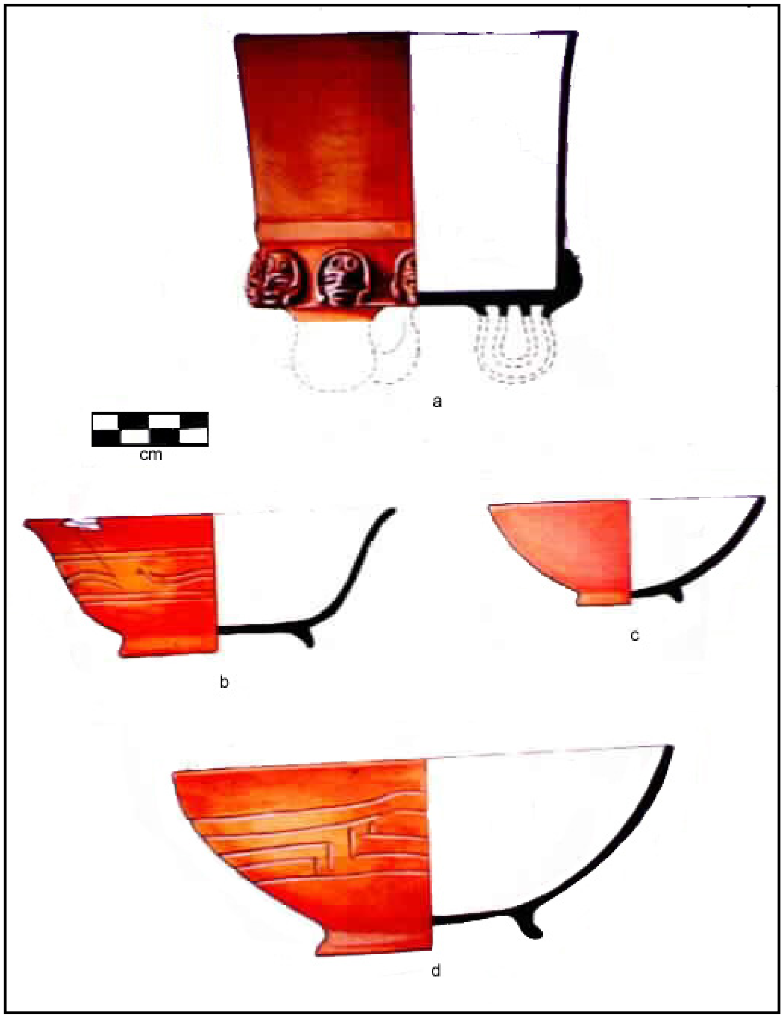

Figure 3.14. Thin Orange ware vessels from Teotihuacan (Rattray 2000).

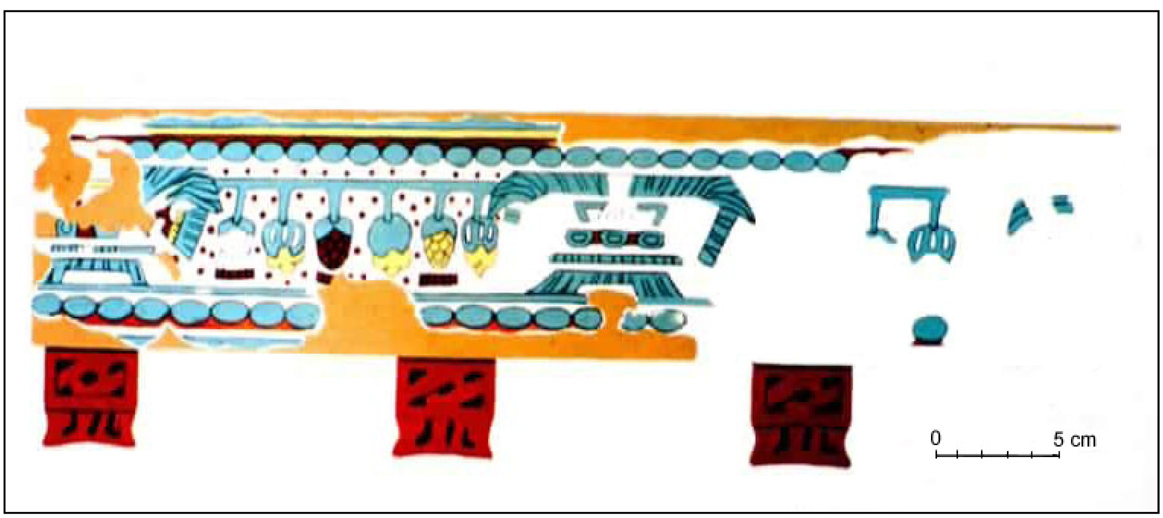

Figure 3.15. Metepec Stucco painted vase showing hollow rectangular supports (Rattray 2000).

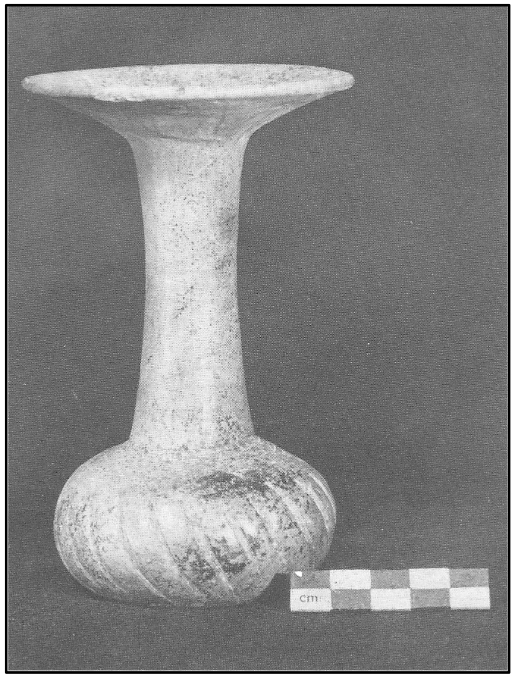

Figure 3.16. Florero from Teotihuacan (Rattray 2001:Figure 118)

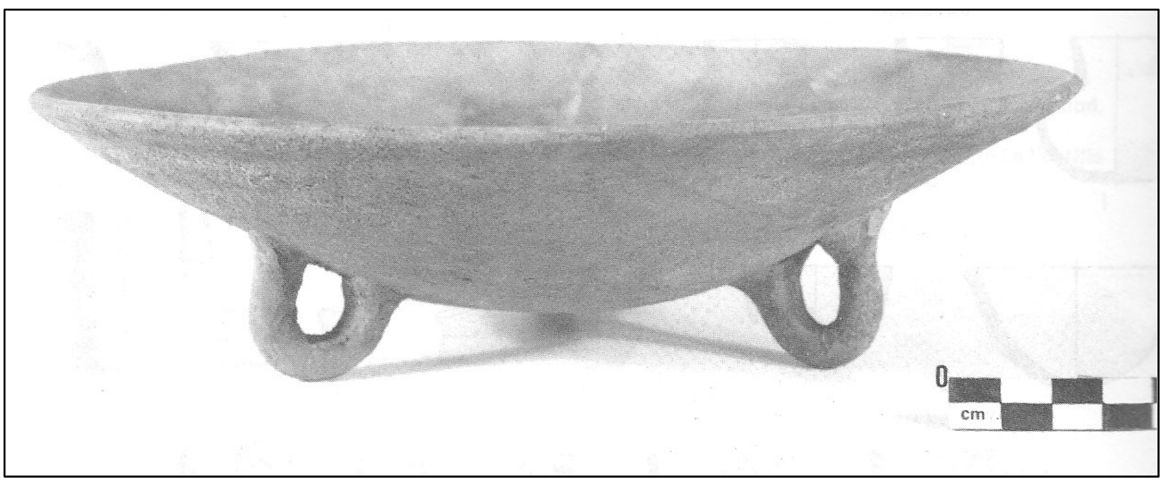

Figure 3.17. Cover plate from Teotihuacan with three loop supports (Rattray 2001:Figure 140).

most typically hemispherical bowls with annular supports and cylindrical jars with flat bottoms and rectangular or globular supports (Rattray 2001:311). A number of other forms have been identified within the Thin Orange ware, but these are the most commonly found outside the central Highlands. Thin Orange was produced in southern Puebla near Cholula (Rattray and Harbottle 1992; Rattray 1998, 2001:305), but Smith and Montiel (2001:258) argue that Cholula presented Teotihuacan with Thin Orange as tribute. Whether produced outside the city or not, Thin Orange was used abundantly at Teotihuacan and traded in small amounts throughout much of Mesoamerica. This ware ceased to be produced after the metropolis collapsed (Pasztory 1997:153; Rattray 2001), so it is a good chronological marker as well as indicator of Teotihuacan identity.

Another serving vessel was the cylindrical tripod jar. The cylindrical tripod jars have three rectangular, usually slab, supports and often have stuccoed and painted decorations that have also been considered diagnostic of Teotihuacan interaction (Figure 3.18). The cylindrical tripod jars were found among the Thin Orange ware, but also occurred within other ware categories (Rattray 2001). The stucco is a very thin layer over which paint is applied. Some have drawn connections between the stucco on cylindrical tripod vessels and the murals found in Teotihuacan apartment compounds, but the artistic techniques differ considerably.

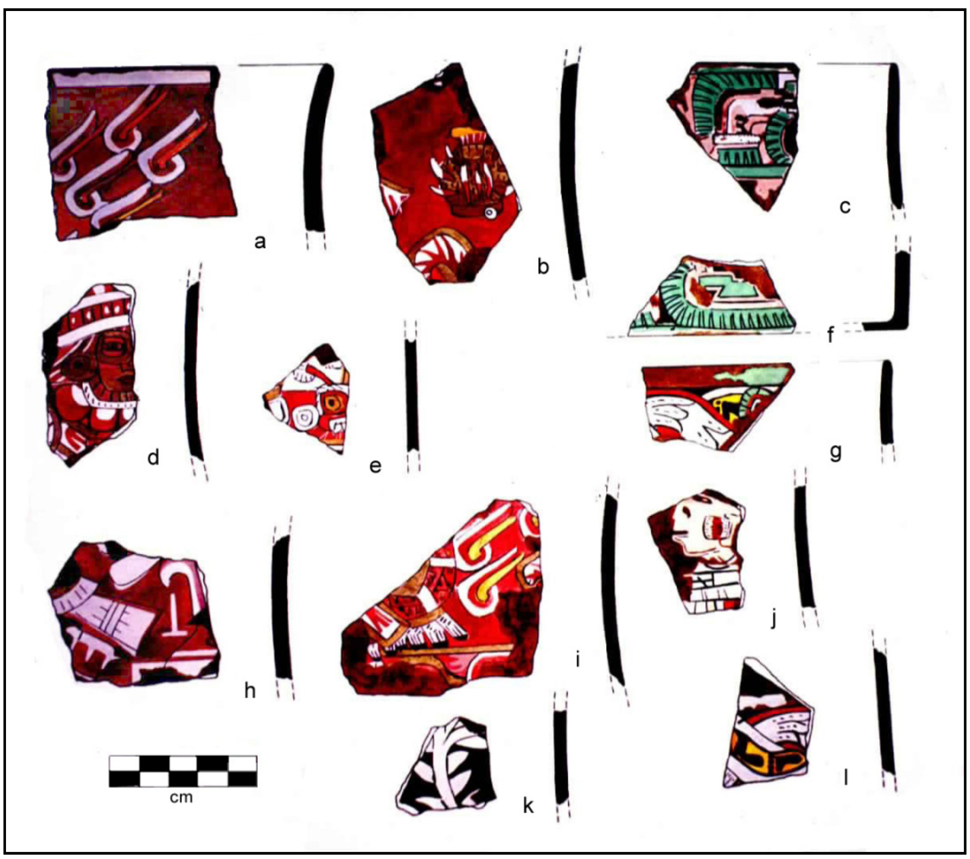

Figure 3.18. Stucco painted cylindrical vases from Metepec Phase Teotihuacan (Rattray 2000).

In all cases, these culinary artifacts have implications for all four landscapes depending on context. Cylindrical tripod vessels, for example, were among the most highly decorated artifacts within royal tombs at Kaminaljuyú, Copán, Tikál, and Monte Albán. Some of these decorations depict religious themes. However, we can separate the exchange of material (the actual vessels) from the export of the ritual ideology and symbols to tease apart different landscapes of interaction.

Settlement Disruption

Conquest by Teotihuacan and very intensive economic relationships may alter settlement patterns and relationships in provincial areas. The effect may involve a more centralized political economy designed to mobilize local materials and goods for export to Teotihuacan. Presence of this characteristic is strong support for political control by Teotihuacan, but areas that display settlement disruption due to Teotihuacan are concentrated in the central Mexican highlands in eastern Morelos, Hidalgo, Querétaro, and Puebla/Tlaxcala. However, another type of settlement disruption is tied to the decline of Teotihuacan. Sites and regions with systemic dependency on Teotihuacan relationships – which does not necessarily imply political or economic subordination – will decline or become abandoned with the fall of the city (e.g., Díaz Oyarzabal 1981, Smith and Montiel 2001). Many Teotihuacan-related sites significantly declined or were abandoned with the fall of the central Mexican city. Other settlements, though, rose to fill the power vacuum left behind (e.g., Xochicalco, Cacaxtla, El Tajín).

Material Exchange

Teotihuacan exported a relatively narrow set of goods including obsidian, Thin Orange ceramics, and cylindrical tripod vessels (executed on Thin Orange pastes as well as Polished and Lustrous wares [Rattray 2001]). Among these, only obsidian cannot be copied. The ceramics could be and were duplicated throughout Mesoamerica. While emulation of Teotihuacan ceramic styles implies an appropriation of certain aspects of

Teotihuacan's symbolic and belief systems, these cultural appropriations were often established with limited or no material exchanges. It is very important to identify actual exports versus local imitations to reconstruct the economic landscape. Pachuca obsidian blades and raw material distributed by Teotihuacan constitute a utilitarian category that may have had added prestige value for some groups due to its connotation with the central Mexican city and its green color. In many contexts, green obsidian is tightly controlled by local elites, non-elites use other types of obsidian.

Pattern Variability

The current study in the Tuxtla Mountains partly builds an argument from negative evidence. That is, Totocapan lacks evidence of Teotihuacan relationships while Matacapan presents ample evidence of the same. It is important to understand where Teotihuacan influence was rejected. Research at many major Classic period sites have failed to produce evidence of a connection to Teotihuacan. Cantona, for example, was one of the largest Classic Mesoamerican cities, but there is no indication that they had any relationship with Teotihuacan, hostile or friendly (García Cook and Merino Carrión 1996). Investigations into why Cantona was resistant to adopting Teotihuacan-related materials and behaviors may prove instrumental in understanding Classic Mesoamerica writ large. My own investigation of interpolity interactions focused on Matacapan and Totocapan is a similar situation on a smaller scale. In both cases, Cantona and Totocapan must have been aware of role Teotihuacan played with the surrounding settlements. Given the apparent choice, they rejected the influence from the central Mexican metropolis in favor of more local developmental trajectories.

CENTRAL MEXICAN HIGHLANDS: THE CORE OF THE TEOTIHUACAN-RELATED WORLD-SYSTEM

Smith and Montiel (2001) argue that Teotihuacan politically incorporated certain regions adjacent to the Basin of Mexico. Perhaps the strongest evidence for provincial integration occurs at the site of Chingú (Díaz Oyarzabal 1981). Chingú, first occupied during Teotihuacan's Tzacualli phase, was located about 9 km to the east of Tula in the state of Hidalgo. This was an important region for Teotihuacan to procure lime for plaster production. The architecture of Chingú was laid out on a grid oriented 15 degrees east of north (Díaz Oyarzabal 1981:108), with some of the civic-ceremonial buildings displaying a layout similar to the Ciudadela at Teotihuacan. *Talud-tablero* architecture was present, as was domestic architecture similar to the apartment compounds. In fact, Charlton (1991: Table 15.2) argues that Chingú displays all of the architectural and settlement planning that could be diagnostic of Teotihuacan interaction. A total of 18% of ceramics collected at this site were of the Teotihuacan style. Among these were Thin Orange vessels. Interestingly, Zapotec-style ceramics were also frequent, which led Díaz Oyarzabal (1981:108-109) to suggest that a resident enclave of Zapotecs lived at the site. A similar pattern of high proportions of Teotihuacan and Zapotec ceramics were also found at sites in the Chingú hinterland, such as El Tesoro and Acoculco (Crespo and Mastache 1981). At these sites, Oaxaca-like ceramics outnumber Teotihuacan-style vessels, but the authors note similarities of the former to the Barrio de Oaxaca in Teotihuacan. Returning to Chingú, a large quantity of Teotihuacan figurine types were found along with some molds. Díaz Oyarzabal (1981) suggests that residents at Chingú were producing figurines. Most archaeologists would agree that Chingú, and its hinterland, were conquered by Teotihuacan (Hassig 1992:54). The presence of both Teotihuacan state and domestic artifacts found in elite and non-elite contexts suggests that Teotihuacan had a pervasive affect on political, economic, and cultural life in Classic Hidalgo. Chingú was abandoned after the decline of Teotihuacan, possibly indicating a situation of dependency (Smith and Montiel 2001:262).

In the southeastern portion of Hidalgo, Teotihuacan also influenced the regional center of Tepeapulco, which was situated near the western end of a major proposed trade corridor that eventually led to the Gulf Coast (Rattray 1998:78). Like Chingú, Tepeapulco contained high frequencies of Teotihuacan ceramics and Thin Orange (as high as 42%) (Matos Moctezuma et al. 1981). Almost all of the Teotihuacan architectural features were present as well. *Talud-tablero* facades, apartment compounds, and nucleated settlement organization, were all present, but the site was not laid out on a grid (Charlton 1991). A point of departure from Chingú is that Teotihuacan figurines were not found at Tepeapulco. The absence of this domestic ritual artifact at Tepeapulco suggests that relationships with Teotihuacan at the two regional centers were somewhat different. Furthermore, c*andeleros* are rare or absent at all sites in Hidalgo that display a Teotihuacan connection.

To the northwest of Teotihuacan in the modern states of Querétaro and Guanajuato San Bartolo Aguacaliente, Santa María del Refugio, La Negreta, El Cerrito, El Rosario and several others sites display connections to Teotihuacan (Crespo 1998, Saint-Charles Zetina 1998). All of these sites are situated within 25 km of each other. Smith and Montiel (2001:254) include this region within the political territory controlled by Teotihuacan. San Bartolo Aguacaliente was the principal center in the region when Teotihuacan materials first appear during the Tzacualli through the Tlamimilolpa phases. It displayed architectural and ceramic evidence inspired by Teotihuacan (Crespo 1998:326). However, Saint-Charles Zetina (1996:151) argues that a Teotihuacan presence is not clearly expressed by the architecture, which displays a complex blend of traits. Santa Maria del Refugio, a ceremonial center in the region, lacked *talud-tablero* architecture but the overall architectural configuration of the site was similar to Teotihuacan. Another site in the region, Inchamacuaro, displayed apartment compound residences. At La Negreta, locally made imitations of Thin Orange and other ceramics inspired by Teotihuacan were recovered (Saint-Charles Zetina 1998:338-339). A general pattern of nucleation at large sites took place in the Valley of Querétaro following the collapse of Teotihuacan.

Toward the southern end of the Valley of Querétaro, El Cerrito displayed the same Teotihuacan elements as other sites in the region, but they were much more mixed with local styles. This intermingling of material styles may pertain to the fact that El Cerrito was occupied long before Teotihuacan rose to prominence. The long temporal depth of El Cerrito occupation may have made some of the long-standing local traditions resilient to foreign influence, an argument that I make for Totocapan. If local cultural identities, behaviors, and rules of political succession were deeply rooted in local social institutions, many local agents would understandably oppose replacement of those traditions with non-local ones. During Teotihuacan's Xolalpan phase, El Cerrito took over as the regional center in the Valley of Querétaro as Teotihuacan influence in the region began to wane (Crespo 1998:326). El Cerrito returned to a more regional stylistic focus at this time, which continued through the collapse of Teotihuacan. Again, it may have been the dedication of the El Cerrito inhabitants to local institutional preservation in the face of Teotihuacan disruption that facilitated their resurgence with the withdrawal of Teotihuacan influence. The history of interaction between Teotihuacan and El Cerrito is one that was strongly influenced by the preexisting local developmental trajectory of El Cerrito. This is a point that will be revisited in different contexts below.

South of the Basin of Mexico, Smith and Montiel (2001:262) and Hirth (1980, Angulo and Hirth 1981) suggest that sites throughout central and eastern Morelos display evidence of conquest and incorporation into the Teotihuacan empire. Within the Amatzinac and Frio River valleys, Hirth (1980) demonstrates that during the Early Classic an increase in population and a demographic restructuring took place from the preceding Formative Period. A dominant regional center emerged, San Ignacio. In contrast to the primate settlement organization at Teotihuacan, San Ignacio integrated the high population of mainly rural sites into a more normalized rank-ordered settlement hierarchy. The settlement hierarchy efficiently organized agricultural production in the southern portion of the valley. Farming hamlets were integrated by small villages that in turn owed allegiance to San Ignacio.

Concordant with these shifts in settlement, there was strong affinity with Teotihuacan in the Amatzinac Valley, much more so than in western Morelos (see Senter 1981). Large amounts of Teotihuacan trade wares were found and local knock-offs were also present. Even utilitarian domestic ceramics were made in Teotihuacan styles, suggesting that interaction went beyond elite prestige exchange. Green obsidian formed a large portion of the obsidian recovered; however, *talud-tablero* architecture and Teotihuacan style figurines and *candeleros* were rare. Smith and Montiel (2001) state that figurines were present in the Yautepec Valley, though. Hirth argues that San Ignacio had the same administrative role in Teotihuacan's hinterland as Azcapotzalco in the Basin of Mexico. Hirth argues that diversion irrigation of the Amatzinac and Frio rivers was common in the southern part of the Valley where cotton may have been a primary agricultural product. Cotton does not grow well in the Basin of Mexico, but it does favor the hotter and wetter climate in Morelos. Securing access to cotton or cotton products may have been Teotihuacan's interest in the area. In addition to cotton, Morelos was a route of trade with Guerrero.

Regional populations increased during the Late Classic in eastern Morelos, but settlement was restructured. In contrast to the Basin of Mexico, which showed a pattern of increasing occupation of rural sites later in the Classic period (i.e., Xolalpan phases), populations in the Amatzinac Valley became more nucleated into urban settlements. There was also a decrease in hierarchical "nesting" in the region. Greater population density shifted to northern valley with a preference for defendable site locations. Hirth attributes these changes to the lack of stability caused by the waning strength of Teotihuacan.

In eastern Morelos, the presence of Teotihuacan state goods at sites of all ranks and in both elite and non-elite contexts suggests a pervasive influence, such as that found at Chingú. The artifact classes recovered include censers, figurines, *candeleros*, Thin Orange ceramics, Tlaloc vessels, cylindrical tripod vessels, floreros, stuccoed decoration. Some architectural similarities occur at Hacienda Calderon (Nalda 1997) and Oaxtepec (Angulo and Hirth 1981:83), which had instances of *talud-tablero* architecture, and San Ignacio (Hirth 1980), which displays urban planning. The site of Las Pilas also displays a variant of *talud-tablero* architecture. Salvage archaeology performed at this site identified more than 10 burials lavished with high frequencies of Teotihuacan ceramics (Angulo and Hirth 1981:85). The burials themselves were in a seated position, but, unlike Teotihuacan mortuary practices, the legs were crossed. Some excavation contexts from Las Pilas produced Thin Orange in proportions as high as 20% (Angulo and Hirth 1981:89).

Regarding the distribution of Teotihuacan materials throughout the region, Smith and Montiel (2001:263) observe that "all reported Early Classic sites in the eastern half of Morelos contain numerous examples of Teotihuacan material culture, both imported and locally made, including Thin Orange and other ceramic wares, figurines, and Pachuca obsidian blades." In the Yautepec survey, 2-4% of ceramics from the Classic period were made in the Teotihuacan style (Smith and Montiel 2001:258). Teotihuacan censers from the same survey are stylistically identical to those of the central Mexican city, and may have been imports from the state-run censer workshop at Teotihuacan (Smith and Montiel 2001:258). Figurines found in this survey area were also identical to those at Teotihuacan. Like Chingú, figurine molds were also recovered. Green obsidian found in central and eastern Morelos was usually in blade form suggesting merchants brought this commodity to the region as finished tools, or artisans traveled with Pachuca cores and produced blades on demand. The role of central and eastern Morelos in the expansion of Teotihuacan likely pertained to a hypothesized trade route between Guerrero and central Mexico. Granular Ware produced in Guerrero was found at Teotihuacan, but it was more prevalent in Morelos (Hirth 1980, Smith and Montiel 2001:259). Montiel (cited in Smith and Montiel 2001:263), however, argues in her dissertation that provincial interaction with Teotihuacan was very diverse.

Settlement patterns in western Morelos were rather dispersed as Teotihuacan was spreading its influence to the east. Ceramic homologues are found in this sub-region (Senter 1981), but Hirth argues that almost all are local imitations (2000a:67). *Talud-tablero* architecture was abundant at Xochicalco, but the relative heights of the *talud* and *tablero* were in very different proportions than at Teotihuacan, though Cowgill notes that this ratio was not very standardized at Teotihuacan (2003; see above). Additionally, most of this architecture was constructed at a later date than at Teotihuacan. Also indicative of interaction was a limited use of Teotihuacan emblems in Xochicalco sculpture, such as the Half Star motif on Stela 2 (Hirth 2000b:93). In contrast to sites in eastern Morelos, Xochicalco flourished in the political vacuum left behind be Teotihuacan's collapse (Hirth 2000a). This is an interesting contrast where different regional reactions to Teotihuacan led to divergent evolutionary trajectories. In Morelos it seems that greater dependence on Teotihuacan for economic interaction, prestige, political legitimation, and ritual increased the likelihood that settlement declined along with the decline of Teotihuacan. The opposite is true for sites with limited relationships with Teotihuacan. Xochicalco, for example, was relatively independent of Teotihuacan, which likely contributed to its success during the Epi-Classic period.

To the southwest of the Basin of Mexico, several sites in the Valley of Toluca fell under Teotihuacan influence (Díaz Oyarzabal 1998) including Ocoyoacac, Ojo de Agua, Calixtlahuaca, and Los Cerritos. Ocoyoacac is probably the best known. The ceramics at this site hold much in common with ceramics from Teotihuacan. These include prestige wares such as Thin Orange and Teotihuacan censers, but domestic ceramics with local paste recipes also were formed similar to Teotihuacan wares. Díaz Oyarzabal (1998:368) notes that Thin Orange percentages were low compared to nearby Ojo de Agua. Also recovered at Ocoyoacac were fragments of Teotihuacan-style masks that were likely part of theater censers, Tlaloc emblems, and feather iconography that all resemble counterparts in Teotihuacan. While one poor example of a *talud-tablero* platform exists at the site, most of the architecture at Ocoyoacac and the rest of the Valley of Toluca was constructed using vertical walls. It is therefore concluded that Ocoyoacac was influenced by Teotihuacan, but it did not displace local traditions.

To the east and southeast of the Basin of Mexico in northern Puebla and Tlaxcala, Teotihuacan also forged intensive relationships, which likely reflected its interest in trade with the Gulf Coast and Oaxaca. Trade with the Gulf Coast was likely conducted through what has been called the Teotihuacan Corridor (Charlton 1991, García Cook 1981, Rattray 1998) that runs diagonally from northwest to southeast through the center of Tlaxcala. On the western end of the corridor, sites of Calpulalpan and Tepeapulco (discussed above) evince strong ties with the city. Calpulalpan exhibits quantities of Thin Orange ceramics (either from Teotihuacan or Tepexi de Rodríguez in Puebla) ranging from 25-75 percent of collections. Teotihuacan-style figurines also were recovered at this site (Linné 1942:56-89). Charlton (1991) details the architectural and settlement similarities between Calpulalpan and Teotihuacan, which is significant, but it could not be determined if the *talud-tablero* style was present (Smith and Montiel 2001:262). Charlton sees Calpulalpan as an eastward extension of the east-west avenue which crosses the Street of the Dead in Teotihuacan.

Toward the eastern end of the "Teotihuacan Corridor", the site of Tetetles de Ocotitla displays a relatively well-known connection to Teotihuacan. García Cook (1972) encountered a tomb there with an offering of 298 vessels, which were mostly in the Teotihuacan-style. Included in the offering were Teotihuacan style figurines and Thin Orange vessels (Vega Sosa 1981). This site and other high ranking sites in the region employed *talud-tablero* architecture. More impressive is the fact that this architectural style was integrated into plaza groups enclosed on three sides by ceremonial buildings, very similar to the three-temple complexes at Teotihuacan. At Teotihuacan, recall that the Old God is associated with these three-temple complexes in the apartment compounds (Headrick 2007). It is therefore interesting that the Old God (referred to by Vega Sosa [1981] as Huehueteotl) imagery was also found at Tetetles de Ocotitla. The relatively high percentage of Teotihuacan artifacts found in the tomb is diluted by more local style ceramics at the site writ large. Only 3 percent of ceramics found there pertained to Teotihuacan influence (Rattray 1998:89). Many sites toward the eastern tip of Tlaxcala display evidence of Teotihuacan interaction, most prominent among these are Cuapiaxtla and Humantla (Rattray 1998). Both of these sites display percentages of Teotihuacan-affiliated ceramic proportions of up to 20 percent. The "Teotihuacan Corridor" in general displays Teotihuacan-style materials on the order of 0.5-6 percent (Rattray 1998:89). There are a number of sites within the Corridor that possess Teotihuacan architectural and settlement elements, but García Cook (1981) notes that architectural similarities are not found elsewhere in Tlaxcala.

An interesting pattern appears near the border of Tlaxcala with Puebla. The Manzanilla subregion displays high percentages of Teotihuacan ceramics, but this material was rare at the large center of Cholula just 20 km to the west (Rattray 1998:89). Cholula maintained a distinct cultural identity during the Classic period despite the adoption of some Teotihuacan traits, and perhaps invention of others (i.e., *talud-tablero* architecture). Hassig (1992:54-55) suggests that Cholula was too large for Teotihuacan to risk a military campaign against the city, but the two were likely linked through peaceful means. The location of Cholula along a major trade route forced Teotihuacan to deal with it in some way. Interestingly, like Xochicalco, Cholula outlasted and thrived in the political vacuum left in the wake of Teotihuacan's decline.

Rattray (1998, 2001:313-319; Rattray and Harbottle 1992) has identified the source of Thin Orange and other ceramics (*cazuelas*, *ánforas*, and *palanganas*) that made up between 10-20% of all pottery consumed at Teotihuacan over a 300 year time span. The Tepexi de Rodríguez region of southern Puebla (about 70 km southeast of Cholula) along the Río Carneiro and Río Axamilpa manufactured these ceramics and traded them, or gave them as tribute, to Teotihuacan or other Mesoamerican destinations under the control of Teotihuacan (Rattray 1998). Tepexi was a composite polity composed of 83 sites of various sizes, but it was not nearly as centralized as Teotihuacan. Indications of interaction with Teotihuacan include Teotihuacan-like apartment compounds, pyramidal platforms with *taluds*, green obsidian, and, of course, Thin Orange and other ceramics consumed at Teotihuacan. Smith and Montiel (2001) suggest that Thin Orange is an indicator of imperial influence because it was likely offered as tribute. It is interesting that Thin Orange is so common in this region and at Teotihuacan, but so rare at Cholula. This fact suggests that Teotihuacan avoided confrontation with Cholula, but sapped resources from the surrounding region all the same.

With a few exceptions noted in the text, the regions detailed in this section correspond to the core political territory that was directly controlled by what Smith and Montiel suggest was a Teotihuacan Empire (Smith and Montiel 2001, Montiel 2010).

SOUTHERN PUEBLA AND OAXACA

South of Teotihuacan's core territory, three regions display very different reactions to Teotihuacan: the Tehuacán Valley, the Cuicatlan Cañada, and the Valley of Oaxaca. Drennan (Drennan and Nowack 1984, Drennan et al. 1990) has worked in the Tehuacán Valley where several sites displayed evidence of Teotihuacan interaction. The Tehuacán Valley is the primary route of transportation from central Mexico into the Valley of Oaxaca. Drennan demonstrates that during the Palo Blanco phase many sites emerged with a high percentage of Thin Orange pottery, as high as 50 percent of total individual site assemblages. These sites were not regional centers or even large villages, but instead were small sites with little to no public architecture. Neither were they located in defensible locations, like most of the larger towns of the period (Drennan et al. 1990:184). Moreover, high percentages of this Teotihuacan export were found in residential contexts. Sites that demonstrated a ceramic link to Teotihuacan also displayed unusually high percentages of green obsidian. This is the case at La Nopalera, which possessed around 75 percent green obsidian in excavated contexts (Drennan et al. 1990:187). Several other sites in the region displayed this same pattern, but it was not the norm. Teotihuacan-linked sites were situated side-by-side with those with no

Teotihuacan-inspired artifacts or reliance on Teotihuacan controlled obsidian. This paints a picture of very different responses to the imposing central Mexican city, and very different interaction networks operating in the Tehuacán Valley. It was as if sites like La Nopalera were not connected to the local system. Drennan et al. (1990:191) suggest this pattern was formed because the Tehuacán Valley was not the ultimate destination of Teotihuacan trade, rather it was a stop *en route* to destinations further south and east. Based on a general lack of Teotihuacan affiliated sites in the Cuicatlan Cañada (Redmond 1983) to the south of Tehuacán, the authors argue that the trade route went east toward the Gulf Coast via the Río Papaloapan rather than south into the Valley of Oaxaca.

The Cuicatlan Cañada is notable because a significant percentage of green obsidian was found there (Redmond 1983; Spencer and Redmond 1997), but there was no other evidence for relationships with Teotihuacan of cultural or political significance. In fact Spencer and Redmond (2004:183) demonstrate that the Cañada was conquered instead by the expanding Zapotec Empire. Around 200-300 CE a large fortress was established at Quiotepec on the northern boundary of the region. Quiotepec was strongly associated with Monte Albán and ceased to interact with settlements to the north of the fortress. The fortification of the northern valley was accompanied by dramatic settlement disruption to the south and evidence that abandonment of previous occupations was brought about through violence. Monument J at Monte Albán holds a "conquest slab" that names the Cuicatlan Cañada as a conquered province of the Zapotec state (Marcus 2003:106-108). Finally, excavations at La Coyotera in the southern part of the region demonstrate "dramatic changes between Perdido and Lomas phases in patterns of residence, economic activities, and ceremonial behavior at village sites south of the Quiotepec fortress (Spencer and Redmond 2004:183)". The fortress at Quiotepec was likely positioned to fend off any attempts of Teotihuacan to expand into Monte Alban's territory.

In the Valley of Oaxaca, Monte Albán emerged as an expansionist state (ca. 200 BCE). There is no evidence, though, that either Teotihuacan or Monte Albán attempted to conquer the other. To the contrary, the relationship between the two Classic Mesoamerican empires seems to have been one of cautious cooperation. The relationship between the two cities was "special" as Paddock surmises (2003:174-175). The volume of trade with Monte Albán was much lower than at more distant sites such as Kaminaljuyú, Tikál, Copán, or the Escuintla region of Guatemala. Teotihuacan hosted an enclave of resident Oaxaqueños (Spence 1996), and several sites north of Teotihuacan were also influenced by the Zapotec state (discussed above).

In the Valley of Oaxaca, Teotihuacan materials were almost exclusively restricted to Monte Albán. The extensive settlement in the Valley of Oaxaca below Monte Albán was not affected (Hassig 1992:68). It follows that the role of the central Mexican city in the Valley of Oaxaca was restricted to the ruling regime and other upper echelon elites of the Zapotec State. Monte Albán, despite its size and importance in Mesoamerica, was a terminal node with regard to the spread of the Teotihuacan symbolic, political, and cultural network. There were, however, several sites on the Oaxacan Coast that also demonstrate a link to Teotihuacan (see Joyce 1993).

Monte Albán took very little from Teotihuacan's architectural traditions. No apartment complexes or *talud-tablero* architecture have been identified, but Winter et al. (1998:465-466) note that Buildings D, E, and VG of the Complex VG form a three temple complex similar to those at Teotihuacan.

Most of the Teotihuacan materials found at Monte Albán were ritual in function. These included censers, *candeleros* (only 3 were found [Ortiz and Santley 1998:450), *floreros*, cylindrical tripod vessels, and Tlaloc jars. These ceramics were found both in tombs and stratigraphic pits (summarized in Filini 2004:79). In burial contexts, the Teotihuacan style materials were associated with typical Zapotec art. Utilitarian objects were not common. Also seen at this Oaxacan city were uses of Teotihuacan art, such as the butterfly, reptile eye glyph, three mountain glyph, and coffee bean appliqué decoration (Santley 1983:81). Butterfly imagery was commonly found on Teotihuacan-style censers (Berlo 1984:206-207), but the context of use provides a good example of how Teotihuacan cultural elements were disjoined from their traditional contexts as they traveled Mesoamerica.

In describing this relationship, Berlo (1984:206-207) nicely describes the disjuncture between the symbolic landscape and ritual landscape:

> Unlike the situation in Escuintla, here we have an instance of partial disjunction: the Teotihuacan Butterfly form, and perhaps some of its symbolic associations, have been

> conjoined to the jaguar god in order to produce a new composite being (one is reminded here of the maize Tlaloc at Zacuala). No aquatic signs or emblems of warfare are conjoined with the Teo-Oaxacan butterfly, though these are two of its most common associations at Teotihuacan and Escuintla. This further supports the idea of partial disjunction. Such a selective adoption of elements of an iconographic cluster is one of the best clues to possible shifts in meaning.

The disjuncture Berlo refers to is between the symbol, its meaning, and religious significance as the butterfly icon was deterritorialized from Teotihuacan and used for local religious beliefs in Oaxaca. In Teotihuacan the butterfly on censers also appears with the Old Fire god, but only rarely does the latter appear in Oaxacan symbols. Oaxacans adopted certain elements of Teotihuacan ritual ideology, but these ideas did not displace local gods. Elite at Monte Alban appropriated the butterfly image and blended it with local jaguar icons, but there was little interest in procuring fine trade wares, such as Thin Orange, from the metropolis, like much of the rest of Mesoamerica. Also in contrast to most Maya sites, as will be discussed below, Teotihuacan military iconography was deemphasized by disassociating the butterfly image with war. Teotihuacan warriors were, however, depicted on Monte Albán sculpture.

Marcus (2003) has made considerable advancements in deciphering the nature of Monte Albán/Teotihuacan relationships through monuments and murals. She argues that the art and sculpture at Monte Albán documents Teotihuacan visitors of "ambassadorial status". In particular, four stelae were recovered associated with the south platform, one at each corner of the platform. The South Platform is an enormous structure that measures over 100 m on a side and stands 15 m above the plaza (Marcus 2003:175). Jorge Acosta's excavations in the South Platform suggests that it was built in a single stage of construction (cited in Marcus 2003:175). Stelae 1, 7, 8 and the Estela Lisa, the four stelae which correspond to each corner of the building, all possessed hidden inscriptions that detail Teotihuacan visitors to the site of Monte Albán. These images were hidden on the undersides/backs of the stelae that would not have been publically visible. Three of the four depict more traditional Zapotec images and writing on the front side, but the fourth, the Estela Lisa was blank on its front face. The hidden Teotihuacan carvings all pertain to the same dedicatory event (Marcus 2003:176), which was likely associated with the construction, or completion of the South Platform. The images depict eight individuals dressed in Teotihuacan-style tasseled headdresses and clothing departing from Tetitla-style temples in Teotihuacan and proceeding to a placed named "the Hill of 1 Jaguar" to meet with a Zapotec Lord (Marcus 2003:176). It is not known if this "hidden" Teotihuacan relationship was at one time in Monte Albán displayed openly. If so, at some point in the site's history, the stelae were 'covered-up' and replaced with Zapotec images or left blank on their other sides. This could potentially signal a shift in the relationships between the two imperial capitals.

Another stela found on the west side of Mound X, named the Lápida de Bazán, also depicted an individual in Teotihuacan-style dress. This stela, made of fine-grained Oaxaca travertine, depicted the Teotihuacano with a copal pouch in one hand following a Monte Albán lord dressed as a jaguar (Marcus 2003:179). In contrast to the Estela Lisa carving, which shows several Teotihuacanos meeting with a Zapotec Lord face-to-face, the Lápida de Bazán implies that the Zapotec lord was leading the Teotihuacan ambassador. Marcus (2003:179) suggests that this stela marked one of potentially many meetings between the two powers to "[maintain] their social distance, their tribute boundaries, and their 'special relationship'". I would suggest that the general absence of Teotihuacan affiliated sites in the Valley of Oaxaca supports Marcus's argument. One could imagine the repercussions for Monte Albán subjects who boast a connection to a rival political entity. Rather than two large and militaristic forces clashing, it was a more beneficial arrangement for both parties to diplomatically resolve macroregional political contests. The regime of Monte Albán actively prevented its subjects from displaying connections with its principal rival; the hiding of carved images of Teotihuacanos on the South Platform was likely part of the political ideology they promoted. Additionally, Teotihuacanos were depicted on murals of Tombs 104 and 105, another private or "hidden" context. While these carvings/paintings boasted a connection with the central Mexican city, such a connection was for elites and not openly displayed. This demonstrates an attempt to restrict access to foreign influence, keeping it as esoteric knowledge to be controlled by elites. Teotihuacan, on the other hand, did not try to suppress or control Zapotec cultural expressions at Teotihuacan or its subject towns. As Paddock (2003:175) notes, however, "at Teotihuacan, nobody but Oaxacans has ever been caught dead with a Oaxaca object".

Filini (2004:81) summarizes that, in addition to a desire for Oaxacan resources, Teotihuacan was interested in acquiring knowledge of Zapotec writing, calendrics, and astronomy. Millon (1967:44) and Coggins (1983:59) suggest that the pecked stone circle and cross motif found at Teotihuacan and Teotihuacan-related sites was used in association with the 260-day ritual calendar, which drew upon Zapotec calendrical knowledge. Furthermore, Winter (1998) suggests that Zapotec astronomical knowledge may have influenced the orientation of the Teotihuacan architecture.

MICHOACÁN

Filini (2004) applies a world-systems perspective to the role of Teotihuacan in Mesoamerica, and specifically to her study area in the Cuitzeo Basin of Michoacán. Using data from previously excavated/surveyed sites from Michoacán and her own surface collections from 12 sites in the Cuitzeo Basin, Filini demonstrates that Teotihuacan-related artifacts and styles were differentially adopted by the local culture. Thin Orange was recorded in minor percentages at eleven sites in Michoacán, such as Santa Maria, Tres Cerritos, Loma Alta, and Aráro. These were primarily found in elite burial contexts. Evidence suggests, however, that many of these Thin Orange vessels were local imitations. Teotihuacan-inspired *floreros* and figurines were also found, but in lower frequencies and at only six sites each. The figurines, in particular, seem to be a hybridization of Teotihuacan elements and more local styles. All were probably produced locally, as attested to by the hybrid styles and a single mold fragment found at the site of Taimeo (Filini 2004:43). Perhaps more interesting than these findings is the Teotihuacan influence seen on utilitarian wares such as polished reddish-brown bowls, Red-on-Brown burnished incised jars, and Red-on-Buff ceramics with incised rims. The last of these types is very interesting because it is similar to ceramics found in the region prior to Teotihuacan's rise to prominence in Mesoamerica. Red-on-Buff is fairly common in the Basin of Mexico, but it is not a ware typically found at Teotihuacan-related sites elsewhere in Mesoamerica. It appears that inhabitants in the eastern Cuitzeo Basin selected Teotihuacan stylistic elements that agreed with existing local traditions.

Decorative motifs between the Cuitzeo Basin and Teotihuacan also show some similarities. These include depictions of humans similar to those at Teotihuacan. There are only two instances that can be considered Teotihuacan-inspired, but it is interesting to note that they were painted on *al secco* ceramics. In the Cuitzeo Basin *al secco* is clearly a local ceramic style, but it has similarities to the stuccoed ceramics common at Teotihuacan. Instead of paint being applied to a stuccoed layer, it was applied directly to the ceramic surface after it has dried. Also commonly found on *al secco* ceramics were localized depictions of butterflies (Filini 2004:68). The Michoacán butterfly was perhaps the most common motif found on *al secco* ceramics (Conides 2001, cited in Filini 2004), and the resemblance to the Teotihuacan butterfly is irrefutable. Other less common decorative motifs found on local ceramics included the Half Star, the L Glyph, elongated eye, solar motif, the trapeze-ray, various geometric designs, Tlaloc goggles, and the tri-lobe design on Red-on-Buff ceramics and obsidian eccentrics. Finally, *talud-tablero* architecture was present at Tres Cerritos, Tingambato, and Santa Maria. Filini (2004:112) summarizes the role of Teotihuacan in the following passage:

> a) culturally homogeneous sites that participated in the Teotihuacan network were distributed in the area surrounding Lake Cuitzeo, b) The process of adoption and translation of Teotihuacan symbolic forms into the local fabric is seen as a result of endogenous processes and c) there was an increase in settlements during the Middle Classic period with concomitant increase in social inequality as seen in architectural structures, burial practices and associated offerings. The Cuitzeo people not only accepted Teotihuacan artifacts in their religious factory but re-produced many of them using local resources. Although many authors consider the reproduction of Teotihuacan originals in a negative way, I suggest that local reproduction implies that the need to preserve Teotihuacan prestige goods was of considerable significance for the maintenance of local societal structures, especially when access to the original is – for whatever reason – impossible. Additionally, local reproduction of prestige goods is, to a certain extent, antisystemic in that, in reducing the need for importation it halts the centralization of resources in the core.

MAYA

There have been many hypotheses attempting to explain the role of Teotihuacan in the Maya area. Among the earliest were suggestions that the Maya were dominated by as part of a Mesoamerican-wide Teotihuacan empire (Bernal 1966), and that Maya cultural developments were secondary to the primary evolution of the Teotihuacan hydraulic-state (Sanders and Price 1968). However, discoveries at El Mirador (Demarest 1984, Matheny 1980) indicated that Maya culture had begun to flourish there centuries prior to the rise of Teotihuacan (see Fash and Fash 2000). Later, Demarest and Foias (1993) argued that Teotihuacan "trade-wares" found in tombs at Kaminaljuyú were actually locally-made and portrayed many elements of local Maya style. This went a long way toward the advancement of the elite emulation hypothesis, which sees interaction as an appropriation of Teotihuacan's well-developed system of warfare imagery and ritual practices to support the locally rooted "Venus-Tlaloc warfare" cult (Schele and Freidel 1990). This hypothesis is widely supported due to the selective emulation of different aspects of the Teotihuacan symbolic canon at different sites throughout the region (Fash and Fash 2000:441). Considering all forms of symbolic and material interactions with the Maya regions (e.g., Braswell [ed.] 2003), a rather varied picture of interaction emerges.

Some of the strongest and most pervasive evidence of Teotihuacan influence in Mesoamerica comes from the Escuintla region of the Pacific Coast of Guatemala. Here the site of Balberta shows signs of an economic connection with central Mexico around 200-250 CE (Bove and Medrano 2003:72). A total of 134 green obsidian artifacts were found in the ceremonial core of this regional center, as well as some projectile points made from central Mexican Zaragoza and Otumba obsidian. These artifacts were all found in elite contexts, suggesting that the nature of exchange for local elite was to gather foreign goods to enhance local prestige. Thin Orange vessels were also present in small quantities, but Bove and Medrano (2003) also note that the local ware, Esmeralda Flesh, bears similarities to the former. Central Mexican obsidian was often found cached with ceramic cacao effigies. The evidence suggests that interactions between Balberta and Teotihuacan were direct and pertained to elite prestige economies of both sites. There is evidence of cacao processing found at Balberta, but its exports may have also included rubber, shells, cotton, salt, and quetzal feathers. Green obsidian was the principal import to the region during this "early pulse" interaction. Several other sites in the region have small amounts of green obsidian and Thin Orange ceramics that date to this time period, all found in elite contexts. Fine Paste wares also were imported from the Gulf Coast

(Bove and Medrano 2003:74). Trade between Teotihuacan and Escuintla at this time was probably symmetrical and balanced.

Balberta collapsed around 400 CE at the same time a primate center at Montana arose about 15 km to the west. Bove and Medrano (2003) suggest that the region was conquered by Teotihuacan who used its proxy center of Montana to launch campaigns into the surrounding region, which explains the collapse of Balberta. They argue, based on the breadth and diversity of Teotihuacan-related artifacts found at Montana and surrounding sites, that colonists of men and women, military forces, merchants, and administrators settled in the Montana area (2003:74). The types of Teotihuacan-related artifacts found at this site and sites under its political administration include censers with associated butterfly and Tlaloc imagery, portrait figurines, *candeleros*, cylindrical tripod bowls, and other types of ceramics. While *talud-tablero* architecture was absent, this architectural style was depicted as an emblem on a censer at Los Chatos. In contrast to Balberta, most of these artifacts were found in domestic contexts. Almost all Teotihuacan style artifacts at Montana and related sites were, however, locally made reproductions. Interestingly absent from this "late pulse" of Teotihuacan influence were actual economic exchanges with the central Mexican city. Within the entire Montana zone, only 2 out of 6500 obsidian artifacts were from the Pachuca source and no Thin Orange imports were identified. This is very different from the pattern observed earlier at Balberta.

The Escuintla region, along with the area around Lake Amatitlan, was the focus of Berlo's (1984) detailed study of Teotihuacan-style censers. Berlo (1984:200) surmises that these censers were more central to Maya religious life than at Teotihuacan itself, where they were primarily "household icons". The principal theme depicted on the Escuintla censers was militaristic, centering on the martial butterfly deity. Berlo refers to this as "an elaboration of a theme not prominent in the metropolitan center (1984:200)". In comparison to the cylindrical tripod vessels found in the region, the censers were relatively standardized, which she argues indicates their production was in the hands of a small number of ceramic and ritual specialists (1984:201). The relatively greater range of expression in other Teotihuacan-related ceramics suggests they were not as tightly controlled and they represent a hybridization of cultures that are of "Teotihuacano, Maya, and Veracruz peoples". At Lake Amatitlan to the north, however, there is a broader range in the styles and images used on censers. Military iconography is still present, but they also depict a number of different ritual concerns (Berlo 1984:201).

In the Guatemalan highlands, Kaminaljuyú has been the source of conflicting interpretations of Teotihuacan influence. Many reconstructions allude to an episode of Teotihuacan conquest at the site (Cheek 1977). Sanders and Santley (1983; see also Santley 1989) argue that Teotihuacan established an enclave within Kaminaljuyú to gain access to the El Chayal obsidian source. According to Santley (1989) this was part of its strategy of economic imperialism, focusing specifically on the control of obsidian exchange. Santley (1989) suggests that Teotihuacan also may have been influential in the distribution of Zaragoza Oyameles obsidian, the source for which lies near the large site of Cantona. For Kaminaljuyú, Sanders and Santley draw partly on a port-of-trade model evaluated by Brown (1977). Brown (1977) considered several models for the relationship between Teotihuacan and Kaminaljuyú and found most support for the port-of-trade model. Under this model, Teotihuacan traders occupied an enclave within Kaminaljuyú and were one several groups that formed a polypolitical port-of-trade operating at the site. This trade network was focused principally on controlling the obsidian trade throughout Mesoamerica. Overturning previous suppositions (see Sanders and Price 1968), Brown (1977:364) concludes that there was no evidence of conquest at Kaminaljuyú.

The connection between Kaminaljuyú and Teotihuacan was very different than what is seen at Montana. First, elements of Teotihuacan interaction missing from Montana and related sites are present at Kaminaljuyú and the site of Solano also in the Valley of Guatemala (Braswell 2003b). These include *talud-tablero* architecture, Pachuca obsidian, and Thin Orange ceramics. Conversely, the objects found in and around Montana are absent or rare at Kaminaljuyú, such as portrait figurines, censers, and *candeleros*. As Braswell (2003b) notes, sites in highland Guatemala that possess ceramics from the Pacific coast completely lack Teotihuacan-style materials. All of these data point to the probability that Kaminaljuyú and Montana formed very different followings pertaining to Teotihuacan. At the former, Teotihuacan was relied upon for establishing and maintaining local elite prestige, while Teotihuacan in the latter region pervaded the local culture and identities more completely as seen in by the use of Teotihuacan imagery in domestic contexts.

Teotihuacan related artifacts are found in two very restricted areas of Kaminaljuyú. First, two buildings in the elite core of the site were constructed in the *talud-tablero* style during the Early Classic around 450 CE (Braswell 2003b:119). Later constructions at Mounds A and B on the southeast fringe of the site were also executed in this architectural style (*ibid.*). Almost all of the Teotihuacan-related materials at the site were found in one of these two locations. Elements of this architectural style are found in another five structures closely associated with the Palangana/Acropolis complex.

Relations between Kaminaljuyú and the central Mexican city were strongly restricted to elite interactions, which is what one would expect if the connection was used to legitimate local political authority. In addition to the exclusively elite contexts in which Teotihuacan artifacts are found, further support of this is provided by the high percentage of Teotihuacan ceramic imitations that make up the assemblage. Foias's (1987: cited in Demarest and Foias 2003) study reports that only 16 of 337 Thin Orange-style ceramics found at Kaminaljuyú and 8 of 67 cylindrical tripod jars were actually imports. The others are local imitations. Demarest and Foias (1993) therefore suggest that no resident Teotihuacanos lived at Kaminaljuyú. Further supporting this conclusion is the fact that the mortuary programs of the tombs where the Teotihuacan-related artifacts presented themselves overwhelmingly followed local traditions. As Demarest and Foias (1993) and others (Filini 2004, Braswell 2003b) suggest, this places the importance of interaction on a need to demonstrate a foreign political link to legitimate local authority, whether or not that corresponds to actual exchange. The elite emulation hypothesis proposed by Clark (1986) seems to fit best for Kaminaljuyú, and ideas of Teotihuacan conquest in the region (Sanders and Price 1968) now seem to have been overstated. Cheek (1977; see also Brown [1977]) proposed that Teotihuacan set up an enclave in Kaminaljuyú to control trade in the region, though the focus of trade was originally thought to be obsidian materials and tools. The low level of pottery exchanges between the regions and the exclusively elite contexts in which they were found weaken the argument for commercial relationships between Teotihuacan and Kaminaljuyú. Even if obsidian was the primary focus of exchange control, a higher percentage of ceramic imports to imitations would be expected if Kaminaljuyú were a port of trade established by Teotihuacan.

Oxygen isotope analysis suggests that elites at Kaminaljuyú did not completely fabricate their connection to Teotihuacan, though. White et al. (2000) conclude that two individuals tested from Kaminaljuyú spent part of their childhoods at Teotihuacan, but were born and lived out their adult lives at the Maya center. This presents the possibility that elites at Kaminaljuyú sent their children to be trained at Teotihuacan, which signals the importance of maintaining this link to negotiate local political authority.

Research in Honduras has revealed another very special relationship, this one between Teotihuacan and Copán. Unlike the Valley of Guatemala, several sites in the region surrounding Copán show an early connection to Teotihuacan. The hilltop site of Cerro de las Mesas, in particular, demonstrated relatively high percentages of green obsidian earlier than a Teotihuacan influence was seen at Copán (Fash and Fash 2000:448). This follows the pattern of early interaction involving actual imports, as at Balberta (Bove and Medrano 2003). Fash and Fash (*ibid.*) argue that "the settlement pattern data, ceramics, and green obsidian lead us to speculate that a faction with ties to Teotihuacan established itself on the fortress-like hill of Cerro de las Mesas, and unified the diverse competing noble lines, moreover establishing a royal center in a thoroughly indefensible place, in the center of the Copán Valley bottomlands". Contemporaneous settlement surrounding Cerro de las Mesas in the Copán Valley was characterized by this same hilltop fortress pattern, showing a concern for defense in a militaristic society. Fash and Fash (2000:448) ask what "better way to resolve internal conflict than to place themselves in the hands of a veteran warrior-merchant who validated his right to rule by his mercantile and militaristic connections with the mighty Teotihuacan?" Investigations in one Copán tomb, thought to be the founder of one of the most prominent Classic period dynasties, show that an individual, named K'inich Yax K'uk' Mo', donned a Cipactli shield and had parry fractures on his forearm. This supports his identity as a warrior trained or affiliated in some way with Teotihuacan. Price et al. (2007) demonstrate using strontium and oxygen isotope analysis that this individual was not from Copán, but neither was he from Teotihuacan. Rather, his geographic homeland may have been in the Maya lowlands, raising the possibility that interactions among

Teotihuacan-affiliated centers in the Maya region may have been as or more important than links to the central Mexican city itself.

The earliest structure that served as part of the central cosmological axis of the site was a building given the field name of “Hunan”. This structure was constructed with a *talud-tablero* façade. The superstructure of Hunan was decorated with Teotihuacan-style murals (Fash and Fash 2000:443). This is thought to have become the tomb of, K'inich Yax K'uk' Mo'. While the tomb itself was inside a Maya vaulted chamber, its placement in this Teotihuacan-style architecture bespeaks central Mexican ties.

A ball court located 100 m to the north depicted stuccoed birds reminiscent of the feathered serpents depicted on the pyramid of the same name at Teotihuacan. Adjacent to the ball court, excavators found a cylindrical stone-lined grave similar to those found at Teotihuacan (Burial XXXVII-8). A cache of green obsidian was associated with this burial in the highest percentages identified at the site.

In front of the building named “Margarita” was a burial called "Tlaloc Warrior". This structure was dedicated by the second ruler of Copán. This was an adult male with dozens of projectile points buried with him. Shell “Tlaloc” goggles, were still in place on the forehead of his skull. Another burial east of the ball court also had these shell goggles as well as thin orange ceramics, a slate-backed pyrite mirror, and a shell platelet headdress. The square stone square cist within which this burial was placed with a wooden roof was similar to those found at Kaminaljuyú and the resident of the tomb (Burial V-6) is thought to hail from Kaminaljuyú. The spondylus platelet headdress was similar to the Teotihuacan warrior costume found at Piedras Negras and other sites (cited in Fash and Fash 2000:445). Taube (1992) believes this is the war serpent deity.

Several mentions are made in the hieroglyphics of the site of Smoking Frog arriving in the Maya area through El Peru, Uaxactún and Copán. Mention of Smoking Frog first comes from Copán at 439 CE in association with the founder of the Classic period Copán dynasty, who was sometimes referred to as Lord of the West, like Smoking Frog. This evidence legitimates the Teotihuacan symbols later used at Copán as part of the dynastic history of the sites.

Teotihuacan connections were symbolically revitalized with 12th ruler Smoke Imix-God K on Stela 6. This individualized representation with Teotihuacan dress continued through the 16th ruler with greater and greater displays of individualized dynastic art contrasting with the corporate ideology of Teotihuacan and possibly the founding ruler of Copán. All of the depictions of K'inich Yax K'uk' Mo' were commissioned after the ruler died; he did not himself arrange for individualized depictions of him at Copán. Fash and Fash (2000:448) suggest that the early political ideology at Copán may have emphasized corporate authority.

In summary, Fash and Fash (2000:455) suggest that the connections involved more than simply an attempt at emulation, and propaganda for the legitimization of the ruling family. The Altar Q text statement that the founder "arrived" from the west, suggests to some that K'inich Yax K'uk' Mo' himself may have arrived from Teotihuacan. This is reinforced by the likelihood that the burial inside the early-fifth-century Acropolis building Hunan, with its *talud-tablero* sub-structure and Teotihuacan-style murals, is that of the founder. Ties continued to be emphasized after the fall of the great city. Several outlying sites constructed structures in the 8th century in the central Mexican style.

The final Maya site that will be discussed in detail is Tikál. Tikál displays perhaps the strongest evidence for a Maya site of a significant disruption of local developmental trajectories related to Teotihuacan involvement (Stuart 2000). *Talud-tablero* architecture occurs at the site, the most common proportion was a 1:1 ratio. While certain elements of this architectural style at Tikál were very similar to Teotihuacan, like staircases with balustrades and finial blocks, Laporte (2003) suggests that that it displays much dissimilarity as well. One residential complex in particular, Group 6C-XVI, displayed several *talud-tablero* buildings, out of more than 90 total structures. Spence (1996:346) suggests that the complex was out of place in a Maya City, and could potentially have been a Teotihuacan enclave. Thin Orange ceramics and high percentages of green obsidian were also found in this complex, but mostly in ritual contexts, such as burials, or in “problematic” secondary deposits. This complex is also where the Tikál marker stone was found, which has strong connotations with both Teotihuacan (Uriarte 2006) and Kaminaljuyú. Laporte (2003) suggests that this indicates a triangular interaction among the three sites. In fact, this marker was identical to one found at La Ventilla in Teotihuacan (Uriarte 2006). The Tikál marker is associated with the ballgame (Uriarte 2006). This, along with several murals depicting ballplayers within the complex, suggests that Group 6C-XVI was used for important ballgame rituals. Despite the evidence supporting a strong Teotihuacan influence on the form of this complex, Laporte (2003) downplays this claim, pointing to the dominance of local style materials and architecture. *Talud-tablero* was also identified at the Mundo Perdido complex and the Central Acropolis of the site. The earliest of this architectural style at the site dates to about 250-300 CE.

The so-called Problematic Deposits at Tikál also boasted small amounts of Teotihuacan style ceramics and green obsidian. PNT-019 was found in Group 6C-XVI and was mentioned above. PNT-21 in Group 6V was a large deposit of refuse, of which the overwhelming majority consisted of utilitarian ceramics (Iglesias Ponce de León 2003:180-182). Only one ware, Ratones Orange, was affiliated with Teotihuacan in this deposit, but several Teotihuacan-like figurines, and a single double-chambered *candelero* were found. Also, 7.2% of obsidian recovered from these deposits was green. Thin Orange was present in two other problematic deposits, as well. Iglesias Ponce de León (2003) argues that to dwell on the handful of Teotihuacan items in 8 out of 16 problematic deposits would be to ignore the "sea" of local style artifacts found in the same contexts.

Iglesias Ponce de León also summarizes Teotihuacan connections evident in four burials excavated at the site (2003:187-189). The first, Burial TP-10, is thought to have been the tomb of the first Tikál king to have claimed Teotihuacan affiliation, "Curl Nose" or Yaax Nu'n Ahyiin. This tomb included several Thin Orange pots and cylindrical tripod jars with stuccoed surfaces and depictions of Tlaloc goggle eyes and fangs, year signs, and atlatls in Teotihuacan-style, as well as materials from other regions. Iglesias Ponce de León (2003: citing petrographic analysis by Anna O'Sheppard) argues that the majority of the ceramics attributed to Teotihuacan interaction were locally made. Burial TP-48 was that of Curl Nose's son and the second Teotihuacan-affiliated ruler of Tikál, "Stormy Sky", or Siyaj Chan K'awiil. This burial contained several cylindrical tripod jars, all but one of which Iglesias Ponce de León suggests are of local wares. In both of these burials, as will the other Tikál burials excavated, the overwhelming majority of grave offerings were of local style.

Perhaps the greatest sources of controversy that pertains to the Teotihuacan link to Tikál are its sculptural and iconographic programs (Schele and Freidel 1990, Stuart 2000, Borowicz 2003). Stuart (2000) conducted an epigraphic and iconographic interpretation of Teotihuacan's role at the site that left many Maya scholars incredulous, conjuring up long-past ideas that the central Mexican city conquered parts of the Maya region. Yaax Nu'n Ahyiin (or Stuart's spelling, Nun Yax Ayin) took the Tikál throne in the year of 379 CE, one year after Tikál conquered its rival Uaxactún. Yaax Nu'n Ahyiin publically proclaimed a link to Teotihuacan on monumental art. Stela 4, which bears the *k'atun* ending date of 396 CE, depicts Yaax Nu'n Ahyiin in Teotihuacan-style military garb. Yaax Nu'n Ahyiin was also depicted on Stela 31, which was commissioned in 415 CE by his son Siyaj Chan K'awiil (Stormy Sky). Siyaj Chan K'awiil was the central figure on the front face of this stela. He was represented in typical Maya style. The headdress was executed in a style found at Kaminaljuyú, which Borowicz (2003:226-227) argues indicates interaction with the highland Maya center. Contained in this headdress, however, is a Teotihuacan war emblem. Flanking this figure on both sides of Stela 31 are representations of his father Yaax Nu'n Ahyiin dressed as a Teotihuacan warrior, though Borowicz (2003:227-228) points out that these images are rendered in Maya style. Together these stelae mark a disruption of Tikál's dynastic lineage. Borowicz (2003) argues that Yaax Nu'n Ahyiin was not situated within the early dynastic lineage at Tikál and therefore could not rule under existing norms of legitimation, so he aligned himself with the powerful central Mexican city. In effect, he changed the rules by which political authority was legitimated. Borowicz argues that this shift came with a shift in the iconographic program during his reign and part of his son's, but Siyaj Chan K'awiil later returned to the first iconographic program. The return to program 1 suggests that for some reason the Teotihuacan affiliated icons began to lose their effect and Siyaj Chan K'awiil felt a need to tie back into the previous dynastic lineage.

Stuart (2000) on the other hand, presents a reading that suggests Teotihuacan conquered Tikál. Glyphs on Stela 31 refer to the father of Yaax Nu'n Ahyiin as a man named "Spear-Thrower Owl" who was the ruler of Teotihuacan from 374-439 CE (Stuart 2000:483). This would indicate that Yaax Nu'n Ahyiin was actually a foreigner from the west. The argument of conquest revolves around the "11Eb" episode that occurred on

January 16, 378 CE. This date is recorded on monuments at Tikál and Uaxactún. The four recordings of this date at the two sites all include another name, interpreted as "Smoking Frog" (Siyaj K'ak'). Interestingly, one of the 11Eb dates at Tikál occurs on the ball court marker in Group 6C-XVI discussed above. Stela 5 at Uaxactún (Graham 1986:143, 145; reproduced in Stuart 2000:473) included this date along with the phrase "he, she, it arrived". The image depicted on the front of the stela is that of a Teotihuacan warrior holding a club and an atlatl thrower and a bird headdress. Stuart (2000:478-489) presents a convincing argument that "Smoking Frog" was a Teotihuacan military leader sent to overthrow Tikál's 9th dynastic ruler at the bidding of "Spear-Thrower Owl" and install his son, Yaax Nu'n Ahyiin, who was quite young at the time, as the next ruler of Tikál. Stuart sees parallels to this disruptive history at Copán as well (see discussion above).

Regardless of who is right (Stuart, Borowicz, or both) Teotihuacan either directly or indirectly had an influence on Tikál and several other sites in the surrounding Petén region of lowland Guatemala. If the central Mexican city held direct political rule over this area, the disruption was much more pervasive than Borowicz suggests. Those who favor an in situ development of Tikál are quick to point out that there is little to suggest intensive economic relationships between Tikál and Teotihuacan, but if they were a tributary would it be expected to find high quantities of Teotihuacan imports there? That would signal a more symmetrical relationship. Intuitively, it seems that the distance between the political centers is too great for Teotihuacan to effectively extract tribute from the area. Despite the disagreements, this is perhaps the clearest case of how Teotihuacan culture was layered into a local system.

GULF COAST

The Gulf Coast region, the subject of this dissertation, is divided into several sub-regions based on cultural traditions and physiography (Arnold and Pool 2008, Bernal 1952-1953, Coe 1965, García Payón 1971, Medellín 1960, Pool 2006, Stark and Arnold 1997). The northern Gulf Coast between Soto la Marina in Tamaulipas and the Sierra de

Otontepec is considered the *Huasteca* (Ekholm 1944). The central Gulf Coast is culturally defined as *Totonacapan* (Medellín 1960), but it is has been sub-divided into north-central and south-central regions to distinguish between different histories of archaeological research and different cultural expressions (see Arnold and Pool 2008). The dividing point between the central subsections falls on Sierra de Chiconquiaco between the Nautla and Antigua rivers. The Papaloapan River is a major physiographic division between the south-central and southern Gulf Coast, the latter region includes the Tuxtlas. This also seems like a good cultural break between Totonacapan and what has been dubbed Olmecapan or Olman (Diehl 2000). As Arnold and Pool (2008:4) point out, these coarse divisions surely cloud the variation within and between Gulf Coast groups, but they serve to order the current discussion.

In the *Huasteca* of northern Veracruz, Ekholm (1944) documented the occurrence of a single annular-based bowl, a rectangular slab support, and several Teotihuacan-style figurines at the site of Pavon. Yarborough (1992:228) cross-references the styles of these items with assemblages at Teotihuacan and suggests they date no earlier than 450 CE (though she was writing prior to the modification of Teotihuacan's ceramic chronology [Rattray 2001]). Based on the style of the artifacts, however, she argues that these artifacts were not traded into Pavon directly from Teotihuacan. Of the figurines, both Portrait and Marionette types were represented (Yarborough 1992:233), but there were as many or more dissimilarities as similarities to actual Teotihuacan styles. Yarborough (1992:233-234) argues that the most striking feature of the Pánuco region ceramic assemblage was the appearance of corrugated decoration on fine paste ceramics, which was a type recovered in the Merchants Barrio at Teotihuacan (Rattray 1979:63). Any interaction with Teotihuacan seems to have been short-lived, however, as the Pánuco region shows increasing interaction with the central Gulf Coast in the subsequent phase of occupation at the expense of connections with Teotihuacan (Yarborough 1992:236). The evidence for a connection between the Huasteca and Teotihuacan is not overwhelming in any period, though.

On the north-central Gulf Coast, Wilkerson (1999) suggests that the Nautla drainage was a natural corridor of interaction with the central highlands based on Teotihuacan-style artifacts from El Pital, an important Early Classic center, and early use of the *talud-tablero* architectural style at La Victoria and Cuajilotes (Daneels 2002b , Wilkerson 1999). In the Tecolutla Basin, Serafin, Morgadal Grande, Cerro Grande, and El Tajín all present interesting records of interaction with central Mexico. Connections between El Tajín and Teotihuacan have received considerable attention (Brüggemann 2004, DuSolier 1945:190, Krotser and Krotser 1973:213, Pascual 1997, Santley and Alexander 1996, Yarborough 1992:237-257). Recent investigations at the site suggest that El Tajín only boasted a relatively small community during the Early and Middle Classic, the time of Teotihuacan's greatest influence abroad (Brüggemann 1991, 2004; Pascual 1997, 2002, 2004). Still, Teotihuacan-style artifacts were found including *candeleros*, cylindrical tripods with lids and rectangular supports, *floreros*, *copa* ware, a three-pronged brazier, and Teotihuacan-style figurines (DuSolier 1945, Krotser and Krotser 1973, Pascual 2004, Yarborough 1992:239). Vaguely Teotihuacan-style figurines were also recovered at Santa Luisa. The stylistic relation of the figurine assemblage examined by Yarborough to Teotihuacan is "tenuous" (1992:240). *Candeleros* from El Tajín are mostly single chambered, but one double-chambered example exists (Yarborough 1992:241). Single chambered *candeleros* were also found at nearby Serafín. That the El Tajín cultural tradition was ever seen as the direct result of Teotihuacan influence was due to faulty chronological and culture historical reconstructions (García Payón 1964, cf. Brüggemann 1993, 2004).

Telling of the relationship between El Tajín and Teotihuacan are data recently gathered by investigations undertaken at Morgadal Grande (Pascual 1997, 2002, 2004). This center is situated a short distance to the south of El Tajín and later fell within its periphery (Pascual 2004). It is at Morgadal Grande, and nearby Cerro Grande, that one can find the cultural roots that contributed to the development of the Tajín cultural tradition. These roots include not only local developments, which carried over from the Formative period, but also stylistic adoption and reinterpretation of imagery used at contemporary Teotihuacan. During the Cacahuatal phase (350-600 CE), Morgadal Grande boasted cylindrical tripod vases with sculpted decoration, sculpture with interlaced serpent bodies, and images of Tlaloc on a monument and ceramics (Pascual 2000, 2002, 2004). These finds, along with those discussed above for the small Early to Middle Classic settlement at Tajín itself, formed a cultural legacy that appears at Late

Classic and Epiclassic El Tajín. While El Tajín displays many symbolic and architectural similarities with the former central Mexican power, it came to power within the region after the decline of Teotihuacan. Furthermore, the ceramic, architectural, and stylistic similarities between Teotihuacan and the north-central Gulf Coast have been subject to local reinterpretation on part of the latter (Brüggemann 2004, Pascual 2000).

Yarborough (1992:255-256) argues that both goods and stylistic information were moving from the north-central Gulf Coast area into Teotihuacan. She suggests (1992:257) that there was an asymmetry to the interaction that indicated a north-central Gulf Coast influence on Teotihuacan. Teotihuacan displays symbols (particularly the interlaced volute style), ceramic styles, language elements, and components of the Gulf Coast ball game and ball game rituals that appear to be influenced by the Totonac culture (e.g., Ángulo 2004, Gómez et al. 2004, Sánchez 2004, Stark 1998). Stark (1998:226) argues that this stylistic emulation was most common between 200-400 CE.

In the south-central Gulf Coast, the evidence for interaction with Teotihuacan is not great. Certain ceramic styles that pertain to this region are found at Teotihuacan, including fine paste wares, double-slipped and negative resist decoration, lustrous ware (though the last is more affiliated with the north-central Gulf Coast), and red-on-orange bichromes (Yarborough 1992:259-260). Red-on-orange is a type very common within the Tuxtlas (Ortiz and Santley 1988), however, and it is not certain where those found at Teotihuacan come from. In the south-central region, several sites show alignment with Teotihuacan. Yarborough (1992:260-264) summarizes Teotihuacan ceramics at Napatecuhtlan about 40 km north of Guadalupe Victoria, Portrero Nuevo in the Nautla drainage, and Viejon near Quiahuistlan. Teotihuacan influence is almost absent in the Cotaxtla and Jamapa drainages (Daneels 2002b). As a whole the south-central portion of the Gulf Coast shows sporadic findings of Thin Orange, which is rare in the north, and a narrow range of imitated Teotihuacan ceramics forms. This shows a lack of coordinated interest from Teotihuacan in the south-central Gulf Coast.

Further south within the Papaloapan and Blanco drainages of Veracruz, a greater involvement with Teotihuacan has been recorded, though not to the point that would suggest conquest or political economic control (Stark 1990). Although not on the coastal plain, the Maltrata area (Daneels 2004, Lira López 2004) in the eastern foothills of the

Sierra Madre Oriental is important to understand Teotihuacan interaction with southern and south-central Veracruz. Maltrata is located along a major transportation corridor to the Gulf Coast that turns east just north of the Tehuacán Valley, discussed above. Drainage from this region feeds into the Papaloapan Basin. The pattern of Teotihuacan-affiliated sites in the region is similar to what Drennan found in the Tehuacán Valley in that they occupied the valley bottoms at the mountains' feet. There was no concern for defense, suggesting the passage was friendly territory for merchants to travel. Lira López (2004) identified Teotihuacan related artifacts as well as a diversity of goods from Tehuacán. Two out of 18 sites displayed relatively strong evidence for interaction with Teotihuacan. At Rincón de Aguila and Tepeyacatitla, Lira López found Thin Orange frequently with button supports, cylindrical tripod vases, green obsidian, and molded figurines. Absent were hollow rectangular supports and *candeleros*. The lack of *candeleros* and other domestic artifacts suggest that there were no resident Teotihuacanos at these sites, but the mold-made figurines are also for domestic use.

For the Mixtequilla region, Stark (1990) has meticulously evaluated the evidence for a Teotihuacan connection. She considers the data with regard to several models of long distance interaction that range from conquest to independence with minimal or competitive interaction. She also divides her examination into economic, political, and symbolic interactions, so it is very compatible with the framework employed in this dissertation. In short she "assess[es] Middle Classic data in regard to settlement pattern change, iconography related to leadership and ritual, economic patterns (especially in regard to obsidian importation), and the effects of Teotihuacan's demise (1990:270)". At Cerro de las Mesas, caches of Teotihuacan-like materials were sealed by a later construction episodes of Mound 1. One stela studied at Cerro de las Mesas depicted a goggle-eyed entity that was spatially separated from the plaza that contained stelae depicting leaders. This stela was executed in local style. The goggle-eyed stelae, as well as caches of "cylindrical vessels filled with marine shells and the ceramic Old Fire God brazier which Stirling (1943) uncovered in Mound 1" indicate an episode of Teotihuacan interaction that was briefly lived. The direction of this interaction is not known, but the style of this ceramic statue is purely Gulf Coast.

At Patarata 30 km to the east possible Teotihuacan materials include loop-footed bowls/braziers, one *copa* fragment, and an Old Fire God figurine (Stark 1989), but these were probably locally made (Stark 1990:271). Rectangular tripod supports on bowls and negative resist decoration were also present, but the cultural source of the styles is dubious. The negative resist technique was present at Teotihuacan and the Gulf Coast relatively early. As for the loop-footed braziers or loop-handled cover plates, we recovered a few examples of these in absence of other Teotihuacan-style artifacts during the TVAS and several were identified at Matacapan as well. There is no solid evidence that this vessel form is directly inspired by central Mexican influence.

In the Mixtequilla survey area, Stark (1990:271, 2008:103) summarizes three *copa* fragments, thirteen fragments of Thin Orange, one possible *florero,* appliqués on vertical walled vessels, incised brown vessels, negative resist decoration, rectangular supports on flat-bottomed "basin-bowls", incisions outlining red painted designs on orange slipped bowls, and rarely, *candeleros* (n=4). This is a much greater diversity of potential Teotihuacan-influenced ceramic traits than is found elsewhere in south-central Veracruz. This influence consisted of individual stylistic elements grafted onto materials that were probably produced locally. Decorative styles on figurines and censers, ritual objects, were also present in a house mound excavation by Yarborough (1992). These share certain similarities with reinterpretations of the same icons found in the Maya region (Stark 1990:272), a connection bolstered by iconographic programs on stelae (Stark 1991).

Despite some level of style sharing with central Mexico, there are limited data on economic exchange and no solid evidence of political subordination. Green obsidian is infrequent in the Classic Mixtequilla (Stark et al. 1992), and as mentioned earlier ceramic affinities are combined with local traditions or are local copies. The thirteen fragments of Thin Orange are imports, but these cluster closely around Cerro de las Mesas suggesting there were imported to bolster the authority of local elites and rulers (Stark and Johns 2004). While she does not rule out a brief period of indirect administration for Teotihuacan in the region, Stark (1990:273) favors elite relations or asymmetrical alliance models. Stark's (1998) study on regional scroll styles suggests that Teotihuacan borrowed heavily from the iconographic traditions of the Gulf Coast as well, and Cerro de las Mesas or Patarata are possible sources of that emulation. As for settlement disruption, a new regional center emerged in the Classic period: Los Azuzules. This does not indicate Teotihuacan settlement reorganization because Cerro de las Mesas remained heavily populated. Neither does the decline of Teotihuacan result in settlement disruption in the area, as one would expect if local settlements were dependent on Teotihuacan. However, there are indications that Los Azuzules became an important economic center in the region during the Late Classic, which partially explains its rise to prominence (Stark 2008:105-110).

Of particular interest in this research is the Teotihuacan influence found in the Tuxtla Mountains. Matacapan portrays one of the strongest links to Teotihuacan on the Gulf Coast. The first mention of this connection was Seler-Sachs's (1922) suggestion that the Tuxtlas were a stop along the trade route with the Maya Lowlands, a position later adopted and modified by Coe (1965:704-705). As Arnold and Santley (2008:296) point out, though, why would heavily-burdened traders haul their goods up the rugged terrain of the Tuxtlas only to hike back out to their final destination? Valenzuela (1945a) was the first to excavate parts of Matacapan. He found a *talud-tablero* structure (Mound 2, a "temple mound") and several triangular figurine heads fashioned in Teotihuacan style near Mound 3. Also strongly indicative of interaction with Teotihuacan was the presence of a reptile-eye glyph on a pot sherd. This was the first strong indication that Matacapan had ties with central Mexico during the Classic period (Pool 1992a, Santley et al. 1987, Santley et al. 1987, Spence 1996). Although he did not explore the façade of Mound 1 at Matacapan, it was the twin of Mound 2 and both were likely constructed in the *talud-tablero* style.

Robert Santley and Ponciano Ortiz began the Matacapan Archaeological Project to further explore the Classic connection with central Mexico, which has produced volumes of information on the topic (Arnold and Santley 2008; Ortiz and Santley 1988, 1998; Pool 1992a; Santley 1982, 1989; Santley and Alexander 1996; Santley and Pool 1993; Santley et al. 1984, 1985, 1987a, 1987b; Yarborough 1992). Matacapan was founded during the Early Classic following a volcanically induced occupational hiatus (Pool and Britt 2000, Santley *et al*. 2000). The group who established this regional center employed symbols associated with Teotihuacan. The fact that the upper Catemaco

Valley was abandoned prior to its founding may have influenced the decision of of this groups to settle in this particular location. Initially, the so-called "Teotihuacan Barrio" (Santley et al. 1987, 1987b) dominated Matacapan's administrative precinct. Unlike many of the Maya centers that displayed interaction with central Mexico through limited classes of material, Matacapan possessed a number of different types of indicators. Teotihuacan-derived artifacts found at Matacapan include, *talud-tablero* architecture, *candeleros*, braziers, censers, cylindrical tripod vessels with rectangular supports, some

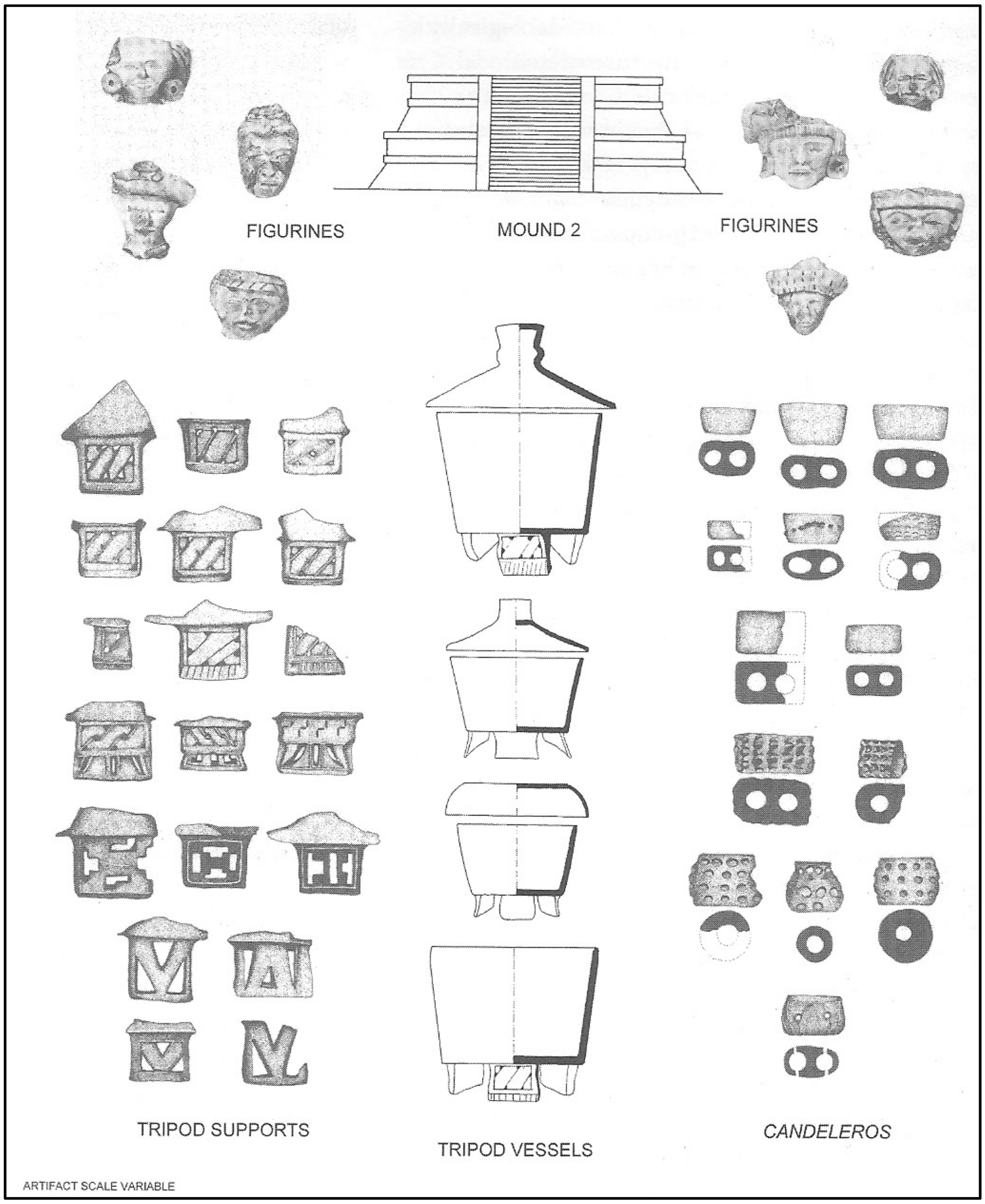

Figure 3.19. Sample of Teotihuacan-style materials recovered from Matacapan (Santley 2007: Figure 6.1).

utilitarian vessel forms, mortuary similarities, figurines, and the reptile-eye glyph mentioned above (Figure 3.19). I summarize these data here. Most of the Teotihuacan-related artifacts were concentrated around the administrative center of the site, particularly around Mound 22 and Mound 61 in the western portion of the site, but they were also found in lesser quantities scattered throughout Matacapan and at eleven other sites in the upper Catemaco Valley.

An unusually high number of *candeleros* were recovered (Ortiz and Santley 1988, 1998; Santley et al. 1987). Domestic ritual artifacts, along with the figurines, braziers, and incense burners, are perhaps the best indication that some of the residents of Matacapan were actually from Teotihuacan (Arnold and Santley 2008, Cowgill 1997). Ortiz and Santley (1998) pay detailed attention to the *candeleros* because they are rare outside Matacapan and the Basin of Mexico. A total of 50 *candeleros* were recovered, that fall into 13 varieties. Some were very similar to those found at Teotihuacan, some less so, but this ritual object is so unlike anything else found throughout Mesoamerica that the central Mexican inspiration is not in doubt. Only at Copán and Kaminaljuyú were *candeleros* found in comparable numbers (Ortiz and Santley 1998, Yarborough 1992:334-335). At both these sites, the *candeleros* recovered were not very similar to those found at Teotihuacan, and more to the point, they were used very differently. *Candeleros* were intended for use in domestic ritual, but at these Maya centers they were interred in tombs of rich burials. This association with tombs in the Maya area suggests that they were used by elites as prestige goods rather than a domestic ritual artifact that helped define the identity of the common resident as they were at Matacapan (Arnold and Santley 2008, Santley et al. 1987). Yarborough (1992:335) notes that "the spatial distribution of slab supports and candeleros across Matacapan more closely resembles Teotihuacan patterns than any other site in Mesoamerica where these artifacts have been found." Subsequently at Montana, however, *candeleros* also were commonly found in domestic contexts (Bove and Medrano 2003).

Santley recovered a total of 453 hollow slab supports from a minimum of 151 cylindrical tripod vases at Matacapan (Ortiz and Santley 1988, 1998; Santley et al. 1987: Figure 3). Among these, few could be considered actual imports from Teotihuacan; most display variations not seen at the central Mexican city. Four complete cylindrical tripods were associated with burials within the Mound 61 residential complex. These, and the partial examples found at the site, tend to have slightly out-slanting walls as opposed to the vertical or slightly concave walls on cylindrical vessels at Teotihuacan (compare Santley et al. 1987 with Rattray 2001). In addition to the ceramic forms most associated with Teotihuacan, Matacapan ceramics producers imitated a wide range of Teotihuacan forms. These include hemispherical bowls with annular supports, *copas*, *floreros*, very shallow plates resembling comals, lids/plates with tripod loop supports/handles, and figurines (Ortiz and Santley 1988). The ceramic assemblage therefore includes "prestige" wares as well as common utilitarian vessels. The range of ceramics affinities present at Matacapan speaks of a detailed knowledge of Teotihuacan artistic cannons as they are executed on the plastic medium. Moreover, the diversity of forms is not well-explained by the elite alliance models.

Figurines also bespeak a domestic ritual that forms part of the innermost personal religion of people who used them. At Matacapan, figurine similarities include marionette styles with flat molded triangular heads, circular earrings, and either cleft or turbaned heads (Pool 1992a; Santley et al. 1987, Yarborough 1992:346-347). Pool (1992a, citing Kann 1990) argues that the Teotihuacan-style figurines at Matacapan are a hybridization of styles from the two sites. This blending of attributes shows a blending of identities, like Filini (2004) argues for Michoacán. Pool (1992a) builds an argument that the elites at Matacapan promoted Teotihuacan through domestic ritual.

Burials excavated within Mound 61 (n=21) were all interred in the floors of the rooms, as was common at Teotihuacan (Santley et al. 1985). Adults (n=18) were typically buried in a flexed position commonly facing east, while children and infants (n=2) were interred in hemispherical bowls with inverted vessels placed over top to seal them. One dog burial was also excavated. These mortuary practices were all practiced at Teotihuacan (Sempowski and Spence 1994). The pattern of burying children in ceramic vessels was also apparent at the extreme southern edge of the site. At Comoapan, a ceramic producing community, two children were found laid to rest in a large Coarse Orange *olla* that is now on display at the Museum in Santiago Tuxtla (Figure 9.4). Daneels (2002b) cautions, however, that these burial practices are also found elsewhere in central and southern Veracruz without Teotihuacan affiliation. The cultural derivation of these mortuary practices is difficult to evaluate because little is still known about 'local' mortuary practices in the Classic Tuxtlas.

Green obsidian is more abundant at Matacapan than elsewhere on the Gulf Coast. This material, imported as finished blades in the Classic, was present in proportions as high as 13 percent during the Late Middle Classic (550-650 CE), up from 6 percent in the Early Middle Classic (450-550 CE) and 5% in the Early Classic (300-450 CE) (Arnold and Santley 2008:Figure 7). The subsequent Late Classic saw green obsidian use drop to 1 percent. Besides green obsidian, other imports were found at Matacapan in the form of scarce Thin Orange vessels.

Teotihuacan-related materials were found in public and private, and in elite and non-elite, contexts, suggesting that aspects of the Teotihuacan identity became woven into the common social fabric of the central Tuxtlas. The frequency of Teotihuacan-style material, however, appears to drop off with distance from Matacapan. Pool and I (Pool and Stoner 2004) demonstrated that the limited Teotihuacan-style material recovered from Tres Zapotes (Drucker 1943, Weiant 1943) resembled a subset of equivalent material found at Matacapan. This suggests that Matacapan mediated interaction between Teotihuacan and Tres Zapotes, or that the focus of interaction was intraregional.

Santley presented a model of interaction that described the Teotihuacan presence at Matacapan as a colonial enclave (Santley et al. 1987). He argues that this enclave may have served an extractive purpose, drawing local resources from the Tuxtlas into Teotihuacan. Santley found support for this hypothesis in the apparent dendritic organization of the Catemaco Valley population, which indicates an economy organized for export (Santley 1994). He later revised this position to state that the economy at Matacapan was more likely a solar marketing system with a limited number of industries oriented dendritically, like Coarse Orange production and exchange (Santley 2007:198).

Pool later modified the argument that Matacapan hosted a colonial enclave descended from Teotihuacan (1992). He draws upon Kann's (1990) analysis of Matacapan figurines and a ceramic chronology (Santley and Ortiz 1988) established after original colonial enclave argument was made. Pool found that the incorporation of Teotihuacan style into the local culture becomes more pervasive from the Early Classic to the early Middle Classic. He concludes that Matacapan was settled by immigrants descended from Teotihuacan and that they promoted the central Mexican style, behaviors, and identity to legitimate their own authority and minimize the ethnic distinctions between regime and subject (1992:52-53). Arnold and associates further modify the colonial enclave argument (Arnold et al. 1993). Based on an examination of the Comoapan production facility, it was argued that Matacapan was oriented toward an export economy. They suggest that commodities, such as liquidambar and honey, were exported and the ceramic vessels produced at Comoapan were essential for transport. The increasing intensity of production at many of Matacapan's craft industries after the decline of Teotihuacan, however, suggested that Matacapan did not only interact with central Mexico. In other words, Matacapan did not function as a point of administrative control and economic extraction for Teotihuacan.

Arnold and Santley (2008:314) recently rehashed the argument that Matacapan hosted a resident population of Teotihuacanos. They were not there, though, to control the Tuxtlas region. Instead they may have been supporters of Quetzalcoatl who fled Teotihuacan during the 4th century CE. This is a time in Teotihuacan when parts of the Feathered Serpent Pyramid were razed. Depictions of feathered serpents subsequently fell out of favor at Teotihuacan. Headrick (2007) notes the same conclusion to explain why the serpent military order apparently disappeared after the burning of the Feathered Serpent Pyramid. Interestingly, feathered serpent designs began to appear at Matacapan at this same time, painted in red on Fine Orange and Fine Buff plates. Once settled at Matacapan, they retained their central Mexican identities and some of their ritual and culinary practices as well.

On the eastern coastline of the Tuxtla Mountains, at the foot of, the reptile-eye glyph was also found on a stela at Piedra Labrada (Arnold and Santley 2008:296, Berlo 1989:43, Blom and La Farge 1927). Also found at Piedra Labrada were cylindrical tripod vases, *floreros*, *candeleros*, and Teotihuacan-style censers (Coe 1965). This site could represent movement of Teotihuacan goods and symbols along the coast, possibly originating from Matacapan.

At Totocapan, limited research by Ortiz (1975) and Valenzuela (1945b) identified a few pieces that may have been inspired by Teotihuacan interaction. Ortiz (1975:182, Figure 83f, 84n) identified two rim sherds that looked to be similar to the cylindrical tripod vessel forms found at Matacapan. The sherd depicted by Ortiz as 84n in particular has the slight outward slant seen in the Matacapan examples. Valenzuela (1945b) identifies a marionette-type figurine in his examinations of the site. He also recovered a single engraved plate recovered from the Pollinapan District of Totocapan that may represent a late echo of Teotihuacan influence (Valenzuela 1945b). This plate depicts a warrior executed in a local, or Río Blanco, artistic style, but he wears disks around his eyes and holds an atlatl. The Río Blanco style tends to date to the Late Classic, which would post-date Teotihuacan's far-flung influence in Mesoamerica, but it may represent a post-hoc use of symbols previously adopted by Matacapan. Use of the Tlaloc goggle image at Totocapan may be analogous to the Epiclassic use of Teotihuacan imagery at Xochicalco and El Tajín. Above one figure on this plate is a motif of a bundle of atlatl darts, similar to the symbol that appears on Teotihuacan warrior shields. The Tepango Valley Archaeological Survey adds a few examples of Teotihuacan-like material, none of which can stand alone as clear evidence of interactions with the central Mexican city. A single instance of a solar motif that depicts a semicircle with rays extending outward was broadly incised on a Fine Orange vessel recovered from Site 87, a rural hamlet. This specimen is identical to a motif incised on a Fine Buff bowl at Matacapan (Santley 2007). A few possible examples of cylindrical vase forms were recovered on Fine Orange and Fine Buff pastes, but no rectangular supports were recovered. A single *florero* was recovered at Site 183. Possible censers and censer lids with loop handles/supports (n=27), like those found at Teotihuacan, were much more abundant than any other trait. Among these 27 artifacts, 17 are very open plate forms executed on a yellowish-red to dark red paste, and 10 are loop handles/supports on the same paste that have detached from the plates. No loops made from this paste were found attached to the plate, raising doubts about their association with Teotihuacan. Additionally, these finds only rarely occur with other Teotihuacan-like materials. Despite these limited finds, residents of the Tepango Valley rarely, if ever, drew upon materials, symbols, or ideas emanating from Teotihuacan.

LOCAL DISRUPTIONS, REGIONAL DIVERGENCES, AND DISJUNCTIVE CULTURAL FLOWS IN THE CLASSIC MESOAMERICAN WORLD-SYSTEM

There was tremendous variation in how different groups throughout Mesoamerica interacted with Teotihuacan. This variation precipitated from a combination of factors including distance, the relative power of Teotihuacan versus the interacting polity, local resource availability, ideological compatibility, and perceived benefit to both sides of the cultural, material, and/or political exchange. Each case displays particular conditions that facilitated the appropriation and reinterpretation of some Teotihuacan traits and the rejection of others. None of the examples discussed above can be understood exclusively as radial influences exerted by Teotihuacan balanced by logistical concerns of distance. To the contrary, several groups, particularly on the Gulf Coast, seem to have influenced the stylistic expressions employed at Teotihuacan. Even groups that experienced political disruption from Teotihuacan simultaneously display continuities in local material culture styles, political structure, economic organization, and ritual. The adoption, rejection, or modification of Teotihuacan-related goods, symbols, and beliefs can be understood through a multiscalar process of negotiation.

At the scale of the Classic Mesoamerican world-system, the first layer of negotiation took place between Teotihuacan and local bridging nodes. For almost all of the cases discussed above, local regime leaders acted as bridging nodes that brought elements of Teotihuacan culture into the local sociocultural system. This integration took place under different conditions, though, which facilitated differential adoption of Teotihuacan-related practices and symbols across the world-system.

All interactions involved some level of symbolic exchange between central Mexico and the local group in question, but different groups emphasized different symbols. The Maya emphasized warfare imagery and certain elements of state ideology. Groups in Michoacán, on the other hand, emulated a broader range of prestige and utilitarian ceramics. Many groups who emulated the Teotihuacan style, though, did not engage in economic or political interactions with the city. Groups on the Gulf Coast, shared many aspects of utilitarian ceramic styles with central Mexico as well as a limited range of prestige symbols, but militaristic symbols were underemphasized. Elites at

Monte Albán did not fully integrate Teotihuacan symbols into their local stylistic canons. In fact, they took steps to hide their Teotihuacan connection from the local populace during later time periods. Even where Teotihuacan symbols were employed on ceramic vessels, they were transformed and combined with well-established local symbols. A few settlements, like Matacapan and Montana, employed a relatively broader range of Teotihuacan symbols and behaviors. At these same regional centers, both elites and common peoples appeared to have constructed their cultural identities based at least partly on practices and beliefs derived from Teotihuacan. Adoption of Teotihuacan symbols in eastern Morelos and southern Hidalgo was even more complete and pervasive. In these regions, symbolic appropriation may have been an effect of actual conquest. In no case examined above, however, did Teotihuacan symbols completely displace existing local symbolic institutions.

Teotihuacan symbols were transformed and translated through local interpretive schemes in many cases. With several exceptions, symbolic appropriation most commonly pertained to the elite class. By adopting Teotihuacan symbols, local agents were defining part of their identity through a professed relationship with the central Mexican city. Local agents used foreign symbols as part of their local political ideologies. The agent therefore demonstrated that he had powerful foreign allies, a connection used to negotiate his superior position within local and regional networks. At Monte Alban, depictions of Teotihuacan emissaries on stelae could be interpreted as inferior to local lords. During the translation of Teotihuacan symbols by different local groups, the original meaning became disassociated with the symbol in many cases. Differential interpretation of the same symbols by groups over the macroregion therefore disjoined meaning from symbols as they traveled throughout Mesoamerica in different forms. This disjuncture is perhaps best evidenced by the use of military imagery. Military orders at Teotihuacan cross-cut lineages, thereby preventing power from being monopolized by any one lineage. This plays into the communal political ideology put forth at Teotihuacan. Maya rulers, to the contrary, utilized Teotihuacan war symbols and professed connections to central Mexico to raise one dynastic lineage above others. This is a very individualized political strategy of the kind that Teotihuacan leaders worked very hard to negate.

The Classic Mesoamerican political landscape with regard to Teotihuacan was rather inconsistent and irregularly shaped. One cannot simply draw a polygon around all settlements known to have experienced Teotihuacan-related political disruptions and call it Teotihuacan's core political territory. Within that area were many major centers that rejected Teotihuacan influence, like Cholula and Cantona. A more accurate description would be that Teotihuacan political control was spotty even within its "core territory". Beyond that core boundary, Teotihuacan's political authority was diffuse, but a few distant groups present evidence of some form of political disruption. Montana, Tikál, Matacapan, and Copán, are candidates that potentially display political disruptions. This does not necessarily mean that they were conquered, but their relationships with Teotihuacan influenced the configuration of local political institutions. It is a point of disjuncture, though, that many groups adopted Teotihuacan symbols for local political use in the absence of actual economic exchange or political subjugation. As Filini (2004) points out, it would have been more feasible for groups who could not afford to interact with Teotihuacan on even ground to simply copy their symbols for local display. This exemplifies the construction of imagined worlds in the literal sense.

Economic exchange with Teotihuacan reached great distances from central Mexico, but the volume of exchange was typically low. Of the limited goods exported from Teotihuacan, obsidian was the most widely traded. Thin Orange ceramics, cylindrical tripod jars, and theater censers were exported in low quantities, but many of these goods found beyond Teotihuacan's core territory were local copies, a disjuncture between the economic and symbolic landscapes. Obsidian is a more reliable indicator of material trade with central Mexico. Pachuca obsidian must have had prestige qualities because most of the groups that consumed these green blades had other obsidian resources of equal quality available at much closer distances. This can be likened to "brand fetishism", where Pachuca obsidian blades were functionally equivalent to other sources, but the "name brand" items were desired and employed, often times in special contexts. Green obsidian blades from Teotihuacan may have had significance for ritual use. Again, the economic aspects of Teotihuacan interaction layer into different local uses that were not necessarily carried over from central Mexico. Most groups that demonstrate connections to Teotihuacan have at least a few actual imports, but there is a rather large disjuncture between the Teotihuacan-related economic and symbolic landscapes.

In the summary above, I highlight mostly direct links between different Mesoamerican groups and Teotihuacan. These have largely been hypothesized previously. What has been lacking is an examination of the local and regional layers of negotiation. These smaller scale analyses are important to understand how non-local inputs affect local sociocultural institutions. However, they are very difficult to synthesize using published literature. This is due primarily to the lack of focus on how Teotihuacan-linked nodes fit into their own local and regional systems.

Local scale negotiations took place between bridging nodes and components of the local network directly connected to them. This negotiation can also be conceived of as tensions between internal and external stimuli of culture reproduction and/or change. Regime leaders were often the bridging nodes that linked local networks to Teotihuacan. It was not the actions of these leaders alone that resulted in alterations to local institutions. This is a commonly abused assumption made by agency theorists who employ world-systems analysis. If one individual or collectivity attempts to alter existing institutional structures, this change will be negotiated by all members of the sociocultural system.

In the case of adopting Teotihuacan symbols to legitimate political authority, it must not be assumed that subjects recognized those symbols as legitimate. Local negotiations of this kind raise the possibility that many regimes throughout Mesoamerica attempted to integrate cultural inputs from Teotihuacan but were not successful due to objections by their subjects or competitors. In fact the variable appropriation and interpretation of Teotihuacan symbols throughout Mesoamerica was largely shaped by local negotiations between regimes and their subjects. How many times did this initial process take place that cannot be detected archaeologically because of the failure of a regime to convince, or force, its subjects to cooperate? In lands that were conquered by Teotihuacan, it is assumed that local regimes had the force of Teotihuacan's military backing them. Alternatively, the Teotihuacan state could have established its own overlord to administer local populations. There is no evidence to support this behavior for the Teotihuacan polity, but such a situation would call for continuous negotiations between the imperial presence and local peoples.

Outside central Mexico, it was much more common for Teotihuacan-related symbols and goods to be found in elite than in non-elite contexts. Elites possessed the social connections, real or imagined, and the perceived right to utilize Teotihuacan symbols. This recognition of Teotihuacan symbols as local symbols of political authority was legitimized and reproduced through the loyalty of subjects. In some groups, dependency on connections to Teotihuacan may have arisen to perpetuate the cohesiveness of the local network. Aspects of local symbolic and political institutions disconnected from local traditions and became attached instead with the power of the central Mexican city. This systemic dependency can be best observed by the simultaneous collapse of dependent centers alongside Teotihuacan around 650 CE. The connections used to legitimate political authority at certain major centers across Mesoamerica disrupted with the fall of the metropolis. Alternatively, competing factions may have seized upon this opportunity to assert themselves as the new regime. This apparently happened at Tikál. After the deaths of two rulers claiming connections to Teotihuacan, the polity returned to more traditional, local-style rule. At the interregional scale, a different process may have taken place at centers that arose to fill the power vacuum during the Epiclassic – such as Xochicalco, Cacaxtla, El Tajín. All three of these Epiclassic centers displayed reinterpretations of symbols that represented the fallen Teotihuacan culture.

The final layer of negotiation occurred at the regional scale. The spotty influence of Teotihuacan in Mesoamerica created hundreds of situations where neighboring polities displayed different levels of interaction with central Mexico. Polity capitals separated by as few as 10 kilometers, the difference that divides Matacapan and Totocapan, interfaced with Teotihuacan-related networks in variable ways. It is a primary argument of this research that world-systems linkages are embedded within regional scale networks. Differential interaction with Teotihuacan may have created social contrasts. These contrasts could have dramatically affected the relationships among different groups in a region, either toward greater cooperation or competition. Examining such an issue is a very data-intensive endeavor, which is very difficult to pursue using published literature.

SUMMARY

Using the discussions above, several main points can be summarized regarding the role of Teotihuacan in Classic Mesoamerican world-system. Teotihuacan had a highly variable effect on groups throughout Mesoamerica. Information and goods exported from the city display different distributions. We must remember that Teotihuacan was not unopposed in projecting its influence throughout Mesoamerica. The distributions of Teotihuacan traits observed in the world-system depend largely on what aspects of Teotihuacan culture that agents in the periphery wanted to appropriate in order to promote themselves within their own local/regional networks. The dissection and selective adoption of different aspects of Teotihuacan culture is the principle reason explaining the variability described above.

Teotihuacan-related disruptions were typically focused at individual nodes within the periphery. Access to these goods and ideas were therefore centralized in the hands of few individuals in most cases. At the local level, two strategies appeared with regard to Teotihuacan interaction. First, regime officials most often used central Mexican goods and symbols to legitimate their authority with their subjects. This strategy required that they maintain tight control over this foreign connection, and they took steps to prevent their competitors and the common subjects from gaining access to Teotihuacan goods. The second strategy is essentially the opposite of the first. In select cases, a regime that adopted elements of central Mexican culture promoted those same ideas and beliefs to its subjects. The principle behind this strategy is to foster an ideology among one's subjects that is controlled by the ruling regime due to its perceived ties to a powerful ally.

At the regional scale, not much is known about the edges of these Teotihuacan-related disruptions. Both of the local strategies above translate to different spatial distributions of Teotihuacan-style goods. For the first, the distribution of these symbols are restricted to the agents that control the connections to central Mexico. For the second, Teotihuacan goods and symbols should trickle down into the general populace and be more wide-spread through the local system. Both of these strategies form limited spatial distributions at the regional scale, though. In all cases, there was a limit to the distance that Teotihuacan goods and ideas spread from the node of disruption into the surrounding landscape. It follows that, in all cases, a social contrast developed between those claiming Teotihuacan links and those that did not. The remainder of this dissertation lays out an approach that focuses on the effects of these social contrasts seen at the regional scale in the 'periphery' of the Teotihuacan-related world-system. Data was collected in the Tuxtla Mountains of southern Veracruz, Mexico to explicitly examine these issues through a systematic comparison of neighboring polities. One polity, headed by Matacapan, was dramatically affected by Teotihuacan and the other, headed by Totocapan, was not.

CHAPTER 4: THE TUXTLAS ENVIRONMENTAL SETTING AND HISTORY OF ARCHAEOLOGICAL RESEARCH

The "Sierra de los Tuxtlas" is an isolated range of volcanic mountains situated on the relatively flat lowlands of the southern Gulf Coast of Veracruz. "Sierra" is Spanish for mountain or mountain range. "de los Tuxtlas" means "of the Tuxtlas". In the modern settlement of the region, there are two "Tuxtlas": Santiago and San Andres. Tuxtla is a derivation of the Nahuatl word *Toztlan*. *Toztlan* is a combination of the words *toztli*[1], a species of green-feathered parrot with yellow feathers on its head, and *tlan* which translates "place of" (Covarrubias 1980). In the *Codex Mendoza* – a tribute list (among other things) of the Aztec Empire's subject provinces – the word *toztla* appears below the painting of such a bird. *Tuxtla* is the castilianization of the word *toztla*. It is interesting that the sites of the two modern-day Tuxtlas are located near the sites of the two prominent Classic period centers of Totocapan and Matacapan/Ranchoapan. While these sites on the landscape were nearly abandoned during the Postclassic (Santley and Arnold 1996, see also Chapter 7 this study), their memory has been preserved in the cultural landscape through today. What about the landscape contributed to the continued and repeated use of these two places as sites of demographic, economic, political, and cultural importance? The natural environment gives useful clues for answering this question. An understanding of the cultural meaning that humans give to places on the landscape is required to take us the rest of the way.

TUXTLAS NATURAL ENVIRONMENT

The Middle Classic settlement patterns in the Tuxtlas owe much to its environmental setting. The mountains host fertile alluvial soils, basalt outcrops, Tertiary marine clay formations that produce fine paste pottery, exotic bird and plant species that were rare in other parts of Mesoamerica, and many aquatic resources. Matacapan sits about five kilometers west of Lake Catemaco, the source of the Tuxtlas' largest river.

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[1] This contrasts the folk etymology, however, which derives Tuxtla from Tochtli, meaning "rabbit".

The Catemaco River not only provides a source of water and aquatic resources, it also is a route of transportation connecting the region to the southern lowlands and it ultimately joins the Tepango River south of the Tepango Valley Archaeological Survey (TVAS) survey area. Totocapan was situated along the upper Tepango River, which originates from run-off waters of San Martín Tuxtla as well as permanent freshwater springs. San Martín Tuxtla is the highest volcanic peak in the western and central Tuxtlas. Also included in the TVAS area was the Xoteapan River, which is situated about midway between the Tepango and Catemaco rivers. The Xoteapan River is a tributary of the Tepango, so when referring to the Tepango and Xoteapan rivers together, I use the phrase "Tepango Valley" for ease of description. I call out patterns specific to each river where appropriate.

Various physiographic and geologic zones characterize the region. The following sections characterize the natural environment of the Tuxtlas and where appropriate I detail its relation to human occupation of the region. I provide more detail for the Tepango River valley where possible to aid in the interpretation of cultural landscapes in the following chapters.

CLIMATE

The Tuxtlas host a tropical climate, one of the wettest in Mexico (Soto 2004). Temperatures are hot (mean annual temperature between 22 and 25 degrees C) and humidity is high (García 1970, Vivó Escoto 1964:207). The hottest part of the Tuxtlas is the southeast, which experiences a mean annual temperature of 26 degrees Celsius. Most of the region, however, experiences annual temperatures between 24 and 26 degrees Celsius. Coolest annual temperatures (22 degrees Celsius) are felt at elevations over 600 m above sea level. At the peaks of San Martín Tuxtla and Santa Marta, mean annual temperature is 18 degrees Celsius (Soto and Gama 1997:9-10).

The Tuxtlas experience heavy rains, which average over 1800 mm per year in the southwest Tuxtlas (Pool 1990:144, Vivó Escoto 1964: Figure 10). However, rain does not fall evenly all over the Tuxtlas. During the summer months, wind currents move from the Gulf southward towards the Tuxtlas (Soto and Gama 1997:8) and the northern slopes of the volcanoes get the heaviest rain: up to 4000 mm per year (Soto and Gama 1997:12). This is one of five locations in the country that receives more than 4000 mm of rain annually (Soto 2004:195). In fact, it receives the more precipitation than any area along the entire Gulf Coast from Florida in the United States to Campeche, Mexico. Santiago Tuxtla and San Andres Tuxtla, fall in the rain shadow created by Volcán San Martín Tuxtla and receive about half the total rainfall that occurs on the northern slopes. While orographic precipitation is more consistent year-round, rainfall in the southern Tuxtlas occurs on a more seasonal schedule: occurring most heavily from June through December, with peak rainfall during September and early October. Winter months bring winds primarily from the south, which provides a drier climate.

Heavy rains make it very difficult to produce pottery during the wet months because of the difficulty involved in drying fuel and vessels (Arnold 1991). January through March are considerably dry for the region, although polar air masses from the north often drop temperatures and cause intensive rain during these winter months (Gomez-Pompa 1973:82, Pool 1990:145). Pottery production was probably at a high in the dry season due to availability of dry fuel (Arnold 1991) and because annual agricultural demands were not yet too time consuming (Killion 1990).

PHYSIOGRAPHY AND GEOLOGY

The Sierra de los Tuxtlas massif formed during intensive volcanic activity that began during the late Miocene. This volcanism continued through the Pliocene and Pleistocene but tapered off into the Holocene (Martin-Del Pozzo 1997, Rios Macbeth 1952, Reinhardt 1991). Pressure that resulted volcanic activity domed up the overlying Tertiary marine deposits (Figure 4.1). Eruptions deposited copious flows of lava over the region (Dirzo et al. 1997), which cooled slowly and formed fine-gained to coarse-grained, olivine, pyroxene, and plagioclase-rich basalts. Explosive Strombolian eruptions shot volcanic ash clouds into the air. This volcanic ash, which is composed of these same minerals as the basalt described above (Stoner 2003), is found in thick beds in many

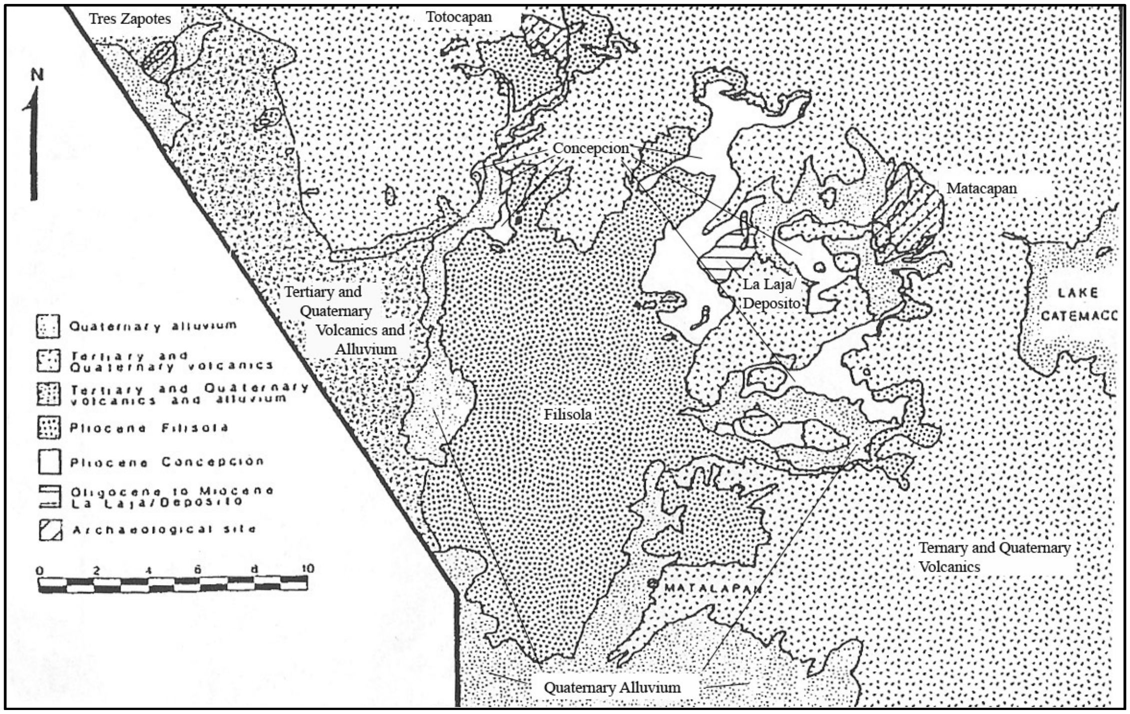

Figure 4.1. Geological map of the study area (after Pool 1990: Map 5).

places throughout the Tuxtlas. Volcanic ash, as will be discussed below, was used to temper prehispanic pottery.

Four major volcanoes compose the Sierra de los Tuxtlas massif, but hundreds of small cinder cones, many of which have erupted within the last 10,000 years, dot the landscape (Reinhardt 1991, Santley et al. 2000). The major orientation of the mountain ranges is from northwest to southeast (Dirzo et al. 1997:5). Major river drainages out of the Tuxtlas massif therefore flow at roughly perpendicular orientations to the southwest. Moving from northwest to southeast, three shield volcanoes protrude from the landscape: San Martín Tuxtla, Santa Marta, and San Martín Pajapan (Andrle 1964, Reinhardt 1991). The fourth major volcano is an eroded cone, Pelón, which lies south of the previously mentioned shields (Pool 1990:141, Reinhardt 1991). The highest peaks in the Tuxtlas, San Martín Tuxtla and Santa Marta, reach elevations of 1700 m above sea level (Andrle 1964, Dirzo et al. 1997:5, Gomez-Pompa 1973). Most of the region that was inhabited by pre-Columbian settlers lies below 1000 m above sea level (Santley and Arnold 1996). Volcán San Martín Tuxtla is the youngest volcano in the region, and the most recently active (Reinhardt 1991, Santley et al. 2000). To the southwest sits a smaller and older volcano, Cerro el Vigía. Williams and Heizer (1965:4) determined that this volcano supplied most of the material (basalt) for stone monuments found at Tres Zapotes. This mountain also defines the western boundary of the Tepango Valley Archaeological Survey.

Lake Catemaco is nestled between the San Martín Tuxtla and Santa Marta volcanoes (Andrle 1964). From this lake springs the largest river in the Tuxtlas: the Catemaco River. The Tepango River, smaller than the Catemaco, was situated to the westernmost area within the Tuxtlas massif. The Tepango and Catemaco merge to form the Tuxtla River in the southwestern foothills before flowing into the San Juan River. The San Juan, in turn, drains into the Papaloapan Basin. Another important river for this research was the Xoteapan. The Xoteapan River was situated between the Tepango and Catemaco rivers. It was an important location for pre-Columbian settlement. Sites located along this short stream segment may have served important boundary maintenance functions for interactions between the Totocapan and Matacapan polities.

The most recent soils generated in the Tuxtlas are Quaternary andosols, which are yellow and brown in color and originate from the weathering of volcanic parent material (Andrle 1964). These soils are very rich in plant nutrients – such as feldspars (sources of calcium and potassium), iron oxide, magnesium, potassium, and aluminum (Andrle 1964, VanDerwarker 2003) – and can support 2-3 crops per year (Andrle 1964, Gomez-Pompa 1973).

Of particular importance to understand pottery economics in this study are the older, Tertiary marine clays. High-quality clay was, and still is, available for making pottery in the region (Arnold 1987, Pool 1990, Pool and Santley 1992, Stoner 2003). Selection of clay will affect the chemical and mineralogical composition of the pot. Ríos-Macbeth (1952:328) characterized the sedimentary geological formations of the Tuxtlas. From oldest to most recent these are La Laja/Depósito, Concepción, and Filisola (see Figure 4.1). Pool (1990:307-314) established that certain ceramic wares – such as Fine Orange, Fine Gray and, Coarse Orange – were manufactured from Concepción clays. Quaternary clays, which include smectite that forms around basalt outcrops, were probably used for other wares, including Coarse Brown. The Concepción formation composition gradually shifts stratigraphically, so a transition between upper and lower

Concepción can be made (Martin-del Pozzo 1997:27, Rios-Macbeth 1952). The transitions between the La Laja/Depósito, Lower Concepción, and Upper Concepción formations are rather gradual and perhaps better characterized as biostratigraphic zones (Kohl 1980:30; Pool 1990:149, Strachan 1986:32). Plio-pleistocene and recent volcanic rocks have formed on top of these older horizons (Pool 1990:148). Since the Concepción formation provided the source of clays used by prehistoric potters (Pool 1990:307-314) and modern potters (Arnold 1987:76) in the Tuxtlas, I will describe these strata at some length.

The Concepción strata are Tertiary marine sediments composed primarily of kaolinite clay minerals. Concepción clays are distinguishable from the stratigraphically superior Filisola formation because the latter is composed primary of quartz sands and sandstone. Filisola sands are the most accessible Tertiary formations in the Tuxtlas because they are the most recent. The Concepción outcrops at several places where river valleys cut through Quaternary soils and Filisola sands. The Concepción strata gradually transition into the Filisola formation, thus clays taken from the top of the upper Concepción should portray some of the characteristics of the Filisola. This provides an interesting source of stratigraphic variation that benefits compositional sourcing studies (Pool 1990, Pool and Santley 1992, Stoner 2003, Stoner et al. 2008). The uppermost Concepción clays should have round and sub-round quartz sand inclusions, and ceramics made from these clays will possess the same mineral inclusions. Martin del Pozzo (1997:27) notes that the lower Filisola has inclusions of fine calcareous minerals, possibly feldspar or calcium carbonate, and the middle layers contain volcanic material and mica. While I observed mica in clay portion of Coarse Orange pottery thin sections, almost no visible feldspar and no calcium carbonate inclusions were noted. Feldspar, specifically plagioclase, is present in volcanic ash grains, but is rarely isolated in the clay matrix. Feldspar and calcium carbonate could be so finely divided into the clay matrix that they were difficult to identify, or perhaps the firing process produced a chemical change destroying their mineral structure. The latter likely took place with calcium carbonate, converting it into calcium hydroxide. Carbon is driven off with the application of high temperatures and the remaining ions bond with hydrogen from remnant water locked in the clay matrix.

One complication with the assumption that pottery should directly reflect the mineralogical composition of the natural clay is that some quartz and feldspar may have been added as temper either in the form of river sediment or mining the sand directly from the Filisola formation, as residents of San Isidro do today (P. Arnold 1991). I believe that both of these temper procurement behaviors were practiced in the TVAS area. Some ceramics displayed temper composed of rounded to sub-rounded quartz, feldspar, volcanic ash, basalt (or any of its component minerals), and iron-rich minerals of varying grain size (e.g., Codes 2701 or 2821). Others displayed angular to sub-angular quartz and feldspar of a very uniform fine to medium grain size (e.g., Codes 2611, 2612, and 2624). The latter example is virtually impossible to determine if the clays used were really sandy or if sand was mined directly out from Filisola outcrops, which are abundant in the survey area. Many of the petrographic characteristics previously argued by archaeologists to differentiate temper from natural inclusions (Stoltman 1989, 1991) may not apply here because the quartz sands are fine enough to add without crushing. With this exception noted, the frequency of quartz sand in the clay matrix of ceramics may still have value for sourcing. Upper Concepción clays should possess fine to coarse quartz and feldspar sands and possibly sandstone that appear in the Filisola formation. It should be noted that feldspar was almost never observed in Coarse Orange thin sections unless encased in volcanic ash. Lower Concepción clays also have quartz and feldspar inclusions, but they tend to be smaller, sized from silt to fine sand. Upper and lower Concepción are also distinguishable by their calcium content. Lower Concepción generally has higher concentrations of calcium. This may, in part, result from dilution in the upper Concepción by greater proportion of quartz sand.

The clay formations discussed above are exposed on the surface in distinct areas of the Tuxtlas (Figure 4.2). Erosion incised river valleys into the Tuxtlas massif, exposing Concepción clays in several parts of the region. The Catemaco and Tepango Rivers exposed these clays to different depths. Pool's (1990) X-ray fluorescence analysis of ceramics and clays demonstrated an east-to-west pattern of chemical variation among the clays in the Tuxtlas. Group C, which is calcium-rich, occurs in the eastern portion of the study area around Matacapan (Pool 1990:311). The Catemaco River exposed clays of the lower Concepción in this part of the study region. The higher calcium content of

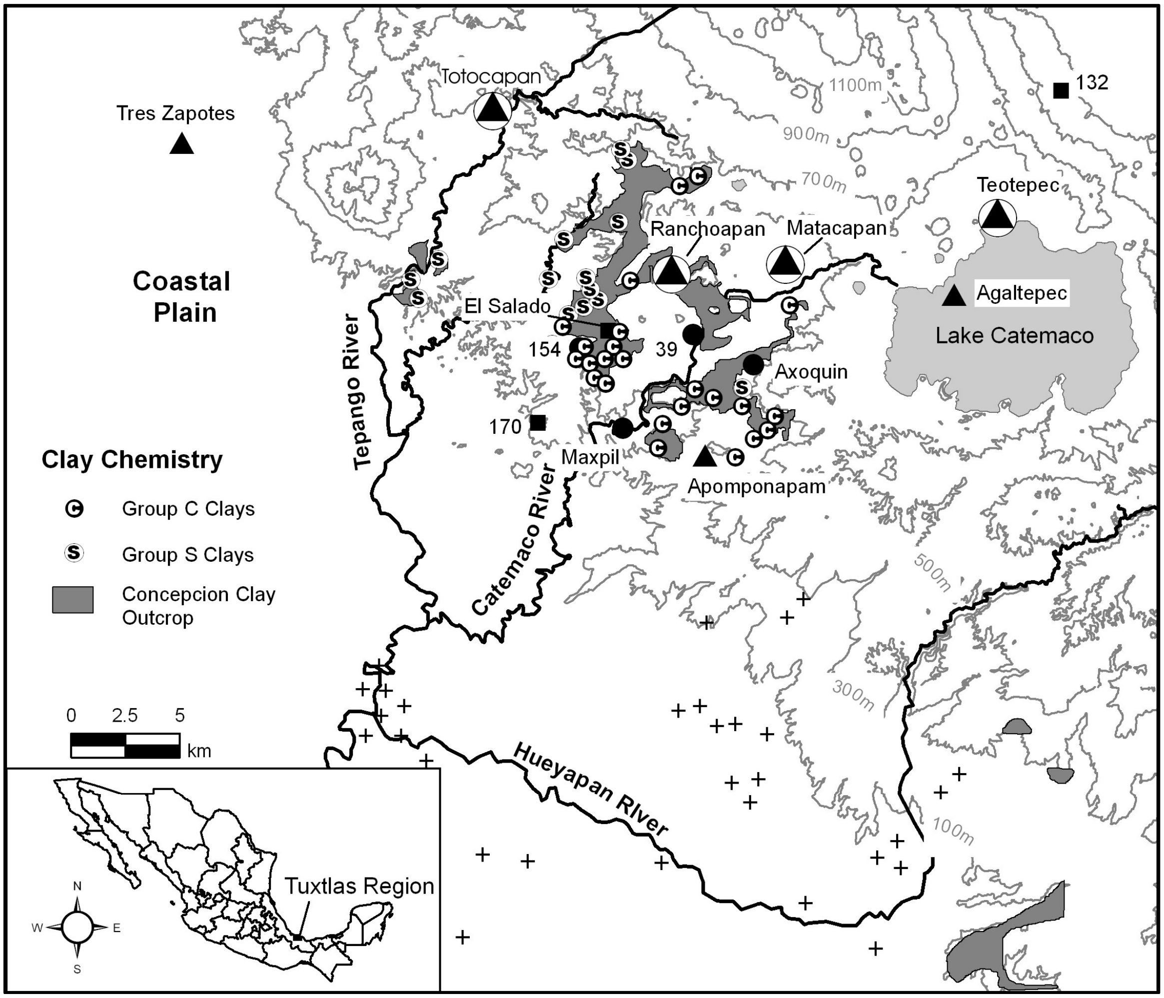

Figure 4.2. Showing the distribution of Concepción sedimentary outcrops and their chemical group designations (after Stoner et al. 2008: data derived from Pool and Santley 1992: Figure 9.1; Rios-Macbeth 1952, and Stoner 2003)

Group C clays of the lower Concepción is attributed to higher frequencies of carbonate minerals and lower concentrations of quartz sand. Group S clays appear farther to the west and southwest of the Catemaco River and within the Tepango River valley. Group S has significantly lower concentrations of calcium and is also elevated in iron and titanium (Pool 1990:345, 376, 379; Stoner 2003). The Group S clays derive from the upper Concepción formation, which has fewer carbonate mineral inclusions and greater frequencies of quartz sand due to its stratigraphic proximity to the overlying Filisola sands. Pool also defined a chemical and stratigraphic subset of Group C, which he named Group M. Group M outcrops in the Ohuilapan drainage located a few kilometers west of Ranchoapan. Group M is not depicted in Figure 4.2 because my own (Stoner

2003) neutron activation analysis of Pool's clay samples could not statistically separate it. Of the six Group M specimens that I sampled for my master's thesis, four fell into Group C, one was assigned to Group S, and one was unassigned[2].

A few small outcrops of lower Concepción clays are exposed in the foothills along the Hueyapan River, about 20-30 km south of Lake Catemaco, and in the Ohuilapan Valley about 4 km south of San Andres near the site of Tilzapote (see Chapter 7). Some of the oldest rocks in the region are also exposed in these locations. They pertain to the Depósito and La Laja formations.

Volcanic ash, a common temper for ceramic production, occurs in many locations throughout the region. The Strombolian eruptions that occurred most recently in the Tuxtlas were of a very explosive and gaseous variety (Santley et al. 2000). This translates into a polymineralic ash that is a combination of exploded basalt and small bits of cooled lava that are spewed onto the air (Figure 4.3). Ash grains are usually encased

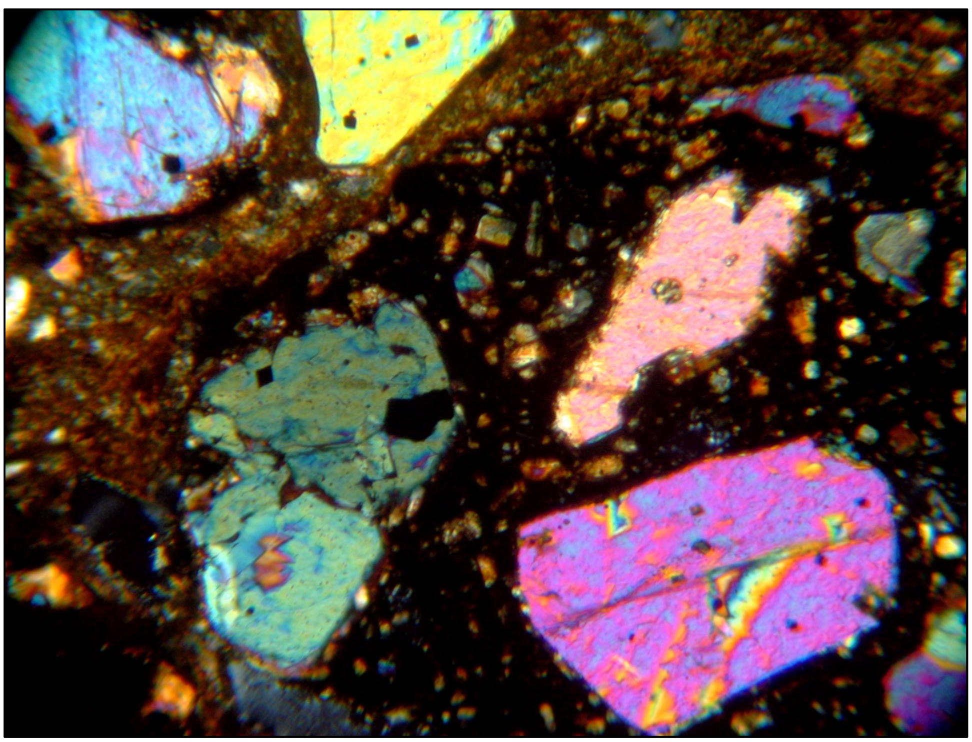

Figure 4.3. Photograph of a grain of volcanic ash in a clay matrix in cross-polarized light. Black colors are volcanic glass, the brown matrix is clay, white or colorless minerals in clay are quartz, and the colored minerals within the volcanic glass are pyroxene, olivine and plagioclase.

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[2] Group M is likely a stratagraphic transition between Group C and S. More research in the future may be able to reliably separate Group M and the ceramics produced from it.

by black volcanic glass that forms through rapid cooling as it sails through the relatively cool air. The internal portions of each ash grain, however, contain mineral crystals of plagioclase, olivine, and pyroxene. These are either formed by a slower cooling process on the interior of the ash grain after ejected into the air, or they may have already formed within the lava. The magma chambers that underlie the Tuxtlas are of relatively mafic composition. Mafic magmas have relatively low concentrations of silicon and high concentrations of heavier elements, such as iron and chromium. Mafic magmas typically form olivine, pyroxene, plagioclase, amphibole and biotite. These are the minerals found in volcanic ash and basalts in the Tuxtlas region.

I analyzed one volcanic ash sample using INAA for my master's thesis (Stoner 2003). This specimen displayed high concentrations of chromium, iron, nickel, manganese, vanadium, and scandium relative to the clays in the region. The relatively higher concentrations of these metals in volcanic ash as compared to Concepción clays which will be important to interpret the pottery chemistry presented in Chapter 9. Reinhardt (1991) identified chemical variation among the ash beds found in the Tuxtlas, but it was due primarily to differential weathering and will not be useful for sourcing to a geographic location. Many of the volcanoes in the region may have shared magma chambers that would yield similar chemical signatures. For pottery sourcing purposes, I previously determined through petrographic point counting that the proportion of ash added to clay and the size of ash particles were significant variables to distinguish compositional groups (Stoner 2003, Stoner et al. 2008).

At least 10 eruptions have occurred within the Tuxtlas since 5300 B.P. (Reinhardt 1991). Each eruption was brief and involved a relatively small amount of magma rising to the surface. The ash fall for each of these eruptions probably varied in geographic extent, but were relatively localized. Pool and Britt (2000:146 – from Reinhardt 1991:Figure 14) show the ash fall for a recent eruption of Cerro Puntiagudo. This ash achieved one-meter thickness on the ground within about a 50 square kilometer area downwind from the volcano. Ash from this eruption was blown primarily to the west. Considering volcanoes extensively dot the Tuxtlas landscape, ash would have been available to nearly all of the inhabitants of the Tuxtlas.

FLORA AND FAUNA

Given the variability in rainfall and elevation, the Tuxtlas are home to a variety of vegetation. Most of the Tuxtlas, at elevations below 900 m above sea level, are tropical forest. Gomez-Pompa (1973:105) refers to this vegetation zone as "*selva*", which is dominated by several species of tree. Forest, on the other hand, is usually dominated by one or two tree species (Gomez-Pompa1973:105; Pool 1990:145).

Gomez-Pompa (1973) divides the Tuxtlas into three vegetation zones: high evergreen *selva*, high semi-evergreen montane *selva*, and low evergreen *selva*. In the high evergreen zones (below 700 m elevation and between 2500 and 5000 mm of rainfall) dominant tree species grow up to 25 m tall and include *Bernoullia flammea, Brosimum alicastrum* (breadnut tree or Ramon)*, Ficus tecolutensis* (*cedro,* which is not like the cedar tree in the United States and Canada)*,* and *Pseudolmedia oxyphyllaria* (Gomez-Pompa 1973:111). These trees grow in brown andosols in the Tuxtlas that derive from volcanic ash weathering. High semi-evergreen montane *selva* (between 700-900 m elevation in areas of more than 1800 mm precipitation) is dominated by *Brosimum alicastrum* and grows in more rocky well-drained soils than the high evergreen *selva*. Low evergreen *selva* is only found at the summit of the Volcán San Martin Tuxtla and possibly Santa Marta. This *selva* is similar to a "cloud forest" with small but very dense forest and many epiphytes, mosses and lichens (Pool 1990:146; Gomez-Pompa 1973:119). Gomez-Pompa also notes the presence of a transitional zone of vegetation between the high semi-evergreen and low evergreen *selva*s. This zone contains *Liquidambar macrophylla* (sweet gum), *Quercus skinneri* (mountain oak), *Ulmus Mexicana* (Mexican elm) and *Meliosa Alba* (Gomez-Pompa 1973:104). Liquidambar resin was used by Aztec doctors as an expectorant and ointment, and would be used to treat tooth aches (Vogel 1970:378-379). Stark (1978:204) observes that *xochiocotzol*, liquidambar, was a major tribute demand of the Tochtepec province. The Tuxtlas, falling within the Tochtepec province of the Aztec Empire (Venter 2008), may have also paid tribute in liquidambar. Selva is rapidly disappearing in the current day Tuxtlas due to urban development, cultivation, and herding cattle in pasture (Guevara et al. 2004).

Aside from non-domesticated plant species, several domesticated species were cultivated in the region. Maize, beans, and squash were staple foods grown in Veracruz, and throughout Mesoamerica. Other domesticated and non-domesticated foods that grew in southern Veracruz were tomatoes, guava, avocado, cacao, amaranth, chile peppers, papaya, and peanuts, among others (Coe 1994). Cotton, which was the favored fiber for textiles, grew well in the hot humid climates of southern Veracruz (Stark et al. 1998).

Although decimated today, southern Veracruz once contained a large variety of animal. White tail deer, red brocket deer, and collared peccary were among the largest mammals that formed part of the diet. Also present in the Tuxtlas were tapir, a variety of monkeys, gray fox, large pocket gopher, opossum, eastern cottontail, armadillo, Mexican wood rat, Mexican gray squirrel, shrew, wild cats, mice, toads, and bats were also present (VanDerwarker 2003, Coe 1994:15). Domesticated dogs also were eaten. A large variety of birds also were exploited for meat, including ducks and turkeys. Tropical birds were prized for their feathers, including the parrots, for which the Tuxtlas are named. Reptiles (iguana, turtles, snakes) and fish were also a major part of the diet (VanDerwarker 2003).

TEPANGO VALLEY LANDSCAPE

The basic environmental data for the Tuxtlas region has been presented above. In this section, I focus on a more detailed description of the Tepango Valley focusing on its prominent features that functioned as important places on the landscape throughout its various episodes of human occupation (Figures 4.4, 4.5, 4.6, and 4.7). The Classic center of Totocapan, which borders the modern town of Santiago Tuxtla to the north, is situated at a very advantageous place on the landscape. One of the major transportation corridors leading into the Tuxtlas passes through this area. Highway 180 follows this natural corridor formed by the high relief of surrounding volcanic cones. Travelling east along Highway 180 toward the Tuxtlas, one arrives at the small town of El Tropico situated at the intersection with another road that skirts the mountains to the north eventually arriving at the coast. El Tropico is the last stop before ascending the Tuxtla

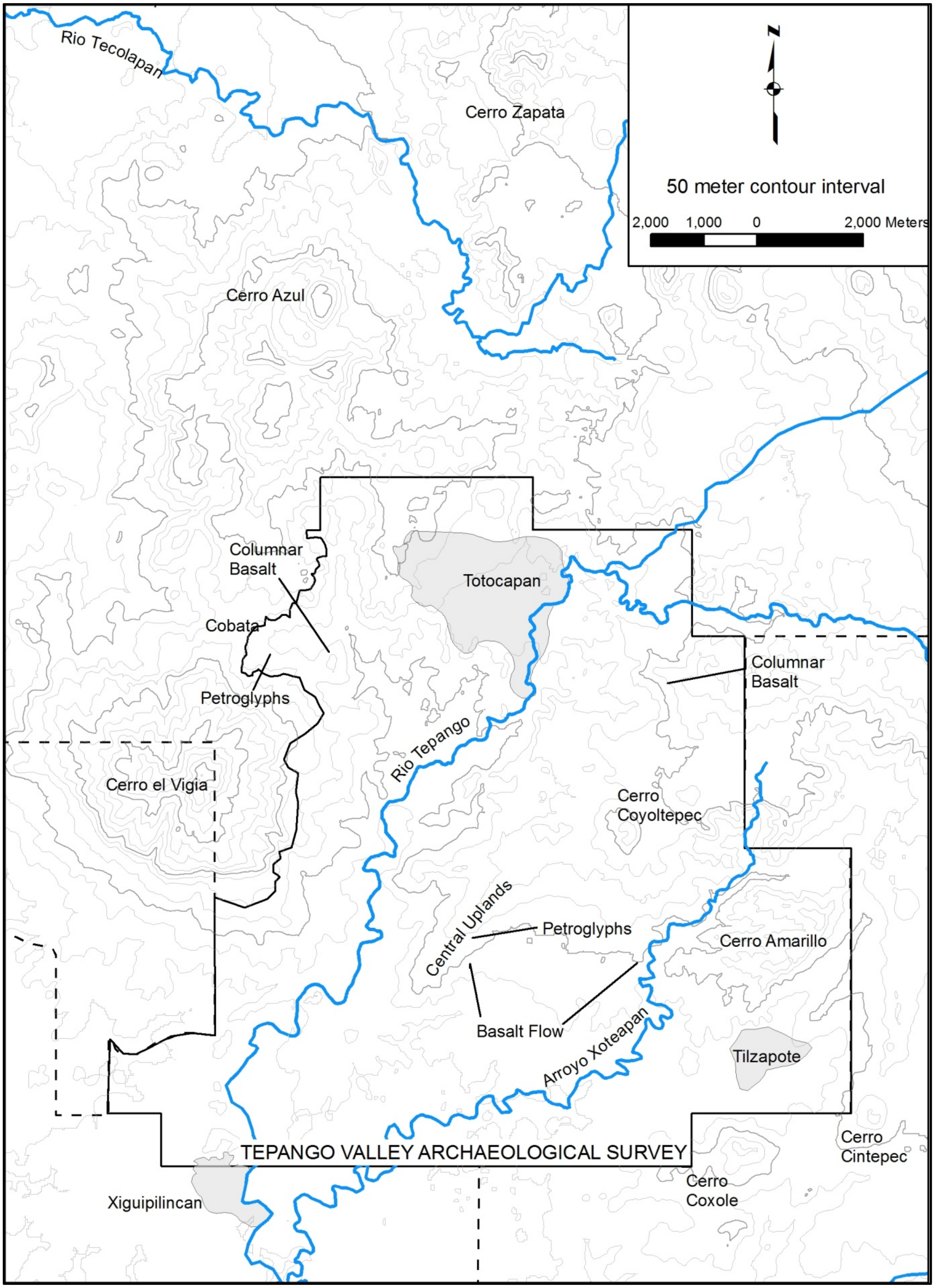

Figure 4.4. The Tuxtlas landscape showing prominent features and large settlements.

Figure 4.5. Overview of the Tepango River toward the southern end of the survey area (facing northwest). Cerro el Vigía depicted in the background.

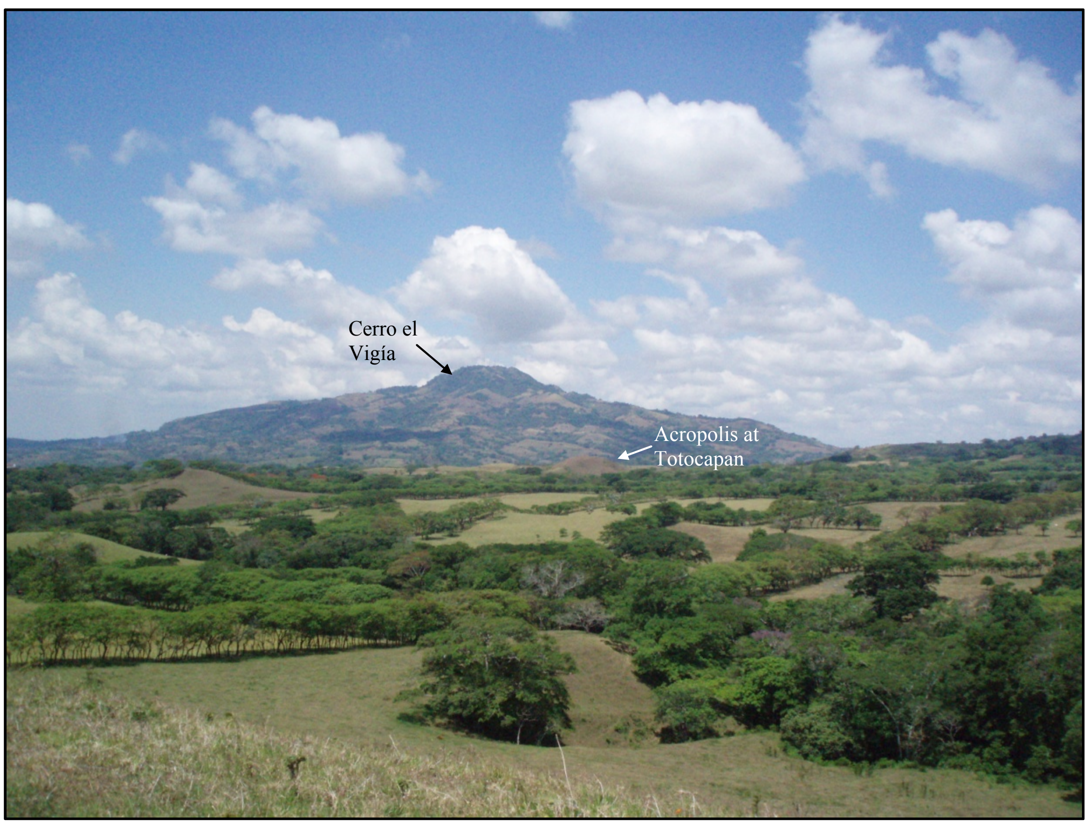

Figure 4.6. Overview of Totocapan (foreground), showing Cerro el Vigía in the background (facing southwest).

Figure 4.7. View of the Central Uplands, showing Cerro Coyoltepec (facing southwest).

massif. Ancient travelers would have also likely taken this path into the Tuxtlas following the Rio Tecolapan, which passes the large mound center of El Mesón further to the west.

As one begins the climb into the Tuxtlas, a narrow pass is negotiated just southeast of the modern town of Tecolapan before the valley opens into the relatively wide Tecolapan floodplain surrounded by dozens of cinder cones, the most prominent of which are Cerro Azul, Cerro Zapata, and Cerro La Palma (see Figure 4.4). In the southeastern foothills of Cerro Azul, a small mound center[3] guards the narrow southern path leading to Totocapan. After a steep climb, the traveler passes the summit of their journey and is presented with a southerly view of Totocapan and much of the upper Tepango Valley. Totocapan occupies the highest elevation of any Classic period center to the north or south. This point of departure offers a "downhill" trip to all other major centers in the Tepango Valley to the south and through the Tecolapan Valley to the

[3] Named Tapalapan in this research after the modern down that borders it.

north. The survey area begins at Totocapan and follows the southern route into its hinterland.

The mountains were no doubt important components of the cultural landscape. The tallest mountain peak within the view shed of Totocapan is Volcán San Martín Tuxtla to the northeast. This mountain is a contributing source of the Tepango River waters. Its summit is an important focus of ritual pilgrimage today during *semana santa* (see discussion on p. 57-58). It was also surely an important ritual place on the pre-Columbian landscape. Blom and La Farge (1927) discovered an important Olmec monument near its summit. Another monument, the *muñeco*, is rumored to occupy the summit of Cerro el Vigía, but our survey teams were not able to locate it. Survey of the saddle ridge between Cerros el Vigía and Azul reveled hundreds of petroglyphs and one incomplete sculpture. This is also the location where the Cobata colossal Olmec head was discovered. The petroglyphs depicted animals, humans, and deities as well as geometric designs, such as spirals. The Cobata head may have marked the boundary of Tres Zapotes political domain during the Middle Formative period. This saddle ridge was therefore an important ritual place that may have also served as a political boundary (discussed further in Chapter 7). Petroglyphs were also found in the modern town Tetax on the long finger ridge that divides the Tepango and Xoteapan watersheds and at the archaeological site of Maxyapan overlooking the Xoteapan River. While there are certainly many monuments and petroglyphs that were not identified by the TVAS, a clear distributional pattern identifies prominent peaks and ridges with ritual and/or political significance. None of these locations supported populous centers, so it can likewise be assumed that they demarcated important ritual and political space *between* places.

Cerro Amarrillo is a very rugged comb-shaped series of ridges situated in the eastern extension of the TVAS area. The majority of the inhabitable land atop this ridge system has been destroyed by modern construction, which prevented identification of either ritual or boundary markers in this location. Cerro Amarillo occupies a position, however, that is exactly equidistant from the architectural cores of both Totocapan and Matacapan. It may have served as an important political divide between these centers. The eastern flank of Cerro Amarillo forms a 200 meter vertical wall that would have barred passage. Travel between the Tepango and Catemaco valleys bypassed Cerro

Amarillo either through the rugged pass to the north or the more easily traveled route to the south. The southern route passes through another Classic period regional center, Tilzapote. Tilzapote likely arose due to its positioning as a mediator of trade and communication between valleys, benefitting from the transportation barrier of Cerro Amarillo. To the south of Tilzapote, Cerro Coxole and Cerro Cintepec may have formed the southeastern political boundary of the Totocapan polity.

Unlike the relatively flat coastal plain, the Tepango Valley is a steep environment with relatively few expanses of level land. Many settlements identified by the TVAS took advantage of the natural topography to augment the height and visibility of the built environment. The Acropolis at Totocapan was a palace complex formed out of a 35 m tall hill. The architects even sculpted the southern edge of the hill to conform to the orientation of Plaza Group 1. Dozens of mounds elsewhere in the survey area were constructed on top of natural hills or rises. The established effect for the viewer standing in the plaza below is a greater verticality within the built-environment that required little expended effort. In two cases toward the southern end of the survey area, isolated earthen mounds occupied the tops of hills with tremendous view sheds, but neither visual inspection of the ground surface nor shovel testing returned cultural materials in these locations. The complete absence of cultural materials is a rarity in the TVAS area, leading me to the conclusion that these mounds were sacred places or boundary markers between groups.

The broadest expanses of flat land tend to be in floodplains or terraces of the Tepango and Xoteapan rivers. One exception is a broad flat basalt flow that spilled out from Cerro Coyoltepec running southwest through the center of the survey area. Though situated rather distantly from either major river within the TVAS, this may be most densely occupied segment of the survey. Excluding this central population aggregation, the Tepango and Xoteapan rivers strongly dictated the distribution of pre-Columbian settlement within the survey area. These waterways were sources of food, water, transportation, and possibly marked differences among social groups. A number of ceramic types and decorations identified by the TVAS follow the course of these two rivers. Additionally, some ceramic distributional patterns adhere to settlements along one river, but not the other. It appears that there were some social as well as political distinctions between the Tepango and Xoteapan watersheds.

I established the Tepango Valley Archaeological Survey area to encompass Totocapan and its southern hinterland (see Figure 4.4). The total area surveyed was greatly restricted by time and available funds. The survey area was identified to include at least a portion of the hinterland with a high likelihood to record secondary and tertiary administrative centers under Totocapan's political domain. This survey area represents, at best, half of the territory over which Totocapan had some influence. It is known that mound centers existed to the north of Totocapan, near the community of Tapalapan (4 km north of Totocapan) and near Cuyapan de Arriba (4 km northeast of Totocapan). Both of these sites were likely important subordinate centers under Totocapan's political domain, but restrictions on time and funding made it impossible to expand the survey to the north. Furthermore, there is no reason to suspect that relationships between Totocapan and its northern hinterland were qualitatively different from the area surveyed by the TVAS. The land north of Totocapan should be surveyed in the future to test this statement, particularly with the idea that the Tecolapan River was a major route of interaction between the Tuxtla region and lowland groups on the Gulf Coast. It is assumed that settlements to the west of the TVAS area fell within the Tres Zapotes political hinterland during the Formative and Early Classic periods. The small remnant of Cerro el Vigía that was not surveyed at and near its summit consists of relatively small settlements that did not hold political significance. The summit of Cerro el Vigía is important for other reasons, namely the ritual significance that it held for all settlements within its view shed. In general, the area selected for survey by the TVAS contained centers of political, ritual, and cultural importance on the Tuxtla landscape, all of which likely formulated some kind of relationship with Totocapan during its Formative and Classic period history.

A BRIEF HISTORY OF RESEARCH IN THE TUXTLAS REGION

The first archaeological explorations into the Tuxtlas were conducted in the late 19th and early 20th centuries (Blom and La Farge 1927, Kerber 1882, Melgar 1869).

Expeditions conducted during this era were not problem-oriented, but they gave the world outside this culture area its first glimpse of the *Cultura Tuxtleca*.

More intensive, site-focused research began in the 1930s and continued through today. Stirling (1943; Weiant 1943) initiated investigations during 1938 at Tres Zapotes for the Smithsonian Institution and the National Geographic society. Drucker entered the project in 1939 and designed the first stratigraphically-based ceramic chronology for the Tuxtlas region (Coe 1965:684-686, Drucker 1943). Weiant (1943) and Drucker (1943) simultaneously created parallel ceramic classification systems, but Drucker's had more influence on subsequent studies at Tres Zapotes. World War II disrupted research in the region, but investigations resumed in the late 1950s.

Running concurrently with research at Tres Zapotes, Valenzuela began exploratory excavations at several locations including Matacapan and Totocapan (1945a, 1945b). These excavations were placed in and around the sites' largest monumental architecture. Valenzuela's overt desire was to locate burial offerings because these presented the most complete and highly decorated artifacts. Valenzuela was the first to note the similarities of material found at Matacapan to Teotihuacan (1945a). At Totocapan, Valenzuela excavated near the modern communities of Totocapan and Pollinapan. Ortiz (1975) later excavated ceramics from Totocapan (which he called El Picayo), Tres Zapotes, and Matacapan to establish a regional ceramic typology. The ceramic typology for later research at Matacapan (Ortiz and Santley 1988) was patterned after Ortiz's analysis of ceramics there and at Totocapan and Tres Zapotes.

In 1982, Santley initiated intensive research at Matacapan to determine the nature of Teotihuacan influence at Matacapan and to uncover evidence of long-distance exchange. This project mapped the central 5 km^2 of Matacapan, made 5500 surface collections with systematic transect survey, and excavated 83 stratigraphic test pits (Pool 1990:168; Santley et al. 1984, 1985). The New Mexico Project was successful in several regards (see Pool 1990:168-182 for a more detailed description of the following). First, a detailed ceramic sequence was reconstructed (Ortiz and Santley 1988; Pool 1990:168). Second, the site's occupational history was detailed (Santley et al. 1985; Pool 1990:174). Third, Teotihuacan influence was better understood (Pool 1990:177-179, Pool 1992a, Santley et al. 1987, Santley et al. 1987). And fourth, evidence for long-distance exchange was uncovered (Santley 1989).

The data and arguments created by the Matacapan project led to a series of 'spinoff' projects that provided material for several theses and dissertations. Pool (1990) conducted a geological survey and study of ceramic production and exchange centered on Matacapan in 1986. Part of this research involved excavating several ceramic production localities located in different areas of Matacapan. With the data gained from sampling clay sources all over the central Tuxtlas surrounding Matacapan, Pool was the first to initiate a source database that could be used to chemically evaluate potential ceramic exchange in the Tuxtlas. The results of his examination of Fine Orange distribution, however, showed that it was produced and distributed locally in the southwestern Tuxtlas. I later examined the exchange of Coarse Orange, the most intensively produced ware at Matacapan, using compositional analyses (Stoner 2003, Stoner et al. 2008) (discussed below). Pool also excavated parts of Bezuapan, a satellite community located to the east of Matacapan (Pool 1997, Pool and Britt 2000). His excavations there helped to better define the Formative to Classic period transition and to understand the archaeological correlates of the houselot settlement configuration (Killion 1991). Killion first examined the houselot settlement pattern in the Tuxtlas through an ethnoarchaeological study that formed the basis of his dissertation research (1987). The houselot residential pattern greatly influenced regional settlement distribution and population densities (Drennan 1988) and agricultural practices in the Tuxtlas (Killion 1987, 1990). Arnold (1988) also conducted ethnoarchaeological research focusing on pottery production methods employed by several modern communities. He compared these data to the archaeological evidence for pottery production at Matacapan (Arnold 1988).

After excavations at Matacapan ceased, Arnold and Santley (Santley and Arnold 1996; Santley 1991, 1994) began a systematic reconnaissance of the Tuxtlas region surrounding Matacapan. A diachronic view (based on the previously established ceramic chronology) of settlement for the west central Tuxtlas was detailed for the first time. This evidence points toward Matacapan's supremacy throughout the Classic period in the west-central Tuxtlas. Sociopolitical domination of the Tuxtlas thus refocused away from

Tres Zapotes at the end of the Formative period to Matacapan during the Classic. Totocapan at this point was not well known through archaeological research (but see Ortiz 1975, Valenzuela 1945b). Much of the research focused on Matacapan and the Catemaco Valley is synthesized in a recent manuscript written by Santley (2007) which was published posthumously.

Pool later initiated intensive systematic survey (1997, 2007) and excavation (Pool personal communication) at the Olmec and Epi-Olmec site of Tres Zapotes in the western Tuxtla foothills. The objectives of this research were to investigate the political organization, craft production, and the settlement history of the site. Like the Matacapan project, the Tres Zapotes project led to a number of 'spinoff' projects, most of which formed the basis for several theses and dissertations. Knight (1999) surveyed and excavated at the site of Palo Errado in the Tres Zapotes hinterland. Kruszczynski (2001) also conducted a study of the Tres Zapotes hinterland focusing on potential loci of basalt quarries used in the production of monuments and other stone tools at Tres Zapotes. Kruszczynski employed an intensive survey strategy of 25 km on the southern and western slopes of Cerro el Vigía. While he identified many loci of pre-Columbian occupation, his goal of finding basalt quarries was not well realized. Loughlin (n.d.) later conducted a survey of 23 square kilometers around Angel R. Cabada to the west of the Tuxtlas massif. This research has helped to better understand interactions between Tres Zapotes and the important site of El Meson.

Arnold returned to the Site of La Joya located south of Matacapan to examine the Early Formative period in the Tuxtlas (1999, Arnold and McCormack 2002). Arnold excavated parts of this site to complement the intensive survey conducted as part of the Tuxtlas Region Survey (Santley and Arnold 1996). This research contributed data that were used to write two more dissertations. VanDerwarker (2003) questioned the assumptions that agricultural intensification was necessary for the development of complex sociopolitical forms. Her study employed archaeobotanical and zooarchaeological data to create data on diet through the phases of the Formative period. McCormack (2002) studied patterns of sedentism in relation to the formation of corporate groups at La Joya.

In the late 1990s, two relatively large scale surveys were undertaken in the southern Tuxtlas foothills. Killion and Urcid (Killion and Urcid 2001, Urcid and Killion 2008) conducted a survey of different physiographic zones in the southern Tuxtlas in and around the Hueyapan River drainage. Their intensive "siteless" survey carved several survey blocks out of a very large area. In general, they found a rather different settlement pattern from what was found in the Catemaco Valley (cf. Santley and Arnold 1996, Killion and Urcid 2001). These differences may be partly an artifact of different survey strategies, but it seems that population and political power was more centralized in the mountains and distributed over several localities in the Hueyapan area. Lowland settlement patterns were more continuous with monumental architecture dispersed throughout their survey area with a few concentrations that acted as centers for the survey region. Just southeast of the Hueyapan survey area was Laguna de los Cerros, a large Classic period center (Borstein 2001, Cyphers n.d.). Cyphers (n.d.) conducted research at Laguna de los Cerros. Later, Borstein (2001, 2005) undertook a survey of a large area around this regional center and non-contiguous blocks distributed over a large swath of land connecting it to Symonds (2002) survey area around San Lorenzo.

Arnold and Venter have recently taken strides to define the Postclassic period in the Tuxtlas. Arnold started research at Agaltepec (Arnold 2007, Arnold and Venter 2004) because materials and structures identified by Valenzuela (1945a) and later by the Tuxtlas Region Survey (Santley and Arnold 1996) were promising to gain a better understanding of the Postclassic period. That study helped to identify ceramic types and elements of the obsidian technology that could be used to date surface collections to the Postclassic. Venter (2008) continued to focus on the Postclassic period with her research at Totogal, an Aztec tributary during the Late Postclassic that was later occupied by the Spanish.

Most recently, Arnold began to intensively survey and excavate Teotepec along the northwest shores of Lake Catemaco. Teotepec was occupied for a long time, but its florescence was during the Late Classic. This site's importance likely increased as political control at Matacapan began to wane.

The history of archaeological research previously conducted in the Tuxtla Mountains provides a solid comparative foundation to undertake the TVAS. Included in these prior investigations are some of the most detailed reconstructions of craft production and exchange, political organization at the polity level, architectural analyses, and reconstructions of diet known to Mesoamerica. The established ceramic chronology permits dating of surface collections, and the compositional sourcing analyses supply a reference dataset to reconstruct trade relationships. In short, the TVAS served to fill-in the gap among previous investigations so that a broad-scale comparison could be achieved.

SUMMARY

The natural environment of the Tuxtla Mountains strongly influences the settlement patterns and patterns of interaction discussed in the remainder of this dissertation. The largest and most politically important settlements tend to be situated along either the Tepango or Xoteapan River. The upland environments were less heavily occupied. Uplands were important for different reasons. They served as important ritual loci between the major settlements on the flood plains, and they may have also functioned as social and political divisions that partitioned the regional settlement into distinct social units.

As a whole, mound construction was much less prevalent within the Tuxtla massif than in the surrounding coastal plain. Part of the reason for this discrepancy is that Precolumbian Tuxtlecos often took advantage of the natural relief to construct their temples, residences, and other important architecture. The other explanation for this pattern may be explained by differing institutions of sociopolitical organization between the Tuxtlas and other groups in the Gulf Coast. Regimes in the Tuxtlas were certainly capable of mobilizing large amounts of labor for monumental constructions, as evidenced by the high concentrations of mounds at Matacapan, Teotepec, and Totocapan. If the centralization/dispersal of mound construction is used as a proxy for political centralization, it appears that there may have been a more clear demarcation between regimes in political centers and their subjects in the hinterland than observed in other Gulf Coast regions such as the Mixtequilla (Stark 1999), the Cotaxtla Basin (Daneels

2002a), or the southern Tuxtla foothills (Borstein 2005, Killion and Urcid 2008, Alfredo Delgado personal communication). In these other areas, mound density is much higher than within the Tuxtlas. It is unclear if this pattern is caused by the differences in topography between the mountains and the coastal plain, but the correlation is clear.

The distribution of natural resources available in the Tuxtlas also help to explain several patterns of interaction observed both within the region and with other regions of Mesoamerica. The high-quality Concepción clay sources have been proposed as one reason why Matacapan developed in the upper Catemaco Valley (Santley et al. 1989). Ceramics produced at this center were traded to many sites in the Tuxtlas (Stoner et al. 2008, see also Chapter 9), and possibly to Teotihuacan (Cowgill and Neff 2004:73). Basalt from Cerro el Vigía was used to sculpt the monuments of Tres Zapotes (Williams and Heizer 1965:4), and Cerro Cintepec, situated just outside the southeastern corner of the TVAS (see Figure 4.4), may have provided the basalt boulders for monuments found at Laguna de los Cerros and San Lorenzo (Williams and Heizer 1965:5). Other products – such as liquidambar, honey, feathers, and cotton – are known to have been demanded of the general region as tribute by the Aztecs. Finally, the lack of obsidian in the Tuxtlas provided the impetus to engage settlements in the central Mexican uplands in trade to procure this material, which was found at the overwhelming majority of sites recorded during the TVAS. In general, the presence and absence of different materials in the Tuxtlas pushed local groups to interact with others throughout Mesoamerica, and it likewise attracted foreigners to establish trade relationships with Tuxtla goups throughout the Precolumbian cultural sequence.

CHAPTER 5: FIELD AND LABORATORY METHODS

The remainder of this dissertation examines the developmental trajectories of the Catemaco and Tepango river valleys, drawing upon other research in the Tuxtlas region and the Gulf Coast extended region where appropriate. I begin the chapter with a detailed discussion of the field and laboratory methods. To facilitate reconstruction of the cultural landscapes presented in Chapter 2, I discuss methods for each landscape under separate sections.

PEDESTRIAN SURVEY

Pool and Ohnersorgen (2007) demonstrate the importance of comparability among survey strategies when developing a research design. Since I created this research design specifically for comparison with the "Tuxtlas Region Survey", my survey methods follow the first stage of their full-coverage survey strategy aimed at efficiently acquiring data over a broad area (Santley and Arnold 1996: see also Sanders *et al*. 1979). This research investigates broad-scale patterns of social organization, so the data need to provide a relatively large window into the region. In contrast, the cost and time involved with siteless survey strategies (Dunnell and Dancey 1983, Loughlin n.d., Pool and Ohnersorgen 2007 Stark 1991) would result in a coverage area too small to test the hypotheses advanced in this dissertation.

During March through June 2007, a team of three archaeologists and four local workers traversed a total of 120 km^2 in the Tepango Valley by walking transects spaced 50m apart (Santley 1991:2). Fifty-meter spacing ensured a large coverage area, but small hamlets may be underrepresented. Sites were initially identified by surface concentrations of material in plowed fields and monumental architecture (i.e., mounds). The project area is, however, covered mostly by pasture (Figure 5.1), which presented problems identifying sites. Where pasture predominated, sites were initially identified by mounded architecture and material concentrations in road cuts, footpaths, and fence lines. Surveyors additionally excavated shallow shovel tests on a 50 m grid to identify and collect material and to delineate sites (Figure 5.2). This grid spacing made it possible to

Figure 5.1. Photograph from the Acropolis at Totocapan, overlooking Plaza Group 1 on the Principal Terrace (facing southeast).

Figure 5.2. Photograph depicting the survey crew walking shovel-tested transects.

cover the entire region in the allotted time, but certainly some small hamlets may have been missed. Shovel tests were square and measured about 30 cm on a side but they did not exceed 20 cm in depth to conform to INAH restrictions on 'excavation'. Without the use of shovel tests, the number of sites identified would have been dramatically less. More importantly, for the TVAS region shovel tests permitted the delineation of boundaries for sites initially identified opportunistically (e.g., road cuts).

During the early weeks of the survey, materials recovered from each shovel test were bagged and labeled separately. It was quickly determined that this collection strategy, though providing advantageous horizontal control of collections, was not compatible with the total coverage goals of the survey. Subsequently, all materials from each transect were bagged together. This preserved 50 m spatial resolution on the grid axis perpendicular to the transect path, but not within transects. Transects ranged in length based on landform and modern division of land into fenced-plots. If landform permitted, surveyors did not reset transects with every field (i.e., property division). This also would have dramatically increased the time spent filling out paperwork. The length of transects therefore ranged between 100 m to 1000 km. After the identification and collection of a site, all field workers were consulted about the material identified within each shovel test along their transect to delineate site boundaries in the field. It must be stressed that once a site was identified, the artifacts for transects within those site boundaries were bagged according to the appropriate site contexts.

The use of discrete "sites" to characterize regional settlement patterns has been justifiably criticized by proponents of a "siteless" survey strategy (Dunnell and Dancey 1983, Loughlin n.d., Killion and Urcid 2001, Pool and Ohnersorgen 2007, Stark 1991). Principal among these criticisms is that traditionally defined sites involve many assumptions that are uncritically applied to archaeological settlements. The most problematic assumption of using the site concept is that human settlements were bounded spatial units. In many cases, settlement patterns are often continuous over a region (e.g., Stark 1991) so that identification of traditional site boundaries is impossible. In the Tuxtlas, though, settlement was much more spatially discrete than in the neighboring lowlands (Stark and Arnold [eds.] 1997). This may partially pertain to physiographic differences between the mountainous terrains of the Tuxtlas and the relatively flat topography of the coastal plain. However, there are segments of the current survey where materials were found distributed continuously over a very large area. Relatively continuous settlement distribution was identified in the southeastern corner of the survey area around Tilzapote (Site 139). Continuous material distributions were more common, but not always present, on the flatter lowlands in river valleys.

Site boundaries are important because they grant a measure of site size and importance within the regional system. I delineate site boundaries based on an absence of material or dramatic decline in the density of material between artifact concentrations over a space of more than 100 meters. Additionally, I described site boundaries on a continuum between interpenetrating and discrete in an attempt to partially reconcile the fact that materials were more evenly distributed over space in certain contexts. discrete site boundaries are well demarcated from their neighbors with a buffer zone of material-free space between them. At the other extreme, interpenetrating site boundaries are cases where central nodes of high material density can be identified with a drop in density between them, but materials are not completely absent. Most sites had relatively discrete boundaries, which probably reflects the rugged terrain. In the lowlands surrounding the Tuxtla Mountains, settlements tend to be relatively continuous over broad areas, which, in part, has led to the preference for "siteless" survey strategies in those areas (Killion and Urcid 2001, Loughlin n.d., Pool 1997, Stark 1991).

Many variables were recorded for each site (Appendix A). Site locations were recorded on topographic maps, with UTM coordinates provided by a hand-held GPS. The elevation of each site was read from the topographic map. The type of landform (e.g., ridge crest, ridge spur, side slope, bench, floodplain, floodplain terrace) was recorded. Vegetation type was recorded because it is important to understand the surface visibility, soil condition, and post-depositional processes. Soil color and texture were subjectively evaluated (no Munsell soil charts were used). Site size was figured as the area where material concentrations were observed on the surface or through shovel tests (see above). An initial assessment of site size was made in the field, but area estimates were often altered in the laboratory as shovel test data was processed. A sketch map of all sites was made on the site form or a separate piece of millimeter-grid graph paper. A narrative description was provided and at least one photograph was taken showing the general location and surroundings of each site

Where surface visibility was good, two types of collections were made at each site: 1) a general collection of all obsidian and up to 100 rim sherds (following Stark 1991); and 2) all portable artifacts from a 3x3 m control square for density comparisons (Santley 1991) (Figure 5.3). Where material densities were sparse only a few rims could be collected. In such circumstances surveyors either collected all ceramics or until one or two large collection bags were full. The indiscriminate collection of all materials was necessary to ensure accurate representation ceramic types present at the site. Unlike 3x3 m collections, general collections are not useful for density comparisons. The archaeologist recording the site did, however, make subjective density observations on the site form. After initial inspection of the ground surface, the 3x3 m collection square was placed in the area of highest material density. On large sites, multiple 3x3 m collection squares were executed to provide a representative horizontal sample of the total site area.

On sites in pasture, at least one shovel test was horizontally expanded into a 1x1 m collection square. This collection square bolstered the number of artifacts recovered and provided a standard unit of intersite comparison[1] for sites with poor surface visibility. It was discovered that removing the sod from pasture was very labor intensive and did not result in robust collections. Material was frequently buried deeper than 10-15 centimeters below surface. This is attributed to alluvial and colluvial soil deposition in the absence of agricultural plowing or bioturbation.

On large sites, many collections (both standardized and general) were made at different locations to gain an idea of how that site grew and declined over time. Each collection was placed in a separate bag with its own descriptive tag. The tags themselves contained all provenience information as well as the date, the archaeologist responsible for the collection and a bag number, which was later assigned in the laboratory.

Architectural features are very important for this research. Mounded architecture was therefore carefully mapped using a Brunton compass and reel measuring tapes. Five UTM points were also taken with a handheld GPS for each mound: one in the center and

[1] This was subject to landowner permission, which was granted in most, but not all, cases.

Figure 5.3. Photograph of workers collecting materials from a 3x3 m square associated with a mound (Site 24 [Chilchutiuca] facing west).

four delineating the sides of the mound. Every mound was photographed from at least one perspective. To characterize the variability of mounded architecture, length, width, height, shape, and building material were recorded. For formal architectural complexes, where multiple mounds were arranged around a plaza or otherwise oriented in relation to each other, the orientation of the group as a whole was also recorded. Some sites displayed evidence of landscape modification. Landscape modification may involve a considerable amount of labor, which was likely organized by elites. These features, including artificial terraces, modified hills and ridge spurs, and borrow pits/depressions (which may have functioned as pools [Stark 2003]) were also carefully mapped. All mapping was performed first on paper, and then digitized in ArcView 9.2.

CATALOGING, CURATION, AND ANALYSIS OF MATERIALS

In the field laboratory, all materials were washed and stored in crates according to site. A master bag registry was maintained and updated daily that contained all provenience information for each collection. Materials were kept in this state while analysis was underway. After the completion of analysis, all materials were deposited in the storage buildings at Tres Zapotes with the permission of INAH and Christopher A. Pool (director of continuing investigations at the site).

CERAMIC ANALYSIS AND CHRONOLOGY

Sites were assigned to phases of occupation based on relative proportions of diagnostic ceramic types within each collection (Figure 5.4). Ceramic analysis was performed by Wesley D. Stoner, Sara Luz Rosiles Hernández, Hugo Alberto Huerta Vicente, and Blanca Rosa Moreno Díaz. The ceramic typology follows that established by previous research in the area (Pool 1990, personal communication; Ortiz 1975, personal communication; Ortiz and Santley 1988; Venter 2008, Chapter 6) (Appendix B). This system of ceramic classification combines technological characteristics (e.g., paste texture, paste color, temper type) as well as stylistic variables (e.g., vessel form, decorative techniques, surface treatment) to define wares, types, and varieties. The ware is the most inclusive level of analysis and generally divides the assemblage based on the coarseness of paste, type of temper, and generalized color categories. Types are defined within each ware based on variation in color, surface treatment, decoration and sometimes vessel form. Varieties characterize subtle variation within types usually pertaining to surface treatment and decoration. Placement of a ceramic sherd into types and varieties is subject to a certain degree of analyst bias. For this reason, I reviewed all classifications until satisfied that all analysts were assigning sherds to categories in a consistent manner.

Most of the ceramic types defined in the TVAS analysis were utilized over several phases of occupation (Ortiz 1975, Ortiz and Santley 1988). Even those with shorter use-histories typically spanned at least two phases. Despite these limitations, certain types occurred primarily in a single phase with minor uses during other time periods. These are the types used to assign collections to time periods. Additionally, each collection was examined individually to evaluate the relative proportion of


Figure 5.4. Example of ceramic sherds recovered within the TVAS, Thin-Walled Polished Black with fine orange or gray paste (Code 2122.4).

diagnostic ceramics present. In the end, most collections were multicomponent. In the following chapter I offer a detailed description of these ceramic diagnostics and non-diagnostic types associated with them for each phase of occupation. Dated collections were plotted on a map of the survey area and site boundaries were drawn for each time period. A total of 176 sites were dated to phases based on 601 surface collections and thousands of shovel tests.

The ceramic chronology used to date sites for the Tepango Valley Archaeological Survey contains nine phases based on previous research at Totocapan (Ortiz 1975), the Catemaco Valley (Ortiz and Santley 1988), Totogal (Venter personal communication), and Tres Zapotes (Pool 2007). The settlement chronology within the Tepango Valley has previously been established by Ortiz (1975) by his excavation at Totocapan (El Picayo). I maintain his phase names, but correlate them with more broadly used time periods for comparison purposes. The Formative periods are divided into Early Formative (1400-

900 BCE), Middle Formative (Initial Picayo phase[2]) (900-400 BCE), Late Formative (Picayo phase) (400 BCE-100 CE), and Protoclassic (Chininita phase) (100-300 CE). The Classic currently has three periods/phases: Early Classic (Santiago A phase) (300-450 CE); Middle Classic (Santiago B phase) (450-650 CE); and Late Classic (Chaneque phase) (650-800? CE). The Postclassic (800?-1521 CE) in the region is best known from research performed by Venter (2008) at Totogal and Arnold (2007) at Isla Agaltepec. The Early Postclassic (Vigía phase) (800-1250 CE) has been moved back in time to encompass what has been referred to as the late Late Classic by the Matacapan project. The Late Postclassic (Totogal phase) (1250-1521 CE) was a time best known from Totogal, an Aztec tribute collection center (Venter 2008). The separation of Early and Late Postclassic diagnostics is a recent event for the Tuxtlas.

CHIPPED STONE ANALYSIS

Almost all chipped stone artifacts recovered by the pedestrian survey were made from obsidian, with only a few pieces of chert represented. All obsidian was imported into the Tuxtlas from highland sources in central Mexico and Guatemala. It is therefore a good indicator of long distance exchange relationships. Obsidian was characterized based on source, tool form, and debitage category (Barrett 2003, Knight 1999, Santley *et al.* 2001). Technological analysis of obsidian artifacts also helps to characterize systems of stone tool production and exchange among sites within the Tuxtlas region. The following sections describe the methods employed to describe the source and technology employed for each stone artifact, as well as to identify production and exchange of stone tools.

The classificatory system was based on Barrett (2003), with some modifications taken from Knight (1999) (Appendix C). Two major reduction trajectories are considered for chipped stone artifacts. Prismatic blade/blade core technologies dominated the chipped stone industry during the Late Formative through the Postclassic time periods, with increasing use through time. Flake core and bifacial reduction

[2] Parenthetical phase names are based on those assigned by Ortiz (1975) based on work at El Picayo.

technologies are the second industry considered in this dissertation. Recently, Knight (personal communication) has identified bipolar reduction at Tres Zapotes. No clear examples of bipolar reduction – including opposing waves of force and bulbs of force and/or crushed platforms on both ends of the piece – have been identified within the TVAS area. However, some sites produced a large amount of angular shatter with evidence of crushing, which can be produced from the tremendous percussive force applied in bipolar industries. Because of the lack of direct indicators of bipolar reduction, it is not systematically examined in this research. Future studies in this region should make an effort to better characterize possible bipolar techniques, particularly at Site 95 where an abundance of angular shatter was identified.

Prismatic Reduction Trajectory

The prismatic blade industry (Figure 5.5) involves the preparation of a polyhedral core, from which hundreds of long, thin obsidian blades could be detached (Clark 1985, Clark and Bryant 1997, Healan 1986, Hirth [ed.] 2006). In the following classification system, stages of reduction are generally divided into by-products of production

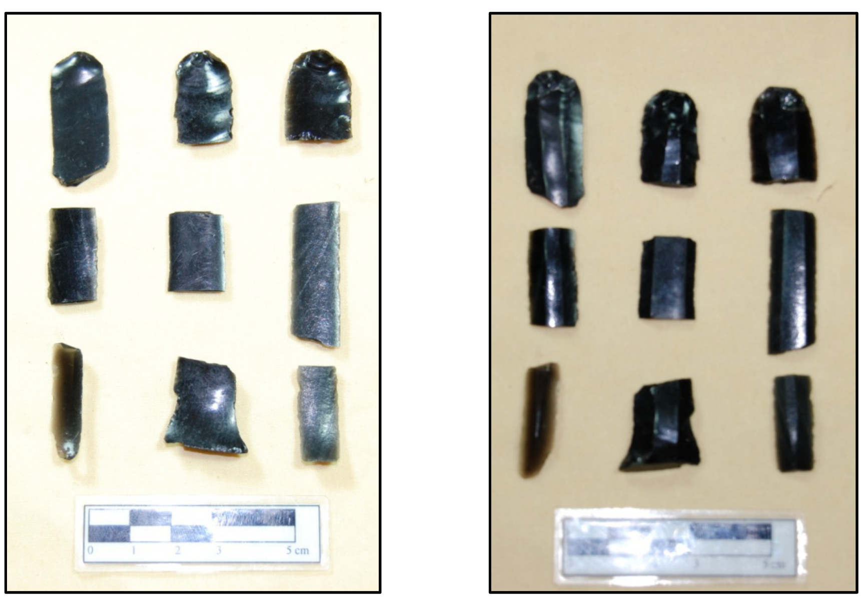

Figure 5.5. Typical obsidian blade fragments recovered from survey.

(macrocore reduction, polyhedral reduction, pressure core error, and blade core) and final products or tools (secondary blade, tertiary blade, blade tool, eccentric) (following Barrett 2003). Since this technological trajectory is detailed by Barrett (2003:64-71) I only summarize it here.

P-1: Macrocore Reduction. This artifact type includes all of the artifacts associated with the reduction of a nodule or block of obsidian into a macrocore, which serves as a stepping stone for further refinement into a polyhedral core. By-products of this stage include macroflakes, macroblades, and percussion blades, some of which may retain some cortex if a cobble was the original source material. Presence of these by-products at sites in the survey region is an indicator of early-stage stone tool production. It also indicates that the site in question may have been responsible for importing raw material into the region.

P-2: Polyhedral Reduction. Polyhedral core reduction takes place during the next stage. An initial series of blades are produced during this stage, as well as several categories of flakes designated as core maintenance debris (e.g., ridge blades, platform trimming flakes, core trimming flakes, and core rims). Flake scar ridges begin to take the form of prismatic pressure cores, but they are not yet parallel. An initial series of blades is removed during this stage, but these are secondary products and regarded as production by-products. These initial blades tend to be small with non-parallel sides and irregular crossections.

P-3: Pressure Core Error. This type is characterized by errors made during the manufacture of prismatic blades. Types of errors included in this category are hinge and step fractures, plunging blades that remove the distal end of the core, distal core truncation flakes, erroneous removal of all or part of the platform, and longitudinal blade core fragments. These are all unintentional by-products and direct evidence of prismatic blade manufacture.

P-4: Blade Core (exhausted/nonexhausted). This type includes all cores, exhausted and nonexhausted. Exhausted cores are those that were worked until no more blades could be removed because of its small size or because the core was broken. Nonexhausted cores are those that were discarded or cached before exhaustion. All cores, exhausted cores, and core fragments are also direct evidence of blade production.

Cores were rarely found on survey, but a single exhausted core could have produced hundreds of blades.

P-5: Secondary Blade. Secondary blades are finished tools removed from polyhedral cores prior to prismatic blade production. They are a less desirable product than the finer prismatic blades, but nonetheless produce a good cutting edge. Macroscopic use wear analysis in the current study shows that these blades were frequently utilized in the Tepango Valley, which supports the interpretation that secondary blades were final products. Use of secondary blades may also indicate restricted access to tertiary blades (Barrett 2003:66, Clark 1997). The dorsal ridges on these blades may not be perfectly parallel to the lateral edges like they are with tertiary blades, but the shape, thickness, and cross-section form are more standardized than initial series blades. They frequently display triangular cross-sections, but prismatic cross-sections are also present.

P-6: Tertiary (Prismatic) Blade. Prismatic blades are the final desired product of the prismatic blade core reduction trajectory. These are long thin blades with a razor sharp cutting edge on both margins. The name "prismatic" derives from the cross section of a snapped blade. These blades display between 1-3 dorsal ridges that travel along the blade parallel to its edges. They tend to be the thinnest of all the blade types with a low standard deviation (< 1 mm). Prismatic blades were often hafted to wood, but use wear in the current study shows use along both edges for many blades.

P-7: Blade Tool. Blades were often modified into other tool types. Several triangular projectile points were found made from obsidian (primarily Pachuca and Pico de Orizaba) blades. These have been referred to as "Tula" points (Coe and Diehl 1980), but they do not necessarily represent interaction with Tula or an Early Postclassic date. The fact that they are most frequently made from Pachuca or Pico de Orizaba blades does, however, suggest that they were produced during the Postclassic when use of these sources was at its peak. Other types of blade tools were stemmed and notched blades and needle blades. The latter of these types were bifacially retouched and probably used as drills.

P-8: Eccentric: This includes any blade or other stone artifact that was chipped to form a geometric or zoomorphic shape.

Flake Reduction Trajectory

The flake reduction trajectory was used to make expedient flake cutting tools and more formal stone tools such as scrapers, projectile points, and bifacial tools (Figure 5.6). Like the blade core reduction, obsidian was the most common material used to make all of these tools. This process involves the removal of flakes from a core primarily by percussion, but pressure flaking was used to retouch edges and to finish bifaces. Only five formal projectile points were recovered by this research, so it is inferred that the majority of the flake reduction strategy was to generate flakes that were used for expedient cutting purposes. Like blade reduction, flake reduction involved by-products (cortical debris, percussion debris, pressure debris, and core debris) and final tools (simple flake, retouched flake, generalized tool, and formal tool). The implement may be a simple flake and therefore difficult to differentiate from unwanted debris. Use wear is really the only way to differentiate between the two.

F-1: Cortical Debris. Cortical debris was rare for any chipped stone artifact in the survey region. This is due to the fact that most obsidian was imported into the region already refined somewhat. When transporting stone over long distances, it makes sense that the porters would want to make the object as light as possible. Cortex is the

Figure 5.6. Examples of obsidian bifaces recovered on survey.

weathered, sometimes rough, exterior of stone materials that is undesirable for producing a sharp cutting edge. Cortex was removed prior to creation of stone tools in nearly every lithic technology throughout the world.

F-2: Percussion Debris. Percussion debris includes all debris that was removed from the core by a striking force through the application of a "hammer". Such flakes will retain a "bulb of force" at the platform of impact, with *Hertzian cone* (Whittaker 1994) ripples extending out from the impact point. Great force applied to detach these flakes may also create "hackles", which radiate from the point of impact in straight lines. Flakes can be detached through striking a core held in a "free hand" with a hammer held in the other hand, or through a hammer-and-anvil technique that creates bipolar flakes. Bipolar flakes have evidence of percussion at both ends of the flake. Force is applied by striking the top of the core. This force travels through the other end of the flake and reflects off of the anvil, which creates a second, usually smaller, bulb of percussion and Hertzian cone at the distal end.

F-3: Pressure Debris. Pressure debris is usually produced as part of a bifacial or unifacial reduction strategy where formal tools are the desired result. The detachment of a pressure flake involves application of force through a somewhat pointed tool that may resemble an awl. The stone is not struck, but instead pressure is applied until the piece pops off. Pressure flakes are usually quite small and lack the bulb of force and other characteristics of percussion flakes. Instead, a small "lip" may occur on the ventral side of the flake at the proximal end. Pressure flaking is the easiest way to produce a fine cutting edge on a biface or unifacial tool, and is usually used to finish or retouch them.

F-4: Core Debris. Core debris is any parent material that bears concave flake scars formed after the removal of a flake. This category includes flake cores and chunks.

F-5: Simple Flake. Simple flakes are unmodified flakes removed from a core, but not further reduced or retouched. Simple flakes have a platform with a bulb of force on the ventral side just below the platform, a dorsal side with at least one flake scare, and a ventral side with no flake scars. Some of the simple flakes have evidence of use, which indicates that they served as expedient tools. Simple flakes may also be by-products of formal tool production of shaping of prismatic cores. The latter suggests that core shaping in the prismatic blade-core trajectory may be underrepresented in the assemblage due to a difficulty in differentiating it from simple flake debris.

F-6: Retouched Flake. A retouched flake is a simple flake with intentional sharpening or retouching (a series of contiguous pressure flakes) on one or more edges. This is not to be confused with unintentional edge modification through use. Retouched flakes are not formal tools, but exhibit use beyond a simple utilized flake.

F-7U: Generalized Unifacial Tool. Generalized unifacial tools exhibit flake scars only on the dorsal surface while the original ventral surface remains mostly unmodified. These are not worked into preconceived or standardized forms, like formal tools, and instead likely had varied functions.

F-7B: Generalized Bifacial Tool. Generalized bifacial tools are rough bifaces that served generalized cutting and chopping functions. They are worked on both surfaces and may display heavy use depending on tool function.

F-8: Formal Tool. Formal tools have a specific function and consist of things such as scrapers, projectile points, drills, and gravers.

GROUND STONE TOOL ANALYSIS

All ground stone tools, sculptures, and petrogylphs were photographed and described in the field, but some specimens were brought back to the laboratory (Figure 5.7). These are currently curated at the laboratory at Tres Zapotes.

Primarily finished tools – stone axes, celts, *manos* and *metates* –were recovered from the pedestrian survey. These artifacts are expected at most residential sites throughout Mesoamerica. Some large basalt flakes were collected on a few sites, which are evidence of early stages of production. However, to characterize the groundstone tool production and exchange requires more intensive study including excavation and micro-lithic analysis. There are consequently few data to characterize ground stone tool production for the survey area.

The system of groundstone tool classification identifies the raw material type and places each piece into a typology (Appendix D). This typology characterizes each piece


Figure 5.7. Example of groundstone artifacts typically recovered on survey.

by types and varieties. An example of a type would be "*metate*". Different varieties within the *metate* type are defined based on its form attributes. For example, each *metate* was described based on the shape of the grinding surface, the corners, and the type of footing. This system of classification was adapted from the analysis at Tres Zapotes (Pool personal communication 2007, see also Kruszczynski 2001).

FIGURINE ANALYSIS

Figurine style was assessed by Wesley D. Stoner based on previous research (Follensbee 2000, Weiant 1943). A large amount of the research on Tuxtlas figurines has focused on the Formative period (Follensbee 2000) and Teotihuacan-style (Kann 1990, Pool and Stoner 2005, Santley et al. 1987) figurines found within the Catemaco Valley and at Tres Zapotes. Diagnostic figurine types were extremely rare among the TVAS surface collections (Figure 5.8). When possible, field crews photographed figurines from private collections. All figurines were characterized by paste type (using ceramic types), technology (molded or modeled), part (body part or other [such as headdress]), type (based on established figurine types) and weight. A narrative description was provided for each figurine.

Figure 5.8. Examples of figurines found on survey.

SPECIAL OBJECT ANALYSIS

All special objects were extensively described and photographed. Because this artifact category encompassed a wide variety of objects, no set classification system was employed. Instead, material, morphology and hypothesized function were described. Examples of special objects were clay whorls, bark beaters, fish “net sinkers”, clay beads, ear spools, and seal stamps.

RECONSTRUCTING LANDSCAPES

The methods detailed above describe the collection and processing of raw settlement data. To examine disjuncture in the Tuxtla Mountains, political, economic, symbolic, and ritual landscapes must first be reconstructed. Landscape approaches in archaeology have typically lacked a standardized vocabulary of analysis. I employ measures of social networks developed and defined by social network theory to standardize my analysis of landscape. These measures do not quantify either the perception or imagination of space, but they do help to characterize experienced space.

Social network theory examines how nodes (i.e., agents, sites, collectivities) interlink to form networks (Barabási 2002). Each of these measures can be applied to describe the spatial experience of all four institutional landscapes described below. My use of network measures, therefore, helps to standardize institutional landscapes for ease of comparison.

Centrality is a measure that pertains to the power any single node has within a network. The degree of centrality can be conceived of as a continuum between central and peripheral. Central nodes display a much greater number (or higher degree) of links than any other node in the network. However, the position within the network is also very important. A node positioned between two clusters may have the advantage of being able to indirectly access more nodes; such is the case with gateway communities (Hirth 1978) or groups positioned on boundaries between two or more distinct groups. Therefore, I consider a measure of *betweenness* to modify the analysis of centrality.

While centrality pertains to the position and influence of a node in the network, network *centralization* is a measure of the entire system. Centralization varies on a continuum between centralized and dispersed (e.g., Blanton et al. 1993; Borstein 2005; de Montmollin 1989; Sanders et al. 1979, Santley 1994). I modify this measure based on the ranked importance of the central network node, which, in the case of a regional center, is based on its size and monumentality (discussed below). An example of a centralized network would be a settlement hierarchy integrated by a primate center (Santley 1994). In centralized networks, deletion of the central node would cause the system to fail and fragment into a number of segmentary clusters. A dispersed network, on the other hand, is one that either has several central nodes of equal importance or that does not contain a single node with a disproportionate number of links in the system. Dispersed networks may be characteristic of political authority in a region of relatively autonomous and equally-sized city-states (Small 1997). Unlike their centralized counterparts, dispersed networks do not have a single point whose deletion can cause system-wide failure. Centralization, or lack thereof, has frequently been used to characterize political organization in archaeological research (Chase and Chase 1996, Crumley 1995, Gledhill et al. 1995, Fox et al. 1996, Sanders et al. 1979), but it can more generally be applied to all of the landscapes examined below. Scale of analysis will certainly affect measures of centrality. Within the Classic Tuxtla Mountains for example, Matacapan was a primate center within the Catemaco Valley, but it is one of three roughly equal sized centers in the Tuxtlas region (which I use to encompass the surrounding lowlands).

Radiality measures the degree to which a node provides novel information or influence throughout a network. All ancient world-systems had nodes that exerted some radial influence throughout the network, but the measure of radiality must be qualified by two other measures: reach and cohesion. *Reach* is the degree to which one node can directly or indirectly contact or influence another node in the network. Reach therefore pertains to the distance a radial line of influence penetrates into the network. Radiality and reach in combination can be used to differentiate a macroregional core and a regional center, for example. *Cohesion*, on the other hand, refers to the degree nodes are directly connected to each other within a network. Where every node is linked to every other node, a high degree of cohesion is indicated. Because of the cost-distance (e.g., Drennan 1984, Hare 2004) and logistical concerns (e.g., Drennan 1984, 1990; Hassig 1985; Stein 1999), I argue that most local and regional networks in ancient systems display a greater level of cohesion than is possible at the macroregional scale. While a core may exert radial influence into the periphery, it is likely that neighboring groups in the periphery display a higher degree of cohesiveness with each other than with the core. However, this may vary depending on whether political, economic, symbolic, or ritual networks are in focus.

World-system integration can be discussed in terms of bridges between local systems. A *bridge* in network theory is an "edge" (or line connecting nodes) that link two or more segments of the network such that its deletion would isolate them into discreet networks. Bridges among local and regional systems in ancient states are typically linked through central nodes, which are often elites (or their offices) in regional centers who provide a high degree of local structural cohesion.

At the edges of cohesive networks (i.e., cliques), one can characterize boundaries in different ways. *Boundedness* is a measure that varies between sharply bounded and a more gradual interpenetrating gradation (e.g., Blanton et al. 1993, Parker 2006). A sharply defined political boundary may be demarcated by an uninhabited buffer zone or fortifications. Though political authority is not exercised across such a boundary, economic and social networks may interpenetrate the otherwise discreet polities, an example of disjuncture. Graded or interpenetrating boundaries, on the other hand, may be difficult to identify because they may seem like a continuation of the network. An example, though, may be two market territories that run together. Settlements in the center of the two territories are free to attend either market even though they may sell the same things. What helps to distinguish a graded boundary between two local networks or systems is a higher degree of cohesiveness within each cluster than between them. Boundaries can also be characterized based on their *permeability* (Blanton et al. 1993, Parker 2006). Permeable boundaries permit the movement of people, objects and information between networks, often through bridges located at the margins of the network. Impermeable boundaries prevent such movements.

All the network measures discussed above are estimated through a variety of quantitative and qualitative techniques that will be further discussed in the sections below. All network measures discussed above are relative.

SYMBOLIC LANDSCAPE

The symbolic landscape is composed of signs that are consciously and subconsciously employed by different groups to express their identities. These signs can be passively infused into the material cultures by producers, or actively manipulated to achieve some social or political end (Gosselain 2000). The experience of the symbolic landscape is one that defines ingroups and outgroups through the symbols they employ. The use of Teotihuacan symbols by elites at Kaminaljuyú, for example, had political implications that referenced a connection with Teotihuacan (the professed ingroup of some elites) while simultaneously contrasting themselves with their subjects (the outgroup). The symbolic landscape is very important for reconstructing the other three landscapes.

To examine how different signs and expressions of social identity are layered together, archaeologists need to consider the entire stylistic corpus of material culture employed by a predefined population (i.e., the study area) over space and time. This consists of highly visible decorative motifs as well as more technological aspects of material identities, such as their form and composition. Decoration can be easily emulated and consciously manipulated (Gosselain 2000), while forming techniques and composition are typically, but not always (Arnold 2003, M. Stark et al. 2000), more stable. The two aspects of style often combine in different ways, such as the union of foreign symbols with local forms and paste recipes. For example, figurines executed in the Teotihuacan-style at Matacapan (Pool 1992b) and the Cuitzeo Basin, Michoacán (Filini 2004) blended with more local attributes. This indicates a fusion of the consciously negotiated aspects of identity and the more subtle and mundane aspects of identity.

Any significant patterning of material culture on the landscape can potentially indicate social connections or boundaries. Recognizing social boundaries is difficult unless style zones are evident. A style zone is a geographically defined area displaying a concentration of a particular style. Such could be the case with an enclave positioned within a larger city, or a polity within a region. Style zones do not necessarily cover a single contiguous space, they may occur at specific nodes or clusters of nodes on the landscape. The identification of style zones is based on objective data, but interpretation of their meaning is very subjective. To balance the subjectivity involved with reconstruction of social boundaries, numerous lines of evidence must be interrogated.

A first step in evaluating the symbolic landscape for the TVAS area comes in the discussion of the regional chronology in Chapter 6. I combine the presentation of diagnostic and non-diagnostic ceramic types with a distributional analysis. I examined the spatial distributions for all ceramic types and special vessel forms using ArcGIS software. Significant patterns represent potential social boundaries that will be evaluated later in the dissertation. Where a ceramic type, form, or decoration is pervasive throughout the region, a shared and stable cultural identity underlies more dynamic social interactions. Style zones imply social connections among nodes. Of course, these connections comprise a wide variety of social distinctions (e.g., class, political faction, gender, kin group) that can only be reconstructed with contextual data. Social connections that create similarities in material culture among nodes in network could range from simple lines of communication to political alliances. Obviously, the symbolic landscape does not stand alone, it permeates all the other landscapes considered below.

While distributions of different ceramic types are embedded in the settlement distribution maps presented in Chapter 7, the distributional analysis presented in Chapter 6 is more detailed and specific to each ceramic type.

A second step toward reconstructing the symbolic landscape is presented in Chapter 8. I conducted a motif analysis of all decorated sherds for the TVAS, from simple line incisions to complex combinations of multiple motifs. Motif analysis followed similar research conducted by Venter (2001, 2008) at Tres Zapotes and Totogal. Designs are composed of motifs, which in turn are composed of elements (Rice 1987:244-252). Elements are the smallest unit of a design and consist of simple shapes such as lines, triangles, circles, spirals, or steps. Elements combine to form motifs such as triangles hatched with straight lines. I used Venter's (2001, 2008) motif codes as a starting point and added variations detected in the TVAS as needed. All decoration (incision, engraving, slipping, painting, surface treatment) on pottery collected during the TVAS was recorded. Simple decorations, like a single line incision traveling along the rim of a bowl, were simply coded in the database after several instances were drawn. All complex designs incised or painted onto pottery were drawn and many were photographed. All of these designs were coded into a database and explored for temporal and spatial variation using ArcGIS software as described in the previous paragraph. Unfortunately, the TVAS ceramic assemblage produced only a few significant spatial patterns in motif distribution. This is due in part to the poor condition of motifs collected from surface and the fact that the assemblage consisted of 176 sites occupied over 2400 years time. However, the observed patterns are significant for interpreting both the symbolic and political landscapes. One stylistic distributional pattern in particular centers on Totocapan and spreads throughout the TVAS in a radial pattern that falls off in density with distance from the center. I reconstruct from this that Totocapan was the source of either the material or the ideology depicted on the ceramic vessels and may have been used to promote its political ideology.

Other sources of stylistic information that facilitate reconstruction of social groups in the region are figurines, stone monuments, petroglyphs, and architecture. In all cases, these elements of style are compared to published literature within the Tuxtlas region.

POLITICAL LANDSCAPE

Settlement patterns reflect various political, economic, physiographic, logistical, and social concerns. In this section, however, I attempt to tease out the political aspects. There is no doubt that the tools I develop in this section reflect economic, social, and religious interactions, but I address those in the following sections.

Settlement Hierarchy

Sites were ranked into a settlement hierarchy for each phase of occupation based on their area, density of surface material, and number and type of mounded architecture. It is assumed that the area a site covers, measured by the surficial extent of a material scatter, is correlated with the number of people that lived at that site. The houselot settlement configuration used in the Tuxtlas (Killion 1987, Pool 1997; Santley and Hirth 1993) resulted in a lower overall population density compared to the central Mexican Highlands. However, urban settlements on the southern Gulf Coast did achieve rather high population densities. Archaeologists have typically inferred population density from the density of surface materials, assuming that more material equals more people (e.g., Sanders et al. 1979). There are many problems with this assumption. First, the duration of occupation positively correlates with material density, so densities must be figured based on the relative proportions of different phase diagnostic materials. Second, agricultural practices, surface vegetation, degree of erosion, and modern soil deposition can all inflate or deflate material densities observed on the ground surface. While surface material densities are of limited use because of these factors, they are the only factors that provide an estimate of relative occupational intensity. Residential house mounds are not a reliable unit to measure population density in the TVAS because they were relatively rare. In the lowlands surrounding the Tuxtlas, common residences were typically poised above mounded earth. This may have served the function of raising the house above the flood stage. The natural topography of the region made it functionally unnecessary to construct residences atop mounded earth.

Due to problems with understanding how postdepositional environments affect material density and difficulty correlating material density with a person per hectare number, population estimates are not measured in number of people. Instead, relative occupational intensity measures are derived from a combination of site area and material density. Material density is categorized based on the number of phase-sensitive ceramic sherds per collection made at a site. Because sites were collected at different intensities depending on access, opportunity, and size, simple density calculations of ceramics per hectare do not necessarily present a valid estimation of relative material density. Dividing the number of phase-sensitive by the number of collections at a site yields the average density of phase ceramics per collection. This figure is then multiplied by total site area to arrive at a relative estimation of population based on density-weighted site area. The density-weighted site area is presented side-by-side with raw site area for the rank-size plots detailed below.

While material densities informed decisions on how to classify a site in the settlement hierarchy, I tended to rely more on site area and mounded architecture. Site area is strongly correlated with population and more objective than population estimates. It is assumed that regional centers were likely the largest sites in a region. However, site size alone cannot be used to bestow administrative functions on a site. First, Drennan (1988) shows that population densities may be larger in villages than in centers. Much of the space within centers is reserved for civic-ceremonial functions and is non-residential space. Second, mounded architecture must also be present for consideration as a regional center[3].

I follow Pool (2008) in categorizing mounded architecture along several dimensions: form and inferred function, scale and monumentality, layout, replication, persistence and modification, and interconnectivity. Form refers to the overall shape of individual mounds, as well as their construction methods. From these physical characteristics, function is inferred based on established conceptions in Mesoamerican archaeology. On the Gulf Coast, for example, tall conical shaped mounds were typically temples; long mounds, which sometimes display an L shape, may have been either elite

[3] Early Formative centers may lack mounded architecture (Pool personal communication 2010), but few Early Formative diagnostics were found in the TVAS.

residences or administrative structures following the pattern seen in the Maya region; closely spaced parallel long mounds may have been ball courts; massive (or monumental) rectangular platforms may have been palaces or seats of political authority; and low platforms or dome-shaped mounds were probably residential. The quality of construction, coupled with scale, serve to indicate the importance of the structure within a site or region. Structures with inferred political or ritual functions were symbols of power. All regional centers defined as loci of ritual, administrative, and/or economic control should possess at least one instance of civic-ceremonial or administrative architecture.

Scale refers to the size of individual structures or formal plaza groups. Large mounds are significant labor investments in this area and time because the human individual was the basic unit of labor. The relative size of mounds is a direct function of the time and number of individuals required to construct them. Larger mounds therefore indicate command over greater populations of people. However, they may have been constructed in stages, which would complicate the interpretation of the amount of labor commanded at any point in time. Like the size of mounds, the scale of plazas delineated by formal mound arrangements reflects the number of people that could attend important civic-ceremonial events. As Pool (2008:125) argues, scale is affected by the perception of space.

Layout refers to formal arrangements of buildings into plans that have recognized intent for structuring the experience and perception of space. Layouts vary according to the forms of the individual mounds composing the formal architectural pattern, their spatial arrangement in relation to each other, orientation, collective function, and their openness. The variable of openness ranges on a continuum from open to closed. A closed mound group consists of a plaza surrounded by mounds, where an open mound group has a plaza where one or more sides present an unimpeded view of the surrounding landscape. The position of the open and closed sides in relation to other elements on the landscape may itself be designed to direct the perception of space of those experiencing it (discussed below).

Replication refers to the extent that the forms and layouts of structures are copied over space and time. Replication of form is necessary to build inferences about function.

Replication of layout, on the other hand, may indicate a common architectural materialization of a political and/or religious ideology. Replicated architectural layouts can indicate close relationships among political regimes or factions. Variation among formal architectural plans, on the other hand, may indicate individualism and competition (Pool 2008).

Persistence and modification refer to the longevity of an architectural plan through time. Stable plans may indicate stability of the political history of a settlement, where as modification could be an intentional manipulation of institutional memory undertaken by sequential political regimes (Ashmore and Sabloff 2002, Pool 2008). The latter would indicate a turbulent political history. The way in which buildings and spaces are experienced, perceived, and imagined can also shift over time even though the physical configuration in space does not. The Aztec reverence for Teotihuacan, as seen in their origin myths (Leyenda de los Cinco Soles), is an example.

Finally, interconnectivity refers to the degree formal architectural complexes acted in concert or in opposition to one another. Pool (2008:126) suggests that interconnectivity can be assessed according to distance between complexes, material evidence for interaction, and intervisibility. The latter variable invokes the view sheds from each complex and the degree that different architectural complexes were arranged to preserve or block lines of sight to each other.

Using site area, material density, and level of monumentality, each site is ranked in the settlement hierarchy. This settlement hierarchy closely conforms to the criteria established by Santley and Arnold (1996), but I leave out population estimates and instead use site area and material density-weighted site area for each phase. Population figures rely greatly on accurate correlation of people per hectare figures with the number of ceramic sherds found in collections. Such a task is very easy to overestimate or underestimate. Using simple area measurements also presents biases. For example, for the Initial Picayo phase in the survey region, Totocapan is smaller than Cruz de Vidaña, but the number of phase-sensitive ceramics at the former (n=163) is over six times larger than the same measure at the latter (n=26). To weight site area I utilize the density-weighted site areas as described above, along with raw site area to calculate rank-size plots and Mehta's ratio as well as the consideration of settlement rank.

I am generally more strict than Santley and Arnold (1996) in requiring at least one administrative structure or complex for small centers and more than one administrative structure or complex for large centers. For example, Ranchoapan was characterized as a large center despite the fact that it possessed only five mounds that appear to be house mounds (Santley 1991, Santley and Arnold 1996). While this may raise doubts as to the administrative functions of this large site, there is reason to believe that construction of an airstrip resulted in some mound destruction. A brief description of regional settlement types follows:

> *Large centers* typically cover 100 ha or more, and have among the highest material densities for a phase. More importantly, this settlement rank is distinguished by multiple administrative structures. The total mound count for large centers is much higher than any other settlement rank, and many different mound types are also present. Large centers serve important economic, ritual, and administrative functions for the sites in their hinterland, which can include every other settlement rank.
>
> *Small centers* typically range between 50 and 99 ha in size, but there are cases where this rank was assigned to sites that were much larger (112 ha) or smaller (35 ha). Material density generally falls into the moderate to heavy categories. Small Centers should possess at least one elite building or architectural complex. Elites in small centers served an intermediate role in the regional administrative hierarchy. They controlled small segments of the regional population and provided many of the same functions as the large centers. However, during many phases of occupation in the Tepango Valley, elites in small centers were likely subordinate to those in large centers.
>
> *Large Villages* range in size from about 25-49 ha. Two types of large villages were identified based on surface material densities. Large nucleated villages have a continuous scatter of moderate to heavy material densities. Large dispersed villages either have continuous light or scanty material densities over a broad area, or the distribution of artifacts over the site's area is patchy. Civic-ceremonial architecture is rare at large villages as they do not function as regional administrators. However, local community ceremonies would have taken place in large villages, so modest ceremonial structures may be present. Local decision making may be performed at these sites by village headmen. Depending on the population of the village and surrounding communities, this may correspond to a considerable amount of local political influence.
>
> *Small Villages* range in size from about 8-24 ha. Like the large villages, there are two types of small villages. Small nucleated villages have a continuous scatter of moderate to heavy material densities. Small dispersed villages either have continuous light or scanty material densities over a broad area, or the distribution of artifacts over the site's area is patchy. Civic-ceremonial architecture should be nearly absent at small villages, but a few of the sites in this category do contain modest mounded structures that probably served communal ceremonial functions.
>
> *Hamlets* are the smallest sites in the survey area. They consisted of relatively few houselots and generally cover less than 8 ha. Material densities cover the complete range presented in Table 5.1. Low house mounds rarely occur at hamlets, and civic-ceremonial architecture is completely absent.

Degree of Political Centralization: Rank-Size Rule

The relative size, monumentality, and position of regional centers to each other and to sites within their hinterland is considered an index of the degree of political centralization, ranging from a high concentration of political power at a single site to power sharing or competition between several regional centers. To examine this trend over time, a modified rank-size analysis is employed. Smith and Schreiber (2006) criticize Santley's use of rank-size analysis for the Tuxtlas Region Archaeological Survey (1994) because this analytical tool was originally intended to be applied only to cities. Santley included rural settlements in his analysis, which could have skewed his results. I use this tool as a *relative* index of political centralization and do not try to fit the patterns within predefined central place models as Santley has ably done (1994). It is recognized that this tool alone does not separate political from economic influences on settlement patterns. Rank-size analysis here provides the means to objectively characterize political centralization with the assumption that regime leaders at larger centers have more labor at their command. This surplus labor can, in turn, be converted to symbolic power and force in the forms of monumental architecture, public ritual, and military. The magnitude of difference between the size of centers is a common calculation most archaeologist conduct whether in the form of rank-size plots, simple arithmetic, or informally without quantitative justification.

Rank-size analysis plots the population of each site within the project area on a logarithmic scale on the y-axis versus site rank on the x-axis. The rank-size rule states that the "population of any community is equal to the population of the … first ranking community divided by the rank of the site in question (Santley 1994:250 – see also Berry 1961 and Zipf 1949)". Plotting estimated site population or area (in this case material density weighted site area) versus site rank on a logarithmic scale should reveal a straight downward-trending line, or log-normal distribution (Figure 5.9). This translates into a well-integrated hierarchy of political centers. A concave plot indicates a more centralized settlement system headed by a primate center that is much larger than any other regional center. A convex plot indicates that several centers of roughly equal size occupied the uppermost tier of settlement, suggesting dispersed political authority.

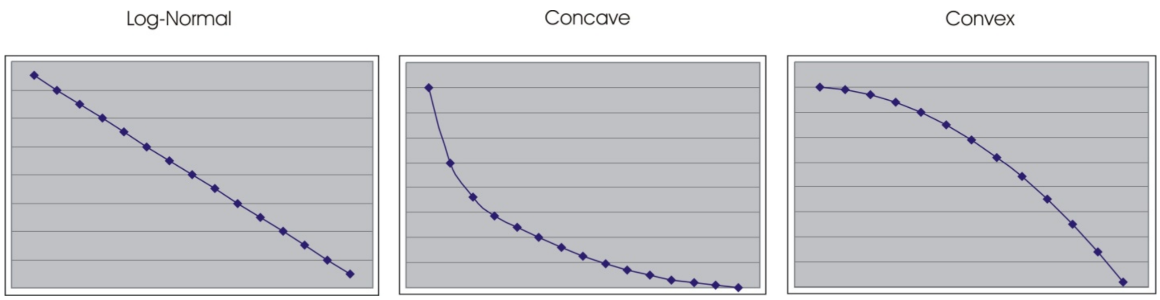

Figure 5.9. Idealized rank-size plots.

Most of the rank-size plots examined in this dissertation form composite curves. The largest four sites for each phase provide the best indication for political centralization within the TVAS area as a whole. I follow Santley and Richards and use Mehta's ratio (1964) to objectively quantify the shape of the curve among the top four centers in the region. This simple measure is calculated by dividing the population of the largest city by the sum of the top four centers including the largest (Santley and Richards 2007:199). Again, I use material density-weighted site area as described above rather than population. A result of 0.48 indicates a log normal distribution, divergences to the downside confirm a convex plot (i.e., dispersed) and divergences to the upside are more concave (i.e., centralized). Mehta did not use logged values to calculate his ratio, while Santley did. I follow Mehta's original formula and use raw site area values to calculate the ratio. Logging the values reduces the magnitude of variation, which has implications for the distribution of political authority in a region. Additionally, a log normal distribution for logged population/size figures is 0.30, not 0.48 (cf. Santley and Richards 2007).

Two more aspects of the rank-size analysis are informative. First, the slope of the regression line is representative of the magnitude of differences between the largest and smallest data points in the plot. The same number of points are used for each phase so slope is a good relative comparison of rank differentiation over time. Second, the correlation (r^2) measures the degree to which the data conforms to the log normal distribution. An r^2 value of 1.0 indicates perfect adherence to the log normal distribution. Low r^2 values indicate greater deviations from the norm, which can be used to evaluate the strength of the deviations detected from the rank-size plot.

Degree of Political Centralization: Relative Monumentality

To refine the rank-size results, the number and relative size of monumental structures at each center is considered. Monumental architecture (i.e., mounds) can be a geographic representation of political authority. Not all mounds have political significance. Two types of architecture are considered to reflect political centralization. Any formal architectural complex, where mounds are arranged according to a formal plan in relation to each other, is considered a potential node of authority on the political landscape. On the Gulf Coast, mounds are usually arranged around a plaza (discussed in Chapter 8). In additional to plaza groups, massive platforms have been suggested to serve as palaces where leaders resided (Borstein 2005, Daneels 2008a , Stark 2003). Massive platforms are taken by themselves as a node of political authority, but no site in the TVAS displays massive platforms unaccompanied by a plaza group. Ritual architecture, like temple mounds and ball courts, can inform the relationship among the political and ritual landscapes (discussed below).

The total number and size of public and administrative buildings should be concentrated in relatively few centers if political authority is centralized, but more evenly distributed if political authority is dispersed. Architectural plans also serve as a qualitative comparison of political relationships between valleys, as centers within the same polity tend to employ similar architectural symbols (discussed below). Because no excavation data are available for mounds, periods of construction and use are assigned to the dominant phase as determined through the ceramic chronology. Mound construction can, however, take place in stages over decades or centuries.

Degree of Political Centralization: Patterning of Regional Centers

Daneels has created a model of political interaction for the lower Cotaxtla Basin that I employ as a third measure of political centralization. The model is largely based on the relative geographic positions of primary, secondary, and tertiary centers within a political territory. Two patterns of interaction were observed, centralized and segmentary. The centralized pattern is one where the primary center is surrounded by tertiary centers and secondary centers occur at the margins of the polity. The tertiary centers are dispersed throughout the interior of the polity, but tend to be situated midway between secondary and primary centers. Both tertiary and secondary centers interact directly with the primary center, conforming to a radial model of influence. This pattern of interaction is inferred because tertiary centers are not closely held within the hinterland of secondary centers and that both tertiary and secondary centers lack some mechanism of social, political, or economic integration that is present in the primary center. Or, as Daneels argues, the secondary center possesses the same mechanisms of social integration but they are literally marginalized towards the outer boundaries of the polity thereby placing political competition at a distance. In the segmentary model, secondary centers are positioned on the interior of the polity and tertiary centers are positioned closely to secondary centers. Tertiary centers interact with secondary centers and only secondary centers interact directly with the primary center. In this case, the mechanism of social integration may be present at both primary and secondary centers, or the tertiary centers are spatially and politically obligated to attend events in their associated secondary center. Either case contributes to a decentralization of political authority.

Though both models depict situations of political subordination, the segmentary model implies a certain amount of autonomy for the secondary centers. In the Cotaxtla Basin, both primary and secondary centers have ball courts and standard plans. If the ball game was the basis of political authority, a large number of ball courts within a polity indicates dispersal of authority. The centralized pattern, therefore, places political competition from secondary centers (which also possess ball courts) at the margins of the territory. The success of this model depends very much on where the political boundary between polities lay. Daneels (2002a, 2008a) uses Theissen polygons to delineate territories for primary centers. I use a different approach.

Political Boundaries

Political boundaries can be difficult to estimate, but a combination of settlement characteristics can be revealing. In this research I use geospatial models to estimate political boundaries surrounding small and large centers in the southwest Tuxtlas. These models take into consideration the relative size of centers and terrain to modify traditional Theissen polygon analysis. The resultant "political territories" are treated as hypotheses that require more qualitative data to evaluate. Qualitative data on political relationships include similarities and differences in architectural plans, monumental art, and politically charged material culture style.

Underlying Assumptions of Geo-Spatial Models

With most of the techniques employed to estimate political boundaries, there are many underlying assumptions that must be addressed (e.g,. Hare 2004:802). First, implied within the application of most spatial political models is the assumption that polities occupy spatially discreet contiguous territories. Adam T. Smith (2004) criticizes this approach as mechanical absolutist ontology of space that views polities as units or cells on the landscape. In reality, polities do not occupy geometrically regular territories, nor are they restricted to contiguous spaces. Furthermore, to draw a polygon around a river valley and call it a unified political entity oversimplifies the political negotiations, alliances, and contestations that take place within those boundaries and with other polities in the region. However, critiques of geo-spatial models often go too far and ignore basic relational patterns over space and time that hold up even in the most complex polities. This basic center/hinterland pattern, for example, is a general assumption that smaller sites situated in the countryside adjacent to large regional centers typically display some type and/or degree of politico-administrative subordinance to that center.

The models used in this dissertation first attempt to identify to which center each site in the survey region pertains (where regime leaders reside). This in itself does not constitute a "polity", but it is a hypothesized political unit that can be pieced together or contrasted with others on the political landscape based on spatial distribution and the symbols that leaders employed. Of course the center/hinterland structure does not only pertain to political organization. Centers serve important economic and ritual functions as well. If ritual display, for example, is the principal path to political authority then the political and ritual landscapes are conjoined and together provide a strong influence on settlement patterns. Economic integration and marketing territories, on the other hand, may either be administered by a political regime or they may operate independently of the political regime. Center/hinterland patterns can arise around large centers primarily for economic reasons, but political elite may still benefit from taxation. Additionally, concentration of regional populations around influential centers creates a large labor force that regimes can mobilize for state and personal projects.

Once sites are allocated to centers using the geo-spatial models, qualitative variables such as architectural plans and material culture style, can be used to piece together political unification or fragmentation for each center/hinterland unit. This is largely an issue of how space within the regional political landscape is imagined by different regimes (discussed below). On the regional scale, allied or unified political segments need not be situated next to each other, and no spatial model can capture the political mosaic that may be realized by a detailed analysis of interpolity relationships.

A second assumption of spatial modeling is that political influence is positively correlated to the size of a center. Gravitational models directly project the size of a polity's territory from the area a regional center occupies or its population relative to other centers in the region. Again, the assumption is not always true. For example, not all state capitals in the US are the largest cities in the state (e.g., Harrisburg, Frankfort, Jefferson City, and Albany). By assuming a direct positive correlation, archaeologists may be attributing political supremacy to an economic or religious center. This is also a problem with the rank-size rule detailed above. Qualitative data can help to differentiate the roles of centers within the regional political landscape. On the other hand, political power in Prehispanic Mesoamerica was highly correlated with the number of people that could be mobilized to accomplish a task (e.g., warring a rival polity, building monumental art and architecture, or high level of production and exchange that can be taxed). Harrisburg politicians do not have to demonstrate their power by the size of their personal militias or large piles of dirt.

A third assumption is that ability to administer a political territory declines with distance from the administrative center. The logic behind this assumption is that territory size increases exponentially with radial distance from the center, thereby making it more difficult to administer. The inverse square function used to model the decreasing influence of gravity with distance applies here. Of course, this natural physical law is not directly applicable to polities that establish secondary centers in the hinterland to refocus administrative power. An administrative hierarchy of centers can overcome to an extent the limitations of distance. Empires often establish outposts at distant locations (Algaze 1993, Venter 2008, Wells 2005). The lands occupied by outposts are often highly contested territories. While the assumption that political power decays with distance from a center is valid, the archaeologist again must use other quantitative and qualitative measures to determine whether secondary centers functioned as administrators for the regime in the primary center or if they were in direct competition with it (discussed below).

A fourth bias is that for most geo-spatial models, the analyst must predetermine the centers to which other settlements in the region will be allocated. This involves reliance on basic settlement data such as size, political architecture, population, and monuments. However, differences between centers may not be clearly pronounced, which can complicate rank designations. In this research I begin by modeling center/hinterland territories for the lowest tier of centers first. Following this step, a variety of techniques are employed to infer which center/hinterland political units were sovereign entities and which were subordinate to larger centers.

Geo-Spatial Models of Political Boundaries

With these biases and assumptions in mind, geo-spatial modeling of political boundaries can be very useful. As Hare (2004:800) suggests these models "generate estimated boundary locations that can be tested against settlement and artifact distributional data. They do not provide certainty as to boundary locations, but they enable the examination of the roles of physiographic characteristics in the processes of political expansion and territorial domination." Archaeologists have employed many different methods to delineate political boundaries. The discussion that follows is not intended to be an exhaustive review of geo-spatial models. Instead, I present several models that have been employed in the examination of TVAS settlement data, leading up to the model that will be executed in Chapter 7.

Visual inspection of settlement patterns may be useful for delineating political boundaries if buffer zones can be identified. Buffer zones, or areas between polities with little or no human occupation, may indicate a concern for defense between hostile polities or for rural settlements to be near their respective centers. Not all polities maintained buffer zones with their neighbors, though. Settlement between polities may run together. In these cases a secondary or tertiary center may occupy the boundary area. Border centers may serve to regulate the movements of people and goods across the border. Buffer zones do not always demarcate political boundaries, nor does the lack of one indicate political unification. Fortifications may also be situated along political boundaries. Fortifications include garrisons, walled settlements, or hill-top fortresses, for example. While fortifications are a clear indication of a concern for defense against outsiders, not all neighboring polities in Prehispanic Mesoamerica were hostile and not all warfare was conducted on a scale that would require fortifications.

Another line of inquiry draws upon highly visible markers on the landscape designed to signify the beginning or end of a territory. Boundary markers can be manmade or natural features on the landscape. Mountain ranges and rivers frequently were used by ancient, and modern, polities to mark their territories. Mountainous terrain has the disadvantage of being rugged and difficult to traverse in the event that one polity needs to mobilize an army against another. It also increases the transportation costs involved in intra-polity administrative control and economic exchange. Lakes and rivers may have also served as convenient territorial limits on the landscape. Man-made markers may consist of monuments, symbols, mounds, or other signs posted at the interface between polities.

Theissen polygon models are one of the simplest methods for drawing political and economic boundaries in archaeology. Its application, however, relies on all four assumptions discussed above. The analyst specifies the centers around which polygons are to be drawn. Perpendicular lines are then drawn at the midpoint between each center. One limitation of Theissen polygons is that it makes no consideration for the size or relative power of each center. It was common in Mesoamerica for large centers to be surrounded by a number of smaller centers. Simple Theissen polygon analysis will therefore attribute a rather small territory to the large center. The analyst can partially bypass this limitation by drawing polygons for each administrative level of the settlement hierarchy. A layer constructed for primary centers will therefore determine the political allocation of secondary centers and their subordinates. However, this still requires the analysts to predetermine the settlement hierarchy.

A second problem with simple Theissen polygon analysis is that terrain is not considered. Political conquest, administration, and tribute extraction rely on the ability to efficiently transport armies, information, and goods over some distance (Hassig 1985, 1988). This is more easily achieved if the intervening distance between regime and subject is not occupied by rugged terrain. Theissen polygon analysis assumes an isotropic landscape. The Tuxtla Mountains are not such a landscape.

I employ a modified version of the Xtent model developed by Renfrew and Level (1979). This gravitational model was originally employed to weight resulting "political territories" by some relative measure, such as site size, population, or number of mounds. It, therefore, overcomes, to a degree, the first limitation of Theissen polygon analysis. To address the second limitation, I substitute cost distance estimations for Euclidean distances in the model. The formula is:

$$I_{xy} = (A_y)^a - (k \times D)$$

I	is the measure of influence of center y at location x
A	is the area of center y, which is measured in m^2
a	is an experimental constant that modifies the importance of A
k	is an experimental constant that modifies the importance of D
D	is the cost distance between location x and center y

The Xtent formula is designed to be calculated for a region from all centers. For each location (site or raster cell), the center with the highest "I" value "wins" and the location is allocated to that center's territory. The constants a and k are weights that modify the relative importance of site area versus distance. A low a (e.g., below 0.5)[4] and high k (e.g., a value close to 1.0) will produce an allocation which is basically the same as the unweighted Theissen polygon example above. The reverse of those values

[4] A value for a of 0.5 produces the same results as an inverse square function.

(e.g., a=0.9; k=0.1) will overweight the influence of the largest center to dominate the entire study region. These values are obviously very important to consider. I experimented with these weights until I arrived at a solution that project a political territory for each center relative to its size while maintaining each center as an autonomous center/hinterland unit. Holding the k constant, I then explore the effect of a on the data by nudging its value by small increments. If a hierarchy of nested political territories was present within the region, a small rise in the "a" value will depict the primary center as taking over secondary and tertiary centers. That is, the "I" value for the primary center at each subordinate center will be higher than the "I" value of the subordinate center for itself. If all centers were relatively equally powered within a region, raising or lowering the "a" value will not have much of an effect on the allocated political territories. Three or more alternative scenarios are delineated for each time period examined in this dissertation. These hypotheses are evaluated in Chapter 8 using architectural and stylistic data.

To calculate cost distance for my modified Xtent model I obtained a digital elevation module (DEM) for the region and created a slope raster in ArcGIS. The cells of the slope raster are populated with slope values. Using the slope surface, ArcGIS can calculate the path of least cost between two or more points on the landscape. I found through intensive investigation of these results that the built-in program overestimates the difficulty of crossing terrain in the project area. I calculated a Euclidean distance raster in ArcGIS and combined it with the cost distance raster. Through experimentation, I arrived at a weight ratio of 2:1 with Euclidean distance weighted more heavily than cost distance. The averaged distance ratio was subjectively determined based on my experience walking the terrain of the survey area.

Perception and Imagination of Polity

The evaluation of the geo-spatial model employed in Chapter 7 will be undertaken in Chapter 8. Evaluation follows a simple rule: if two centers were politically allied then the politically charged material culture at those centers should display similarities. Of course, definition of what constitutes “politically charged material culture” is itself an inference. In the case of portable artifacts, identification of politically charged material culture is an inference made based on its association with administrative and possibly ritual contexts at the regional centers in question. It should display symbols that are not commonly found in non-elite or non-administrative contexts. Conversely, if two centers were politically opposed then the political symbols they employed should display differences. In both cases, a relationship between two centers is assumed. This relationship varies between competition and cooperation. A third scenario of non-interaction could also be hypothesized. In the Tuxtlas case, though, centers are rather closely situated and display greatly varied sizes and monumentality. It would be extremely rare if the centers in this region did not interact on some level.

The three alternative scenarios for political cooperation, competition, and non-interaction are interpreted based primarily on the signification dimension of political institutions. The symbols that a regime employs openly displays its political identities and its proclaimed relationship to other regimes. Most political regimes leave no ambiguity over the spaces it claims to rule. It uses ritual, symbols, history, genealogy, and displays of power to lay claim to a territory. It attempts to instill a perception of political control to those who experience the polity. Of course, it must compete with the imaginations of other potential regimes. This political negotiation can create material culture expressions of political affiliation that range from homogenous to heterogeneous over a given space.

One of the best indicators of political affiliation is the layout and form of administrative architectural complexes. Architectural style can be a symbol of power. Use of a standard architectural plan is often emulated throughout a polity and by neighboring polities (e.g., Renfrew 1994, Daneels 2002a, Urcid and Killion 2008). On the other hand, contrasting architectural styles employed by different centers or groups within centers may indicate political competition or factionalism (e.g., Pool 2008). There are many similarities among the architectural plans employed throughout the Gulf Coast extended region (Borstein 2001, Daneels 2002, Domínguez Covarrubias 2001, Stark 2008, Urcid and Killion 2008). Among the sub-regions of the Gulf Coast, however, several important differences have also been noted. I will compare the architectural plans identified in the TVAS to other regions of the Gulf Coast with particular emphasis placed on Matacapan and the Catemaco Valley.

A similar argument can be made for politically charged material culture like monumental art, prestige ceramics, and iconography. The motif analysis described above for the symbolic landscape will be used to examine variation among materials that may have been important for regime identification. These would have been the more iconic symbols engraved on pottery and stone monuments. These symbols will be compared within the TVAS region and beyond. Comparison will be limited by what has been published for other survey regions.

Experience, Perception, and Imagination of the Political Landscape within Regional Centers

To this point, I have treated regional centers as homogenous units on the political landscape, which was rarely the case with ancient states. Individual centers can be characterized in different ways that will permit comparisons of their political structures.

The first dimension of variation ranges from centralized to segmented. This is essentially the same as the regional characterization of political centralization, at a smaller scale. Centralized centers will display either one central political complex, or multiple complexes where one central authority can clearly be identified that stands above the others. The relative rank of political nodes within the site can be estimated based on the scale of architecture employed and their position within the site (central or peripheral). Scale is a measure of the relative political power each faction possessed. Several equally sized mound groups suggest a segmented political landscape. Where one complex clearly dwarfs the others, a centralized decision making apparatus can be inferred. Furthermore, the form and layouts of architectural plans at each complex may speak of different functions or services that elites associated with each offer.

The second dimension of variation characterizes the interconnectivity among different political groups (if present). This variable ranges from cooperation to competition, which is evidenced by distance between political complexes, boundedness of political districts, material evidence of interaction, and the replication or alteration of architectural layouts. Closely situated mound groups may indicate a close political relationship. Plazas associated with Standard Plan formations on the Gulf Coast, for example, are often spatially contiguous and they may even share mounds (Daneels 2008, Stark 2003, Urcid and Killion 2008). Alternatively, distantly separated complexes may represent political districts within the center. Identification of districts is aided by the boundedness of different architectural groups. A continuous distribution of mounds and settlement, between architectural complexes indicates that the areal extent of political authority employed by each faction is not well demarcated. Discrete architectural clusters, on the other hand, indicate greater separation of political authority, and perhaps differentiated, political districts. Material evidence of interaction may be the display of similar symbols of authority on monuments or portable artifacts. Display of different symbols suggests a more competitive political environment where factions differentiate themselves by creating alternative political ideologies. This same concept may be applied to the replication or modification of architectural layouts (Pool 2008). Replication implies coordinated political action, while modification may signify intentional opposition to competing political factions.

An overarching consideration of the political landscape employed in this research is the distinction between collective and exclusionary political strategies. These strategies describe the relationship between a regime and its subjects. Collective groups work together to deemphasize the constituent parts and promote an ideology of unity and sameness (Blanton 1998, Feinman 2001). Exclusionary strategies laud the individual based on personal accomplishment, lineage, or wealth and intentionally draws a distinction between regimes and subjects. The agent attempts to monopolize sources of power to exclude all others. The expression of the collective and exclusionary strategies can be seen in the configuration of space at regional centers. The openness of political and ritual architecture to the general public may indicate the intent to involve the community in important administrative decisions and ritual. The Street of the Dead at Teotihuacan comes to mind. This was a large open space capable of holding much of the population of Teotihuacan. The populace would have experienced rites of political ascension and religious ceremonies along this space. Incorporation of “the people” into these important ceremonies may be an expression of a collective political strategy, but at the same time the rituals may have been intended to instill a perception of social contrast between the common Teotihuacano and the agents acting in the ceremonial processions. Closed architectural space, though, can be less ambiguous. The intentional exclusion of non-elites from elite space is often used in exclusionary strategies to create social difference. Small closed ritual spaces are designed to be experienced by relatively few people. The privilege of experiencing space by a select few creates the perception of dominance and subordination

As Pool (2008) argues, the corporate and exclusionary principals were not necessarily employed in opposition. They may operate simultaneously at different scales of inclusion and depending on perspective. For example, multiple corporate groups within a city may employ exclusionary strategies in relation to each other to make their own group stand out.

ECONOMIC LANDSCAPE

The economic landscape refers to the organization of production and exchange within the region. The data at hand do not permit a detailed examination of the perception or imagination of the economic landscape, so I concentrate mainly on its spatial experience. The economic relationships among different network nodes can be partially inferred through the location, intensity, and scale of agricultural and craft production throughout the region. However, more direct evidence of exchange is desired to recreate the economic landscape. Below I detail methods to reconstruct networks of production and exchange in the western and central Tuxtlas, with particular attention on the relationships between the Catemaco and Tepango Valleys.

Ceramic Production

Ceramic production is typically identified in Mesoamerican archaeology through three indicators: wasters, kiln debris, and high concentrations of pottery sherds. A waster refers to the pieces that result from the breakage of pottery during the manufacturing process, usually during firing. Wasters often show signs of overfiring. These signs include discoloration (sometimes to a greenish hue), vitrification, extreme hardening of the paste (so that it cannot be chipped with a fingernail), bloating, warping, and specific forms of cracks (Pool 1990, Rye 1980). Kiln debris is rare, as the majority of pottery production in pre-Columbian Mesoamerica was fired in the open air. Kiln debris was differentiated from house daub based on the combination of the following features: vitrification, color zonation, gentle curvature on one or two surfaces, and a lack of wattle "pole" impressions. The majority of fired clay specimens recovered could not be confidently assigned to either kiln debris or house daub because of their small size. Those that could not be assigned were placed into a general category of burnt clay and dropped from the current analysis. Where either kiln fragments or wasters were present, pottery production was inferred only if accompanied by a sherd density in the upper tercile for the project, following research at Matacapan and Tres Zapotes (Arnold et al. 1993; Pool 1990, 2007; cf. Santley et al. 1989). Stark (2007:167-168) suggests the upper decile is a better cutoff point if combined with a spatial element where upper decile collections are closely spaced and coocurrance with direct production byproducts. She suggests (and Pool confirms) that the co-occurrence of direct evidence of production with upper tercile sherd concentrations may inflate the incidence of pottery production. However, she also suggests that the upper decile cut off may actually under represent ceramic production. I employed the upper tercile of ceramic densities accompanied by at least one overt indicator of ceramic production for ease of comparison to the Tuxtlas Region Survey and Tres Zapotes. Using these criteria resulted in the identification of very few production sites, so it does not seem like the number of pottery production loci was overestimated in this case. Unfortunately, many direct production indicators were recovered in general collections, so no material density measurements could be figured. The pottery production analysis as detailed here likely under represents household production at low intensities.

The design of this coarse-grained survey was not ideal for the identification of ceramic production. The majority of the survey region was covered by pasture, which severely limited the surface visibility. Reliance on shovel tests and soil cuts in pasture permitted only a narrow window into most sites, which could have limited detection of kiln debris and wasters. Additionally, the fact that more robust collections were not made on a grid at each site limits my ability to address the size of production units. Shovel tests conducted on a 50 m grid were insufficiently robust and too widely spaced to gain insight on the size and organization of production. With these caveats in mind, several instances of ceramic production were identified. Most of the collections in the survey were multi-component. Therefore, production is assigned to phases based on the type of ceramic wasters recovered and the major component for each collection.

Several characteristics of each production locality are considered, in part following Pool (1992, 2007; Pool and Bey 2007) and Costin (1991, 2005). Context refers to whether the potters were attached to an elite residence, or other administrative context, or removed from elites to operate in an independent setting. Size is the surface area that a production locality covers. This type of survey was not ideal to measure this variable, so a relative characterization is employed. Small signifies that production indicators were isolated within a single collection, medium indicates that two neighboring collections (separated by at least 50m) had such evidence, and large indicates that more than two adjacent collections display production indicators. Size was characterized independently of intensity. Intensity takes into consideration the investments into, and the general output of production. Kiln technology, a relatively high number of wasters, specialization in a limited number of wares, and high sherd density were all factors considered with this variable. In particular, kilns represent a significant investment in ceramic production beyond simple open firing techniques. They require specialized knowledge of the firing technology. Frequency of wasters is in direct correlation with the total output. A high waster frequency may indicate efforts to produce and exchange high numbers of ceramic vessels. Such a concern would indicate beyond the consumption requirements of an individual household, and production for exchange can be inferred. A similar argument could be made for high ceramic densities. While high density collections are not direct evidence of production, pottery firing will typically generate about 5-30 percent loss due to breakage depending on the technology employed (Rice 1987). Open firing, in particular, may not reach temperatures high enough to mark firing losses as "wasters" (i.e., warped, vitrified, or discolored sherds). Low intensity producers did not likely provision people outside their own households or local communities. Kilns were probably not used for common household consumption, and sherd and waster densities should be low reflecting the low levels of output. Moderate intensity potters are inferred to have provisioned households outside their own familial unit due to relatively greater investment into production or higher inferred outputs. High intensity producers are those that demonstrate the greatest investment in pottery production (e.g., kiln debris, specialization in a limited number of ceramic types) and the highest output (e.g., high sherd densities and wasters). Specialization in a limited range of ceramic types and forms shows a concern for either marketing wares or producing to meet the demands of a specific client rather than provisioning one's own household. Production for household consumption will usually generate a wide variety of ceramic types and forms. Potting facilities labeled as high intensity probably served consumers throughout a relatively large segment of the survey region. Their role as specialists is inferred based on their relatively high output exceeding the consumption demands of the local population. The types of ceramics produced are inferred based on the types of wasters recovered and the major ceramic types represented in the collections.

Ceramic Exchange

On a general level, pottery exchange can be assumed if the ratio of producers to consumers is low within the survey region. The assumption is that producing sites provisioned those with no evidence of production. However, the survey methods used in this dissertation are not sufficient to detect low intensity household production, which was probably the most common form of production in the region for most phases of occupation.

One ceramic ware in particular, Coarse Orange jars, was subjected to instrumental neutron activation analysis (INAA). These large jars were a utilitarian commodity produced at intensive workshops (Comoapan and Area 199) at Matacapan. Previous research demonstrates that Matacapan was heavily invested in the production and regional exchange of this pottery type (Arnold et al. 1993; Pool 1990; Santley et al. 1989; Santley 1994, 2007; Stoner 2003; Stoner et al. 2008). It is therefore an important aspect of the regional economy. The Coarse Orange type occurs in the Tepango Valley, so compositional analysis was directed to identify the production source of these jars. For this reason, I attended the Archaeometry Lab at the Missouri University Research Reactor (MURR) through an internship to conduct INAA on a sample of Coarse Orange jars from the Tepango Valley.

Neutron activation analysis of ceramics at MURR consists of two irradiations and a total of three gamma counts (Glascock 1992; Neff 2000; Neff and Glascock 2002; Stoner et al. 2008). A short irradiation is carried out through the pneumatic tube irradiation system. Samples are irradiated for five seconds at a neutron flux of 8 x 1013 n/cm2/s. The 720-second count yields gamma spectra containing peaks for the short-lived elements aluminum (Al), barium (Ba), calcium (Ca), dysprosium (Dy), potassium (K), manganese (Mn), sodium (Na), titanium (Ti), and vanadium (V). A longer, 24-hour, irradiation at a neutron flux of 5 x 1013 n/cm2/s is then undertaken and samples decay for seven days. They are counted for 2,000 seconds (the "middle count") on a high-resolution germanium detector coupled to an automatic sample changer. The middle count yields determinations of seven medium halflife elements, namely arsenic (As), lanthanum (La), lutetium (Lu), neodymium (Nd), samarium (Sm), uranium (U), and ytterbium (Yb). After an additional three- or four-week decay, a final count of 10,000 seconds is carried out on each sample. The latter measurement yields the following 17 long halflife elements: cerium (Ce), cobalt (Co), chromium (Cr), cesium (Cs), europium (Eu), iron (Fe), hafnium (Hf), nickel (Ni), rubidium (Rb), antimony (Sb), scandium (Sc), and strontium (Sr).

Based on a previous analysis of Coarse Orange (Stoner et al. 2008), some samples prepared by Pool (1990) were contaminated by the use of a “shatter-box” with tungsten carbide steel components. This machine artificially elevated the levels of cobalt (Co) and tantalum (Ta), common binding agents in carbide steel. Eliminating these elements from the analysis adequately compensated for the differential preparation, leaving the analysis with 31 elements in total. Because the sample from the Tepango Valley was taken for comparison to the original Coarse Orange analysis from the Catemaco Valley, the same 31 elements are employed in the current analysis.

Statistical analysis of the raw chemical data was carried out by Wesley D. Stoner using GAUSS statistical software and routines written by Hector Neff specifically for application to archaeological materials. The raw chemical data (ppm) required the conversion into base-10 logarithms to compensate for differences in magnitude between major and trace elements. Initial patterns in the data were identified through hierarchical cluster analysis. This statistic groups specimens based on their chemical similarity considering all 31 elements. The logged elemental data were also reduced to principal components and projected in principal component space to assess the variability of the sample. Principal component analysis measures the correlation among variables (elements) within a sample and combines them into new axes of variation. Strongly correlated elements are grouped together to form a new variable. There is some data loss involved with this process, but the first principal component, for example, usually explains the majority of variability in the sample. The second principal component, which is oriented at a 90 degree angle to the first, captures a smaller amount of variability. Each subsequent component explains less variation. In short, principal component analysis can usually capture the most meaningful variation in a sample with two or three variables rather than 31 using elemental data. Furthermore, the principal component loadings were used to identify the elements most important for partitioning the sample into groups.

The data were also projected on bivariate plots of all logged elements to visually evaluate potential group separation. In this particular case, calcium and chromium provide the strongest and most meaningful separation of chemical groups for reasons detailed in more depth in Chapter 4, Chapter 9, and elsewhere (Pool 1990, Stoner 2003, Stoner et al. 2008). In brief, calcium levels vary on an east-to-west axis due to the depth of Concepción clay outcrops that have been exposed on the surface. The upper Concepción contains less calcium and more quartz sand inclusions, while the lower Concepción is finer textured and has greater calcium inclusions due to marine carbonate mineral inclusions. Addition of volcanic ash temper in the Coarse Orange ceramics raised the concentrations of several transition metals (e.g., Cr, Fe, Ni, Mn, V, and Sc).

Chemical groups were created based on cluster analysis, principal component analysis, and visual inspection of bivariate elemental plots. Finally, group membership was evaluated based on Mahalanobis distance based probabilities for group membership. For this statistic, initial group assignments were provided for each specimen. However, the statistic was jackknifed, meaning each specimen was removed from its original group assignment and the probability of placing that specimen was evaluated equally for all groups defined.

Petrographic analysis was not conducted for the current Coarse Orange sample. However, very informative results were generated by petrographic point counting in the past that will assist the current analysis. The Tepango valley sample was easily assigned to groups with chemical data alone, partly due to the benefit of having prior analyses on the same ware (Stoner 2003, Stoner et al. 2008).

The final compositional groups are considered to be *paste recipes* which represent significant differences in the raw material selection and production sequence that can be used to differentiate pottery production loci. Compositional sourcing in archaeology is often stated to source the raw material procurement location, but a more culturally valid source is the location of production. For this reason, every step in the production process is seen to infuse the pottery with culturally sensitive information that can be "read" by the archaeologist to infer the production source for a pot. This information is then used to reconstruct the flow of pottery, as a commodity for exchange, across the economic landscape.

Obsidian Source

Obsidian was the most common lithic material recovered on survey. Obsidian does not naturally occur in the Tuxtlas, so all of this material was imported into the region from other sources throughout Mesoamerica. As such, obsidian provides one of the clearest indicators of interregional exchange. Obsidian source was initially identified based on several color and sub-color categories following Knight (1999, 2007). Mesoamerican obsidian source colors have been described by previous research (e.g., Barrett 2003, Knight 1999, Stark et al. 1992). I provide a brief description here only of the sources identified by the current research.

Zaragoza-Oyameles consists of a series of cobble outcrops and obsidian flows that occur over a large area between the modern towns of Zaragoza and Oyameles in Eastern Puebla. This obsidian is of excellent quality and contains few impurities. It is therefore ideal to produce prismatic blades. Zaragoza-Oyameles obsidian is typically colored black, but clear regular bands also occur in the black matrix. Less commonly, Zaragoza-Oyameles obsidian from the current project sometimes has a subtle bluish-gray tint with regularly spaced darker bands of the same color. Even rarer, Zaragoza-Oyameles may appear as a clear but smoky gray color.

Guadalupe Victoria and Pico de Orizaba obsidian both result from the extinct Orizaba volcano located at the border between Veracruz and Puebla. Pico de Orizaba obsidian was mined from seams on the Veracruz side of the volcano, while Guadalupe Victoria occurs in cobble form on the Puebla side. Both of these obsidians are clear, which makes them difficult to distinguish. However, quality and subtle color differences serve to visually divide the clear specimens. Guadalupe Victoria often has inclusions of varying sizes that are visible with the naked eye. It also frequently has irregular bluish bands of varying thickness. Pico de Orizaba is a much finer quality material. It is clear, but often has a dusty appearance. This "dust" is actually subtle bands that are aligned parallel with the fracture plane of the piece being viewed. These bands are visible when aligned at an angle to the fracture plane. The bands themselves are dark, sometimes black, but on close inspection, their "dusty" texture can be seen. Another difference between banding in Guadalupe Victoria and Pico de Orizaba obsidian is that the latter has much thinner bands that occur at more regular intervals. Perhaps the best differentiating characteristic is the finer quality of Pico de Orizaba specimens.

Several obsidian sources had only minor representation in the TVAS project area. Pachuca obsidian comes from the Sierra de Pachuca in the State of Hidalgo. It is a high quality source that has a distinctive green color that ranges in intensity from bright to dark. Otumba obsidian comes from the upper Teotihuacan Valley in the Basin of Mexico. This is high quality obsidian that is gray in color. The darkest Otumba specimens may be confused with the smoky colored Zaragoza-Oyameles obsidian, but Otumba is on average much lighter. A few specimens were also identified as the El Chayal source based on X-ray Fluorescence, but these specimens were not a good fit with the reference data for El Chayal. The El Chayal obsidian as identified on this project was visually characterized as dark grayish brown-colored obsidian. A few specimens of chert were also identified, but no source location is assigned.

Color alone is a fairly reliable source indicator for Mesoamerican obsidians, however, there are problems. Subjective bias in color determination can skew results. Additionally, certain sources are difficult to distinguish based on color alone, such as Pico de Orizaba and Guadalupe Victoria. For these reasons, I chemically characterized a small sample from each of the resulting color designations at the University of Missouri Research Reactor under the supervision of Michael D. Glascock. The instrument of chemical characterization was an ElvaX energy dispersive X-ray fluorescence spectrometer. The following passage describes the technical description of the instrument and software used to assign each specimen to a source:

> The spectrometer is equipped with an air-cooled rhodium target anode X-ray tube with 140 micron beryllium window and a thermoelectrically cooled Si-PIN diode detector. The beam dimensions are 3 x 4 mm and the detector has a resolution of 180 eV for 5.9 keV from iron… The X-ray tube was operated at 35kV using a tube current of 45 μA. Measurement times were 400 seconds on all samples. Peak deconvolution and element concentrations were accomplished using the ElvaX spectral analysis package. The instrument was calibrated using data from a series of well-characterized source samples in the MURR reference collection, including eleven Mesoamerican sources (El Chayal, Ixtepeque, San Martin Jilotepeque, Guadalupe Victoria, Pico de Orizaba, Otumba, Paredon, Sierra de Pachuca, Ucareo, Zaragoza, and Zacualtipan) and three Peruvian sources (Alca, Chivay, and Quispisisa) (Glascock personal communication 2007).

Chemical data was collected for eleven elements including potassium (K), titanium (Ti), manganese (Mn), iron (Fe), zinc (Zn), gallium (Ga), rubidium (Rb), strontium (Sr), ytterbium (Y), zirconium (Zr), and niobium (Nb). Source was easily determined for almost all specimens using the ElvaX spectral analysis package by comparing the spectra of the unknown and source standards. Source designations were applied to the entire obsidian sample based on the XRF chemical data and original color descriptions in light of known source color descriptions.

Chipped Stone Tool Production and Exchange

Not every site identified through this research has direct evidence for stone tool production (i.e., production debris, cores, early stage reduction, production errors).

While coarse-grained sampling probably missed considerable production evidence, it is likely that some sites did not produce their own stone tools. However, stone tools were a common utilitarian commodity found at almost all sites in the region. The analysis here attempts to identify sites that produced a relatively high volume of stone tools. With these data, inferences are made with regard to production and exchange of stone tools within the Valley. The assumption is that those with a lot of production evidence exchanged stone tools to sites with very little production evidence. This is a reasonable assumption considering both reduction strategies considered herein leave behind production by-products that are resistant to deterioration and are readily found on archaeological sites. If a site contained only blades and no production debris it is probable that the inhabitants obtained their stone tools from another site from within or outside the region. Two indicators are used in this dissertation to identify centers for the production of obsidian tools.

The first measure of stone tool production, the blade production ratio (BPR), considers the ratio of production debris and early stage reduction evidence to finished tools. Prismatic blades were the tool of choice for the majority of the occupational sequence considered. This measure is restricted to blades and the byproducts of blade production because it is difficult to isolate flake tools from flake debitage. Furthermore, relatively few formal bifacial tools were recovered from survey, so bifacial reduction debitage was correspondingly scarce. A high number for this statistic (close to 1.0) indicates greater evidence for blade production and increases the likelihood that blades were manufactured for exchange to other sites in the region. A number closer to zero increases the possibility that a site was strictly a consumer of blades manufactured elsewhere.

The second measure is the ratio of producing to consuming sites. The relative centralization or decentralization of the obsidian production and exchange is inferred by the relative degree of tool production found throughout the region. A single site producing mass quantities of tools where surrounding settlements possess only finished tools indicates a high degree of centralization in the obsidian tool industry. Small scale production spread over the region would represent a decentralization of obsidian tool production and exchange.

Finally, the ratio of total obsidian to ceramics for each collection is an indicator of the relative abundance of obsidian in a collection. This measure may reflect the greater or restricted access to the material.

RITUAL LANDSCAPE

In the research area, ritual played a pervasive role in maintaining social order. Public and private ritual space was delineated through architectural arrangements and portable religious objects. Buildings – such as temples, altars and ball courts – were the spaces utilized by religious specialists for both public and private displays of divine knowledge. Ritual specialists and political leaders were often one in the same, but many Mesoamerican groups maintained them as distinct professions. Small scale rituals in private spaces are more difficult to see in the region without household excavations. However, portable ritual objects include figurines, incense burners, instruments, censers, and serving wares decorated with divine symbols.

The goal of examining the ritual landscape is to delineate the spatial extent and relative importance of ritual behaviors throughout the region. Like the political and economic landscapes, the ritual landscape can be characterized on a continuum between centralized and decentralized. Public ritual, in particular, may take place at a hierarchy of ritual nodes throughout the regional network. The relative importance of these ritual nodes can be inferred by the monumentality of the ritual architecture involved. At the polity scale, centralized state religion may be inferred if a single site contains ritual architecture (e.g., ball courts or temples) of disproportionate size and number when compared to the hinterland. A decentralized ritual landscape would be indicated by pervasive use and relative standardized size and layout of ritual structures. For central Veracruz, for example, Daneels (2008) has identified centralized and decentralized versions of the regional political hierarchy by the distribution and size of ball courts. I employ a similar approach here without the political and ritual aspects of the Mesoamerican ball game. It cannot be refuted that the Mesoamerican ballgame was a political tool. The covert function of the ballgame as a political implement, though, was masked by its overt role in coordinating the world of the divine.

In addition to the number and size of ritual buildings, the orientation of constructions often pertains to astronomical alignments or other lines of sight on the landscape or they may have calendrical functions. Sprajc (2000), for example, argues that the Pyramids of the Sun and Moon dictated the orientation of urban constructions at Teotihuacan based on a combination of solar alignments of quarter-days within the 260-day calendar and the perpendicular axis was determine based on alignment with Cerro Gordo. Prominent architecture is typically oriented to reflect solar patterns or cardinal directions, and therefore have ritual significance. Moreover, the replication of particular architectural orientation across different architectural groupings or sites may indicate coordinated ritual beliefs. Azimuth readings will therefore be recorded for the orientation of all mound groups and individual long mounds for regional comparison. Additionally, architectural position and alignment will be examined for orientations that may serve to sight in major topographic features, like prominent mountain peaks.

Also significant for understanding the ritual landscape is the perceived meaning of ritual architecture. For example, the southern half of the Templo Mayor at the Aztec capital of Tenochtitlan was seen as a recreation of Coatepec, the mythical hill where Huitzilopotchtli was born fully-grown and subsequently slew his sister Coyolxuahqui and all his brothers. Key to the successful interpretation of this temple was Matos Moctezuma's excavations, which identified the Coyolxuahqui stone (1984). This sculpture depicts his sister's dismembered body lying at the bottom of the temple's stairs. Human sacrifice would have recreated this battle, as bodies were tossed down the stairs to rest on the stone. However, it is not just the space occupied by ritual structures that served some ritual importance. Pathways, or processions, that link different ritual foci can be equally as important. Ritual pathways can be seen in the spatial juxtaposition of temples, altars, corridors, plazas, and open spaces. Where the layouts of buildings in space often directs movement through a fixed path that intersects on ritual node after the other (e.g., Joyce 1995). Monuments may be positioned within these ritual paths to augment the divine experience, such as the "forest" of "tree-stones" positioned along the principal plaza at Copán (Schele and Freidel 1990).

Portable ritual paraphernalia also will be considered in the characterization of the ritual landscape. This category of artifact includes figurines, censers, and ceramics decorated with religious symbols. The TVAS did not result in the collection of many of these objects, unfortunately.

A final category of the ritual landscape is the perception of the environment itself. Natural physiographic features were often attributed with divine significance. Mountains were often seen to have generative qualities and were worshiped. Caves in Mesoamerican religion are portals to the underworld. Springs are seen to possess life-giving qualities. Human-built temples replicate natural topographic features, such as the decoration of Maya temples with images of Witz Monsters, *witz* being the Mayan word for mountain or hill (Schele and Freidel 1990). The same could be said for rivers and lakes. Reverence for these physiographic features can often be found in architectural layouts and early texts. In the survey area, several prominent features on the landscape contained petroglyphs and stone monuments. These were not heavily inhabited areas, but possessed some ritual importance.

The ritual landscape is not examined in isolation because of the limited data currently at hand. Instead, the distribution of ritual architecture and construction of sacred space is discussed with the evaluation of political models in Chapter 8.

SUMMARY

To summarize, the pedestrian survey and laboratory analysis undertaken during the Tepango Valley Archaeological Survey produced several categories of data that will be used to reconstruct political, economic, ritual, and symbolic landscapes in the following chapters. As stated throughout this dissertation, it is not the final objective to treat these different landscapes in isolation, and I do not attempt to do so. Instead, they are conceptually divided so that conjunctures and disjunctures can be empirically reconstructed based on the multiscalar cultural inputs that contributed to the development of Tepango Valley settlement. These data are used to compare the composition of Tepango Valley settlement to the surrounding regions, with particular emphasis on

Matacapan and the Catemaco Valley. Due to the involvement of Matacapan with Teotihuacan, the development of Catemaco Valley groups may display developmental divergences from neighboring settlement in the Tepango Valley.

CHAPTER 6: TUXTLAS CHRONOLOGY AND CERAMIC DISTRIBUTIONS

In this chapter, I present the chronological phases and periods employed by previous research in the Tuxtla region and the materials that are most sensitive to these temporal divisions (Table 6.1). Phase names come from Ortiz's (1975) work at Totocapan (El Picayo) for the Formative and Classic periods within Tepango Valley Archaeological Survey (TVAS). In addition to Ortiz's excavation pit at Totocapan, the ceramic characteristics of TVAS phases are informed by excavations conducted at Matacapan (Ortiz 1975, Ortiz and Santley 1988), Bezuapan (Pool and Britt 2000), Tres Zapotes (Drucker 1943; Pool and Ortiz n.d.; Pool personal communication 2009, Ortiz 1975), and La Joya (Arnold and McCormack 2002) (Figures 6.1, 6.2, and 6.3). Postclassic phase names and material culture characteristics follow work performed at Totogal by Venter (2008). Until recently, little was known about the Postclassic chronology in the Tuxtlas. Arnold (2007, Arnold and Venter 2004) worked at Isla Agaltepec, which had a substantial Postclassic occupation. Venter (2008) excavated and surveyed parts of Totogal on the southeast flanks of Cerro el Vigía, which helps to tease apart Early (Vigía phase) and Late (Totogal phase) Postclassic phases.

The TVAS ceramic analysis is a ware-type-variety classification that considers technological attributes of the paste (temper type, paste color and texture), surface treatments (slips, polishing, burnishing), vessel form, and decorative techniques. While the ware-type-variety system has several disadvantages, the chief benefit is direct comparability to other projects in the region. I employ the Tres Zapotes typology specifically, which is based on the classification developed for excavations at Matacapan (Ortiz and Santley 1988). The Tres Zapotes system has been applied to the survey of the southern flanks of Cerro el Vigía (Kruszczynski 2001), excavations at Palo Errado (1999), and surface and auger survey at Tres Zapotes (Pool and Ohnersorgen 2007, Wendt 1998). Venter employed an attribute analysis for Totogal ceramics because existing ceramic classifications did not adequately distinguish the Postclassic period. Much of Venter's ceramic analysis is patterned after Arnold's approach to the La Joya and Agaltepec assemblages (Arnold and McCormack 2002, Arnold 2007). The attribute

Table 6.1. Chronological Sequences of the Central and Western Tuxtlas.

DATE (uncal)	PERIOD	TRES ZAPOTES Ortiz 1975; Lowe 1989; Coe 1965; Pool 2007, personal communication	EL PICAYO Ortiz 1975	CENTRAL TUXTLAS Santley and Arnold 1996, Pool and Britt 2000	TOTOGAL Venter 2008	THIS STUDY
1500						
1400	Late Postclassic				Totogal	Totogal
1300						
1200			Not Defined	Postclassic		
1100	Early Postclassic	Soncautla				
1000					Vigía	Vigía
900						
800	Late Classic	Quemado	Chaneque	Late Classic (Phase F)		
700					Chaneque	Chaneque
600			Santiago B	Late Middle Classic (Phase E)		
500	Middle Classic			Early Middle Classic (Phase D)	Santiago B	Santiago B
400		Ranchito	Santiago A			
300	Early Classic			Early Classic (Phase C)		Santiago A
200			Chininita	Protoclassic		
100	Protoclassic	Nextepetl				Chininita
CE / BCE						
100			Picayo			
200	Late Formative	Hueyapan		Late Formative		Picayo
300						
400						
500						
600	Middle Formative	Tres Zapotes	Picayo Inicial	Middle Formative	Not Defined	Initial Picayo
700						
800						
900						
1000						
1100						
1200	Early Formative	Arroyo	Not Defined	Early Formative		Not Clearly Defined
1300						
1400						
1500						

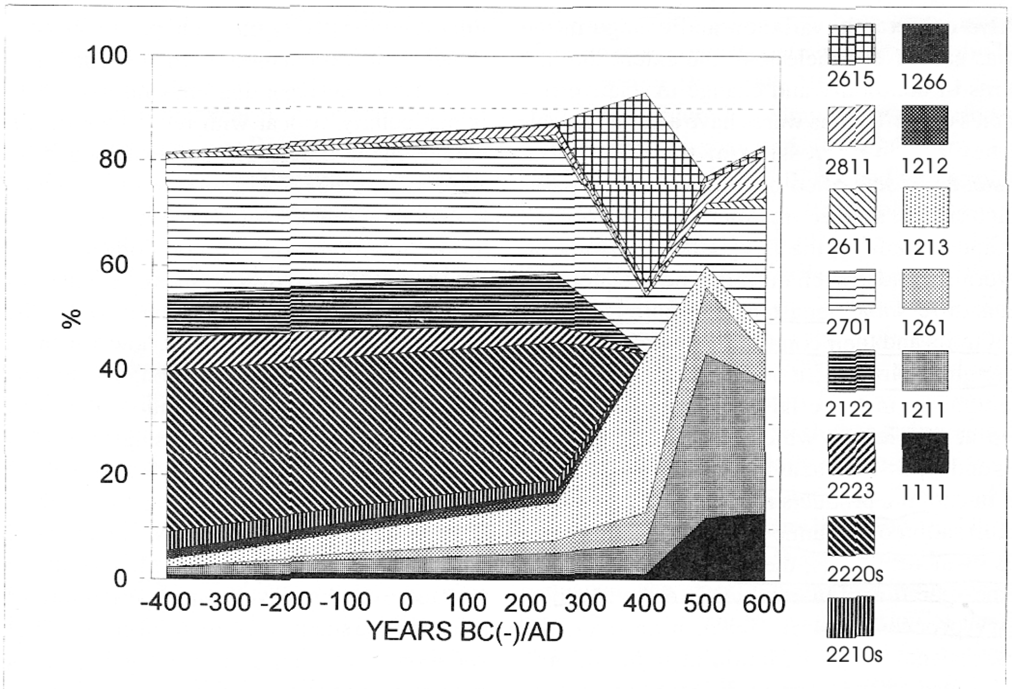

Figure 6.1. Diachronic trends in relative ceramic type frequency from excavations at Matacapan and Bezuapan. The width of each band represents percentage of rim sherds for that type for the occupation indicated (modified from Pool and Britt 2000: Figure 10).

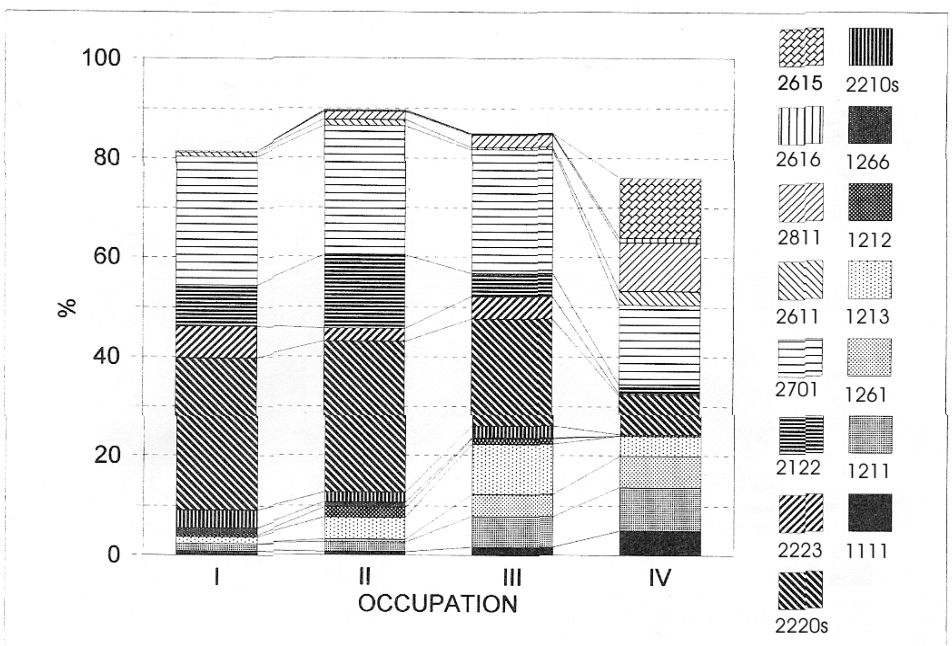

Figure 6.2. Bar Chart depicting relative ceramic type frequency from excavations at Bezuapan. The width of each band represents percentage of rim sherds for that type within the occupation indicated (modified from Pool and Britt 2000: Figure 9). Occupation I=early Picayo phase; Occupation II & III=Late Picayo and Chininita; Occupation IV= Classic.

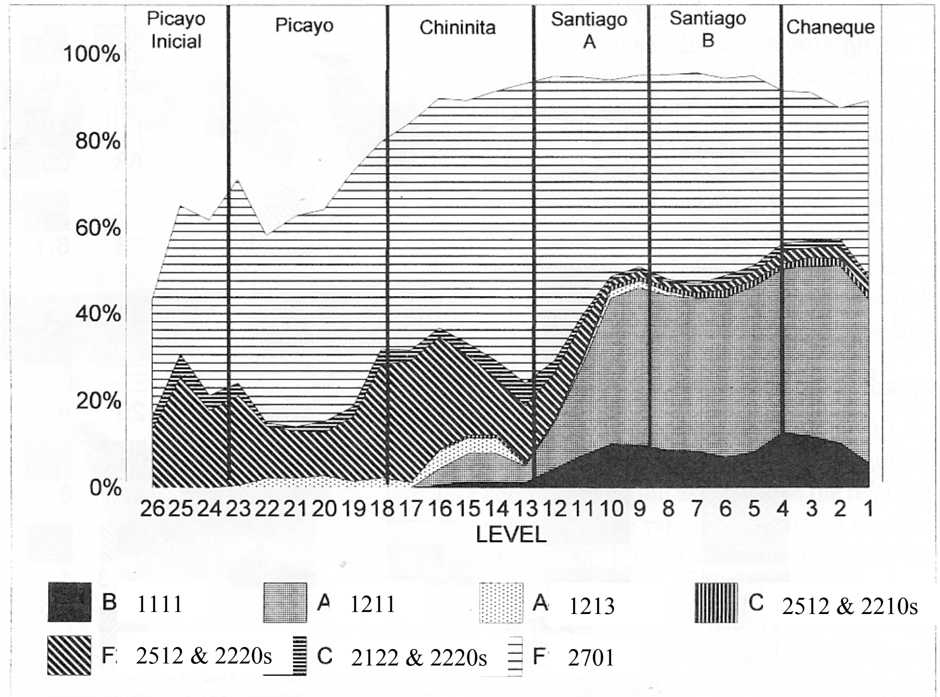

Figure 6.3. Smoothed relative frequencies of pottery types at Totocapan Pit 3 (data from Ortiz 1975: Tables 9 and 10; Figure from Pool and Britt 2000: Figure 11).

analysis measured temper type, size and amount; paste color; slip and paint colors; decorative techniques and motifs; surface treatments; and vessel forms. Venter's analysis spanned the Santiago B (Middle Classic) through Totogal (Late Postclassic) phases.

Together, these works create a chronology of ceramic types that can be used to date surface collections recovered during the TVAS. Below, I focus on describing the broad ceramic trends and provide a basic description of types and forms that are most popular within each phase. I also describe the distribution of each phase-sensitive type within the survey boundaries. Following the presentation of materials common to each phase, I offer a discussion of tentative social boundaries. I highlight where possible the external connections made between the TVAS and regions outside the Tuxtlas.

The settlement maps presented below are compiled from the distributions of collections with materials common within particular phases. Because almost none of the ceramic types are exclusively associated with a single phase, I do not place sites with less than 3 phase-sensitive sherds within the settlement hierarchy. I also eliminate any site that possesses only one type of temporally-sensitive material with less than five sherds. Some mixing of phase sensitive sherds even in single component collections is expected, so these criteria will produce a more conservative map of the TVAS settlement hierarchy. I depict collection locations with fewer than three phase sensitive sherds split over at least two categories, or fewer than 5 sherds in a single category, with a + on the map. These are collections with weak evidence for belonging to a phase. Spatially clustered collections within larger sites are treated the same way. For example, almost 100 collections were made at Totocapan. If these collections do not present a continuous distribution of phase materials over space, the site is divided into different sites.

In addition to the analytical function of presenting the chronology in this chapter, I present several characteristics of the symbolic landscape. The Tepango Valley generally displays ceramic styles similar to those of settlements in the Catemaco Valley (Ortiz and Santley 1988, Pool and Britt 2000), to the west at Tres Zapotes (Pool and Ortiz n.d.) and the southern flanks of Cerro el Vigía (Kruszczynski 2001), and to the south in the Hueyapan River area (Killion and Urcid 2001). There are sub-regional differences that will be noted where possible, but basic ceramic forms, paste recipes, and simple decorations do not vary tremendously across the Tuxtla region. These ceramics are a major part of the archaeological identification of Tuxtla social identities. They are products of the *habitus* shared among most groups in the region. Compared to other regions on the Gulf Coast, the Tuxtla ceramic assemblages compose a distinctive style zone (see e.g., Stark 1997). Even Tuxtla groups who experienced disruptions from outside the region (e.g., Totogal, Matacapan) shared this basic set of material culture styles with those that developed along a more localized trajectory. Imported ceramics, like Escolleras Chalk, and imported symbols, like Texcoco Molded censers, stood out against the Tuxtleco ceramics backdrop. However, intraregional variation is seen as well, which I intend to highlight where possible. The distributions for all ceramic types discussed below were examined using ArcGIS computer software.

EARLY FORMATIVE PERIOD (1500-900 BCE)

The Early Formative marked the rise of the Olmec center of San Lorenzo along the Coatzacoalcos River (Coe and Diehl 1980, Cyphers 1997, Symonds 2002). Ceramics types defined at this site are found over a broad area in southern Mesoamerica. In particular, Limón Incised and Calzadas Carved ceramic types became used over much of the region. Several examples similar to both these ceramic types have been found at Arroyo Phase Tres Zapotes (Pool, personal communication 2010) and nearby areas (Loughlin 2005). Designs carved into these ceramics, and on ground stone celts and other media, include frontal and side views of the "earth-monster", hand-paw-wing motifs, brackets, were-jaguars, cleft motifs, crossed bars (or St. Andrews Cross) among others (see e.g., Coe and Diehl 1980, Cyphers 1997, Pool 2007:112-120). Also indicative of the early date of these ceramics are the techniques of decoration. The carving technique consists of broad excision on a leather hard paste. Incisions, on the other hand, tend to be deep and executed in sweeping diagonal arcs and scrolls. Also present in Early Formative assemblages are the rocker-stamping and stick or fingernail punctate decorative techniques. Many of these styles and techniques tend to be generally associated with Olmec culture, and span Early and Middle Formative periods.

Within the Tuxtlas, Arnold (2003; Arnold and McCormack 2002) examined Initial and Early Formative ceramic assemblages from La Joya in the Catemaco Valley. Vessel forms tend to be continuous over the two periods, consisting of *tecomates*, plates, bowls, and cylindrical forms similar to those found at contemporary San Lorenzo. Early Formative pastes are dominated by volcanic ash temper (74 percent) of a medium texture (0.5 – 2.0 mm) (Arnold 2003:34-36)[1]. Through the Tulipan and Coyame phases of the Early Formative period, though, volcanic ash temper declines slightly, replaced by a volcanic ash and quartz/feldspar sand mix. In general, the *tecomate* form, a globular or oblate-shaped vessel with a restricted orifice, was most popular during the Early Formative over much of southern Mesoamerica.

Arnold noticed correlations between the ceramics at La Joya and the types identified at San Lorenzo. In particular, Coyame phase ceramics present pastes and forms similar to Tatagapa Red, Calzadas Carved, and Limón Incised (Arnold and McCormack 2002: B-3). While no examples of the latter two ceramic decorations were

[1] It is significant that Arnold's texture characterization does not employ a standardized scale such as the Wentworth scale. Since many of the chronologically sensitive materials discussed in this chapter depend heavily on paste texture, direct comparisons in name may not be appropriate.

identified for the Early Formative in the TVAS, ceramics similar to Arnold's red paste ceramics were recovered. During the Chicharras phase at San Lorenzo, all but one of the Tatagapa Red vessels was in the *tecomate* form (Coe and Diehl 1980). Just under half of the Polished or Smoothed Red rims within the TVAS were in the *tecomate* form, like Coyame phase La Joya and Chicharras phase San Lorenzo. The distribution of these ceramics closely conforms to the Tepango River, they are found at Totocapan, Cruz de Vidaña, Arroyo Salado, Oteapan South, Chilchutiuca Arriba, and Site 49. With the exception of the last two, the sites that display these red-paste *tecomates* became the most populous places later in the Formative period. Other common ceramics at La Joya that date to the Early Formative period include Black-and-White Differentially-Fired and Polished Black. Both of these wares appear throughout the Formative period in the Tuxtlas, but a combination of decoration, vessel form, paste texture, slip can be used to sub-divide them (see below)

In the TVAS collections, there were no instances of the decorative techniques or motifs that clearly mark an Early Formative presence. This can be partially attributed to the generally low frequencies of decorated sherds recovered from surface collections due to erosion. The decorations on these carved and deeply incised ceramics do not easily erode, though, which raises the possibility that the Tepango Valley was sparsely inhabited. However, two instances of rocker-stamped decoration and over two hundred *tecomates* were identified. Given the dearth of clearly Early Formative markers, I generally treat the *tecomate* forms as sensitive of the Initial Picayo phase. This form, though, may indicate Early Formative occupation, especially those on Polished Red pastes. In his excavation pit at Totocapan, Ortiz did not identify a phase that corresponds to the Early Formative.

INITIAL PICAYO (MIDDLE FORMATIVE [900-400 BCE])

Middle Formative ceramics in the Tuxtlas are best known from previous research for the Tres Zapotes phase at Tres Zapotes (Drucker 1943, Weiant 1943, Ortiz 1975, Pool 2007, Pool personal communication) and Phase A at Matacapan (Ortiz and Santley 1988, Ortiz 1975). Ortiz (1975) identified the Initial Picayo phase at Totocapan (El Picayo) which corresponds to the Middle Formative. Materials from the Initial Picayo phase were scarce in his test pit (Ortiz 1975:169), so I use Middle Formative assemblages in neighboring settlement areas to inform the designation of the Initial Picayo ceramic assemblage.

At Tres Zapotes, Ortiz (1975) demonstrated that Polished Orange *macetas* are very common during the Tres Zapotes phase, but their use extended into the Hueyapan phase. Polished Black with a coarse paste was also in its highest percentages during the Tres Zapotes phase. Recent excavations at the site directed by Pool show that the *macetas* form on Polished Orange pastes is most popular during the Hueyapan phase. Polished Orange of all forms, then, mostly pertains to the Hueyapan phase. In Pool's recent excavations, Coarse Polished Black ranges from the Early Formative through the Protoclassic. However, Incised Coarse Polished Black shows a strong trend toward the Tres Zapotes phase in Unit 8. The same pit shows Medium Polished Black and most varieties of Medium Black-and-Tan Differentially-Fired to almost exclusively fall into the Tres Zapotes phase. Common decorations for these ceramics at Tres Zapotes include incised pendant lines hanging from S-curves and line breaks. Rocker stamping should also be fairly well-represented compared to other phases. Of the common decorations found on these ceramics, few examples show up in the TVAS (n=4). Instead, the most common decorations found on Medium Polished Black in the TVAS are incised geometric shapes, which tend to be more in line with what Ortiz (1975) found common to the Picayo and Chininita phases at Totocapan.

Excavations in Phase A strata at Matacapan recovered significant frequencies of Coarse Brown *tecomates* decorated with rocker-stamping, fingernail incision, and zoned stick punctate designs (Ortiz and Santley 1988). These forms and decorations were also recovered during Early Formative and Middle Formative phases at La Joya (Arnold and McCormack 2002). At Matacapan, these were the most sensitive ceramic features for Phase A, along with Coarse Gray with volcanic ash temper, Polished Black and Coarse Polished Black, and a variety of white or white-slipped types on brown or orange pastes. The white-slipped varieties correspond to White-Slipped with a Matte Finish and White-Slipped Coarse Brown in the current typology. Pool notes based on recent excavations at

Tres Zapotes that the White-Slipped Matte Finish type is not strongly sensitive of any single phase, but I include it as a secondary marker of the Initial Picayo phase. Among the white wares, forms are dominated by flat-bottomed plates with straight or slightly curved and slightly divergent walls, but bowls with vertical, slightly curved convergent walls also appear. Common among the Polished Black vessel forms are *tecomates* and cylindrical vessels.

Arnold and McCormack (2002) note that the Gordita phase, which corresponds to the Middle Formative, is the least represented phase at La Joya. Still, ceramics found within this stratum resemble those found in neighboring regions. They observe increased use of white slips, sometimes with incision (see also Stark 1997). Orange slips also become more common and often display polishing (see also Pool 2000). Polished Orange, though, tends to date to the Late Formative at Tres Zapotes (Ortiz 1975, Pool personal communication 2010), a pattern that I observe for the TVAS collections.

Based on a combination of previous research in the Tuxtlas, ceramics used to reconstruct the Initial Picayo phase include Coarse Gray with volcanic ash temper (Code 2113), Medium Polished Black (Code 2123), Incised Coarse Polished Black (2512.11), Kaolin White (Code 2301), and Cream Slipped Coarse Brown (Code 2302), White-Slipped with Matte Finish (Code 2405), and three varieties of medium paste Differentially-Fired Black-and-Tan (Codes 2226.1, 2226.2, and 2226.4) (Figure 6.4).

The *tecomate* form also is used as a marker of the Initial Picayo phase. *Tecomates* are restricted orifice jars that have an oblate-shaped (or globular) profile. They typically occur on the Coarse Brown (Code 2701), Coarse Polished Black (Code 2512), and Polished Red (Code 2906) pastes. Some are polished or burnished on their exterior surfaces, but some exhibit remains of red paint or slip. As mentioned above, *tecomates* may have been more common during the Early Formative.

Decorations that indicate a potential Initial Picayo occupation include line breaks, rocker stamping, S-curves with pendant lines, zoned stick punctation, or fingernail punctate on pastes similar to types mentioned above.

Table 6.2 lists the distribution of types and forms common during the Initial Picayo phase across the sites within the TVAS. Figure 6.5 shows the distribution of settlements in the TVAS during the Initial Picayo phase.

Figure 6.4. Sample of Middle Formative ceramics.

Table 6.2. Initial Picayo phase-sensitive ceramics itemized by site (totals in red italics provide only tenuous evidence for occupation during this phase).

Sites	2113	2123	2226	2301	2302	2405	2512.11	Tecomates	Totals
1 (Totocapan)	23	70	17		3	4	6	40	**163**
2 (Oteapan)	3	2	2		3	1		5	**16**
5			1				2	1	**4**
7								2	***2***
8		3							***3***
12								1	***1***
16/17 (Sehualaca)	2	3					1	18	**24**
18								1	***1***
19 (Arroyo Salado)		10	2	1				5	**18**
20			1					1	***2***
21								1	***1***
24	3			1				3	**7**
25			1					1	***2***
27	1		5	1					**7**
29								5	**5**
31								1	***1***
32								1	***1***
33								1	***1***
34								3	***3***
37		1						2	**3**
38 (Cruz de Vidaña)	6	10	3			1	6		**26**
39			1						***1***
42									***1***
46						2			***2***
47					2				***2***
48		1						2	**3**
49			5		1			1	**7**
51			1					4	**5**
54	3				1			3	**7**
57		2						3	**5**
58	1								***1***
63		1							***1***
64				1					***1***
69				1				1	***2***
70						1	1		***2***
71								2	***2***
74		1	2			1			**4**
76			5				1	3	**9**
77		3	2					3	**8**
78								2	***2***
82								2	***2***
84		2	4					2	**8**
85		1						2	**3**
86								1	***1***
89				3				2	**5**
93								2	***2***
94								2	***2***
95 (Ocelota)		2				1		31	**34**
96		1						5	**6**
98				2					***2***
99								2	***2***
106			5						**5**
107	1		1						***2***
108								1	***1***
112 (Bella Vista)	1	6	11					1	**19**
113								1	***1***
114			1						***1***
116	2					2			**4**
117								1	***1***

Table 6.2 (continued).

Sites	2113	2123	2226	2301	2302	2405	2512.11	Tecomates	Totals
118								2	2
125								2	2
130								2	2
132								1	1
138			1						1
139			3	1				2	6
140	1								1
143								1	1
144			2						2
145			1					1	2
147		1	2						3
148			2						2
149								1	1
151		2	2					1	5
152		2	5			1		12	20
158								7	7
159			1						1
163		1	3			1			5
166		1							1
167		5	4					5	14
168								1	1
170								2	2
174			1					1	2
177			9						9
178			2					2	4
179			2						2
181								3	3
182								2	2
183	1								1
184	1	3		1					5
Total	49	130	106	12	10	15	17	228	567

Within the TVAS area, Code 2123 ceramics are the most prevalent within the Initial Picayo phase. Fifty-four percent of them were recovered at Totocapan, with eight percent found both at Arroyo Salado and Cruz de Vidaña. These were the three largest sites in the region. The remainder is distributed throughout the region, but somewhat less represented in the central uplands. Of the 35 rim sherds recovered of this type, the majority are open forms. These include dishes with convex divergent (26%), straight divergent walls (20%), and concave divergent walls (11%). The latter two vessel forms likely had flat bases. Necked jar, composite silhouette, and *tecomate* forms are also present in minor percentages.

Code 2226 ceramics were the second most abundant Initial Picayo markers. Totocapan and Bella Vista possessed a disproportionate amount of these ceramics. While the remainder is spread throughout the survey area, they are absent in the extreme

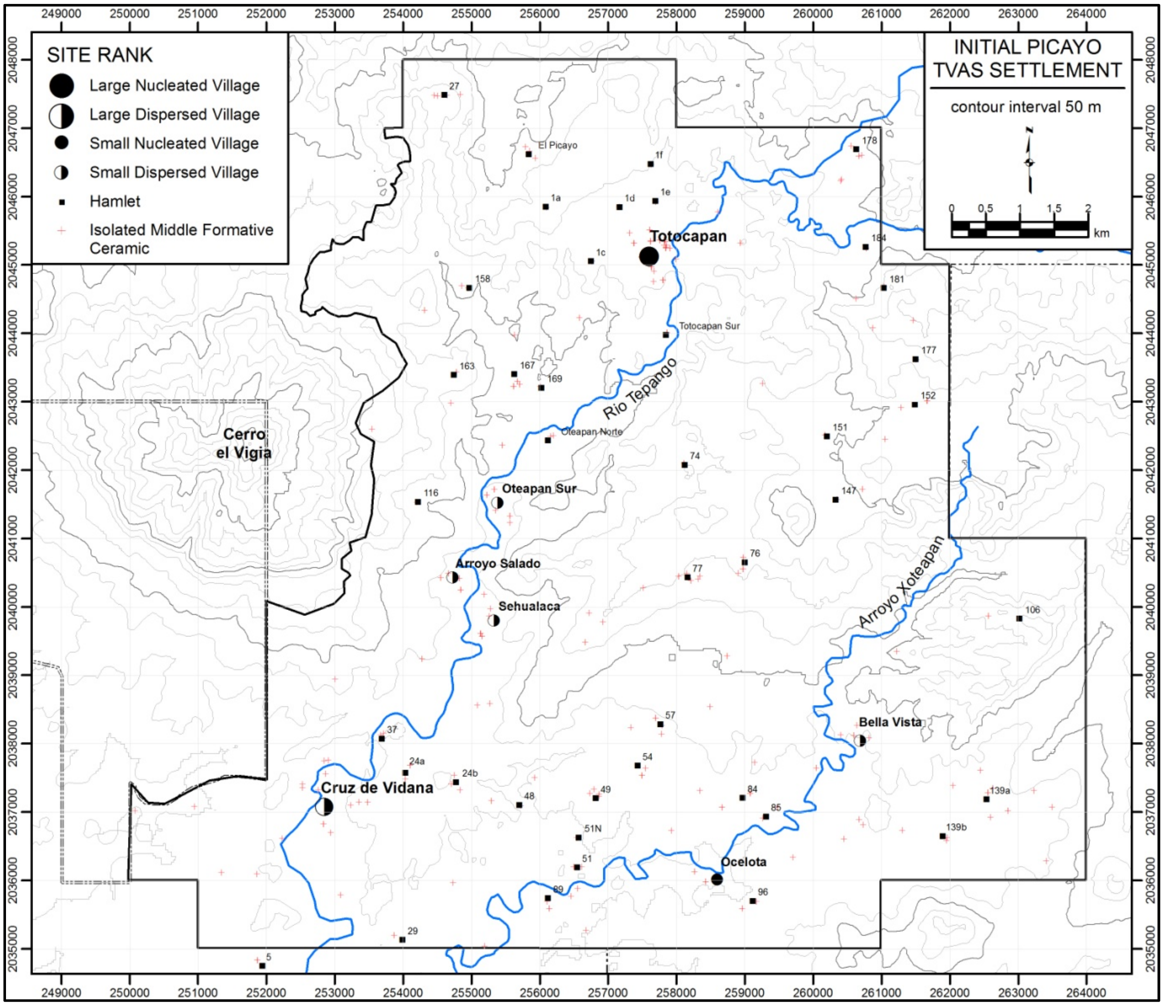

Figure 6.5. Distribution of Initial Picayo phase (900-300 BCE) sites and ceramics within the TVAS.

southwestern corner of the survey area and the southern foot of the central uplands. Almost all of the ceramics assigned to this type were rim sherds, otherwise they would have likely been coded differently. Of 97 rim sherds, half are dishes with straight divergent walls, 24 percent are bowls with convex divergent walls, nine percent are closed bowls, eight percent are vertical-walled bowls, and a minority of other forms is represented.

A total of 49 sherds of Code 2113 was recovered, almost half of which came from central Totocapan (n=23). The remaining 24 specimens were distributed sparsely, but evenly, over the survey area. The majority of Code 2113 was recovered at sites along the Tepango River, as opposed to the Xoteapan River or the surrounding uplands. Of 10 rims, vessel forms represented are evenly spread over straight divergent-walled dishes, convex divergent-walled bowls, closed bowls, and one *tecomate*.

Among the white-slipped types, only 12 specimens of Code 2301 were identified in the TVAS area. They were spread over a large portion of the survey area, but were notably absent at Totocapan. The 10 specimens of Code 2302 recovered during the TVAS were concentrated in two tight clusters. Six of the specimens were found at Totocapan (n=3) and Oteapan (n=3) in the northern half of the survey area. The remaining five specimens were found at Sites 47 (n=2), 49 (n=1), 54 (n=1). All four of these sites are clustered in the center of the southern half of the survey area. Over a quarter (n=4) of the 15 Code 2405 sherds recovered were found at Totocapan within its central ceremonial district. The remainder was spread throughout the survey area in small amounts, but it was absent in the southeastern third of the TVAS area around Tilzapote and the upper Xoteapan River. Of all three of these white-slipped types, only nine rim sherds were recovered. Almost half were dishes with straight divergent walls, but closed bowl, composite silhouette, and open bowls are also present.

Seventeen Code 2512.11 ceramics were found within the TVAS area. Seventy percent of these were found at Totocapan and Cruz de Vidaña. Among the rims present, most are *tecomates*. The "incision" on two of these specimens is actually horizontal channeling on the exterior surface below the lip. While this is not considered incision, channeling such as this on *tecomates* is very indicative of Early and Middle Formative ceramics.

In the above discussion, a clear pattern appears with the distributions of Codes 2113, 2405, 2512.11, and 2123. The first three closely follow the Tepango Valley and are absent in the Xoteapan Valley, while Code 2123 is found in both valleys but not the central uplands. This suggests that lines of communication followed rivers, a pattern that is repeated with the distribution of many ceramic types discussed below. In particular, it seems that the Tepango River was a feature on the landscape that facilitated social/symbolic interaction and probably economic exchange. No clear administrative center has emerged by the Initial Picayo phase within the TVAS, so these type distributions do not indicate political influence unless exerted from Tres Zapotes outside the survey area.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH INITIAL PICAYO MATERIALS

The Initial Picayo ceramic types listed above were accompanied by many other types of ceramics that were employed across several time periods and that are therefore not useful as temporal markers. I provide a brief discussion of chronologically non-sensitive ceramics that co-occur in collections with primarily Initial Picayo ceramics. Unfortunately, there were few exclusively Initial Picayo collections in the TVAS, so I cannot address direct associations. That said, eight collections in the TVAS displayed a strong majority of Initial Picayo markers. These collections are located in Totocapan, Oteapan, Cruz de Vidaña, and Sites 27, 54, 74, and 76.

The most prevalent ceramic type in the Middle Formative assemblages from excavation at Tres Zapotes, Matacapan, and Totocapan was Coarse Brown with Volcanic Ash Temper (Code 2701)(Ortiz 1975, Ortiz and Santley 1988:69). Coarse Brown is the most common type during all periods, though certain forms and decorations are characteristic of the Initial Picayo phase. As mentioned earlier, *tecomates* were most prevalent during the Initial Picayo phase. This form occurred primarily on Coarse Brown pastes with volcanic ash temper (Code 2701; n=117 or 49%), but it was also found on Coarse Brown paste with white temper (Codes 2614[2] and 2654; n=50 or 21%), Polished Brown with a medium paste (Code 2519; n=8 or 3%), Polished Red (Code 2906; n=7 or 3%), and in minor percentages in a wide variety of other types. The *tecomate* form (n=228) in the TVAS area was widely distributed.

Among the eight collections that contain a majority of Initial Picayo ceramics, Coarse Brown with volcanic ash temper (Code 2701) composed 42 percent of the assemblage. Almost 42 percent of the Coarse Brown rims were necked jars, followed by *tecomates* (29%), slightly closed bowl forms (17%) and plates with straight divergent walls (13%) and a minority of several others. Within this type, 67 percent was of the plain variety, 22 percent exhibited brushing (*rastreado*) on the shoulders of jars, and a few others displayed incision, red paint, or white slip. The white-slipped variety (Code 2701.7) was created during the TVAS to encompass pastes that do not strictly conform to

[2] 2614 is not a common type to be formed into *tecomates*, these 10 specimens were probably mistyped and should have been coded 2654.

Code 2302 or 2405. Code 2701.7 may be associated with the Initial Picayo phase. The most common form on Code 2701.7 ceramics is the necked jar, which does not likely date to the Initial Picayo phase. However, plates with straight and slightly curved divergent walls and *tecomates* are also common. Eliminating the necked jar forms, the distribution of White-Slipped Coarse Brown strongly conforms to the Tepango and Xoteapan rivers. Of 37 specimens, only three were found in the central uplands that divide the drainages.

The next most frequent ware was Coarse Brown with white temper (Codes 2614 and 2654), composing 11 percent of the collections. Within the total TVAS assemblage there was a lot of variability among the white tempered Coarse Browns, some of which may have been Classic period ceramics. However, Classic period markers made up only one percent of these eight assemblages and no Classic *cazuela* forms are represented. It is likely that the Coarse Brown with white temper considered here was produced during the Formative period. Forms represented among the white-tempered Coarse Brown ceramics were dominated by flat-bottomed plates, with minor representation of necked ollas. Medium Polished Brown (Code 2519) made up 7 percent of these eight Initial Picayo collections. The plain variety is generally common in the Formative period, but not sensitive to any particular phase. Coarse Polished Black (Code 2512; 3%), Sandy Fine Orange (Code 1212; 3%), and Tepango Coarse Orange (Code 2813; 2%) were also present. The remaining types present among these ten collections compose less than two percent each.

PICAYO PHASE (400 BCE-1 CE)

Ortiz (1975) surmised that the Picayo phase at Totocapan is marked by the absence of Fine Orange and Fine Gray ceramics, but Coarse Polished Black, Fine Polished Black, fine paste Differentially-Fired wares, Polished Brown, and Polished Orange increase in frequency. Surfaces treatments are mostly polished, except for the interiors of *tecomates* and jars. Vessel forms are dominated by flat-bottomed plates with straight, divergent walls and widely-everted rims. Also present are *tecomates*, *macetas*, globular jars, and cylindrical vessels. The most common decorations include geometric designs and parallel lines incised on widely-everted rims and red paint was observed on several specimens.

At Tres Zapotes, Polished Orange and Black-and-White Differentially-Fired wares are most common during the Hueyapan phase (Ortiz 1975, Pool personal communication). Black-and-White Differentially-Fired is also common during Phase B at Matacapan (Ortiz and Santley 1988). Coarse Gray with white temper also gains in popularity, but Pool notes that its use is also common during the Nextepetl phase (personal communication).

At Bezuapan and La Joya, the Early Bezuapan phase was marked by high frequencies of Differentially-Fired ware and Polished Black (Arnold and McCormack 2002, Pool and Britt 2000). Polished Black was often incised with geometric designs, step-frets, and pendant lines. The incisions were sometimes rubbed with crushed hematite or cinnabar to make the designs stand out.

For the TVAS, ceramics used to indicate a Picayo phase occupation include Coarse Gray with white temper (Codes 2111; white-slipped varieties probably date to the Initial Picayo phase and are not included here), Thin-Walled Polished Black with fine orange or gray paste (Code 2122.4), Differentially-Fired types with black bodies and fine paste and white rims (Code 2212), coarse paste and white rims (Code 2213), or coarse paste and tan rims (Code 2225), Incised Medium Polished Brown (Code 2519.11), and Polished Orange (Code 2904) (Table 6.3, Figure 6.6 and Figure 6.7, see also Figure 5.4). Pool (personal communication) finds, based on excavations at Tres Zapotes, that Incised Medium Polished Brown (Code 2519.11) dates primarily to the Middle Formative (or Tres Zapotes B phase). Common decorations found on these earlier ceramics are “S” curves, line breaks, and rocker stamping. Within the TVAS, none of these decorations occur on the Incised Medium Polished Brown type. Instead, the most common decorative motifs are simple horizontal line incision and geometric designs (e.g., triangles with hatched fill), which tend to be more common during the Late Formative and Protoclassic. I leave Incised Medium Polished Brown in the Picayo phase because of this, but acknowledge that future research in the Tepango Valley should make an effort to chronologically sort the variants of this ceramic type.

Figure 6.6. Sample of Picayo Phase ceramics.

Table 6.3. Picayo phase-sensitive ceramics itemized by site (totals in red italics provide only tenuous evidence for occupation during this phase).

Site	2111	2122.4	2212	2213	2225	2519.11	2904	Totals
1 (Totocapan)	41	11	5		17	17	27	**118**
2 (Oteapan)	8	2	2		3		7	**22**
5	2					1		**3**
7			1					***1***
9		1			1			***2***
15	1							***1***
16	2		2					**4**
17	10	5			1			**16**
19 (Arroyo Salado)	6	2		1	9	5	10	**33**
20			1				2	**3**
21		1					1	***2***
24 (Chilchutiuca)	7	2			20	1	3	**33**
25	1							***1***
27	1							***1***
28		1						***1***
8/38 (Cruz de Vidaña)	22	1	4	2	28		12	**69**
39	3							***3***
40							1	***1***
42	3				2			**5**
44	2		1		3			**6**
48	1		1				2	**4**
49	2	6	3				1	**12**
50	2							***2***
51	2	1					1	**4**
54	4				2		1	**7**
57	1	1					1	**3**
59			1					***1***
68		1			2			**3**
70	1				1			***2***
72	3		1		2			**6**
73	1	1						***2***
76	6	1						**7**
79					1			***1***
81				1				***1***
82		1				1		***2***
84	1		1					***2***
89	4				1			**5**
95 (Ocelota)	2			1	21		2	**25**
100	1							***1***
102	1		1					***2***
106		1			2			**3**
107		1					1	***2***
112	1	5						**6**
116					1			***1***
124	1	1						***2***
125	1		2		1	2		**6**
133	1				1			***2***
138							1	***1***
139	7	1	5		4		1	**18**
140					1		2	**3**
144	5							**5**
145	3							***3***
147	1							***1***
149					2			***2***
151						2		***2***
152	1				1	2		**4**
158		3			5			**8**
163	2				1			**3**
167	1				10			**11**

Table 6.3 (continued).

Site	2111	2122.4	2212	2213	2225	2519.11	2904	Totals
175						4		*4*
178	1							*1*
179	1							*1*
181	2				1			3
184	1		1				3	5
186					1			*1*
Total	172	52	32	5	145	35	79	520

* Not given a detailed description because only 1 specimen found on survey.

Vessel forms are very similar to the Initial Picayo phase with the addition of higher frequencies of *macetas* and lower frequencies of *tecomates*. Jars may also become more popular to replace the *tecomate* form. Also, the incidence of widely-everted rims, sometimes with parallel lines impressed on the superior surface, should increase from the

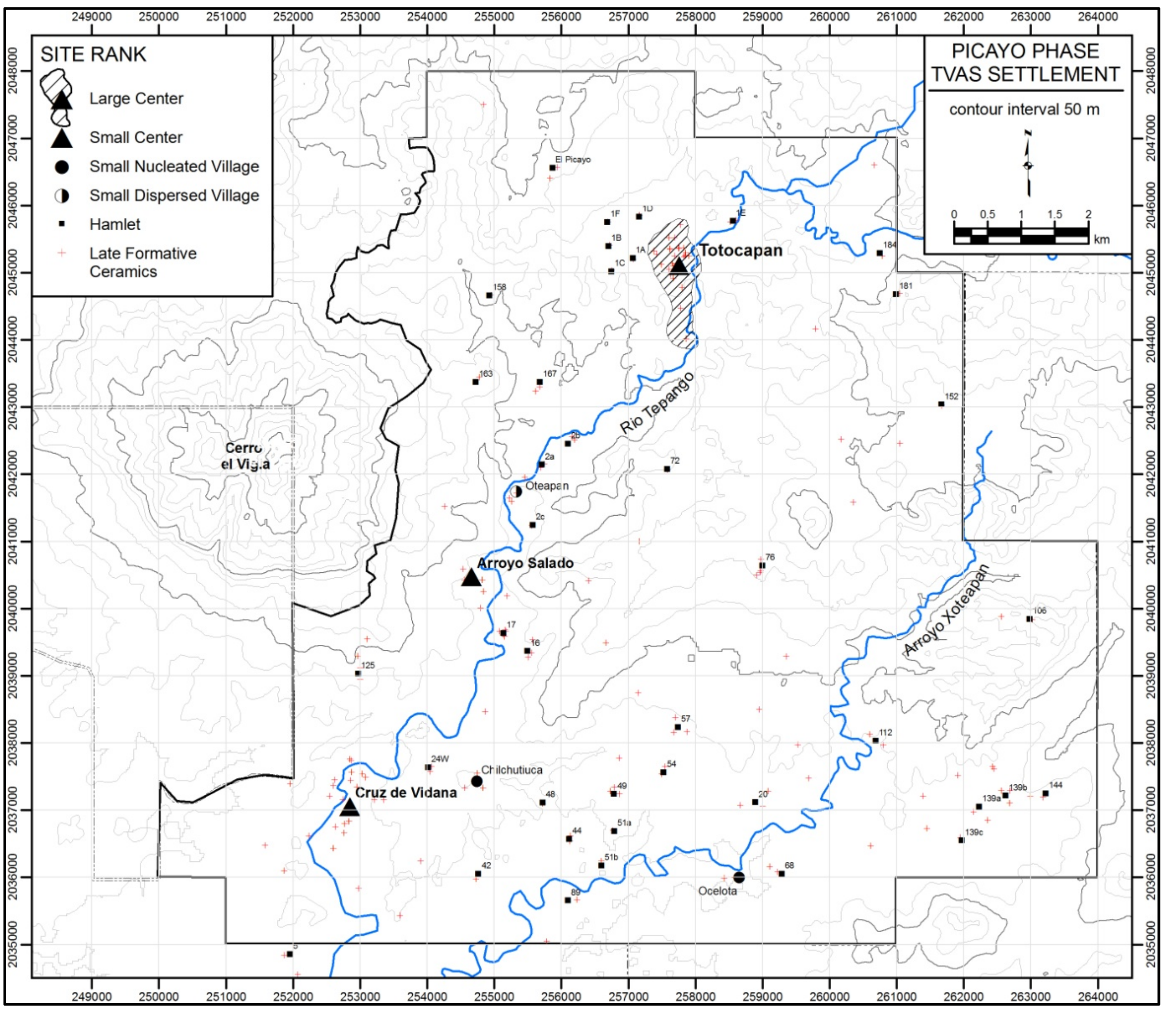

Figure 6.7. Distribution of Picayo phase (400 BCE – 1 CE) sites and ceramics within the TVAS.

previous phase. These widely-everted rims usually occur on flat-bottomed plates with straight divergent walls on Polished Orange or Medium Polished Brown pastes. Common decorations include geometric designs with hatched triangles forming the most common motif. pendant lines are also present, but not those that hang from S-curves.

Code 2111 pottery occurs in minor percentages throughout the survey region, but concentrations are found at the largest sites. This ceramic type is primarily a serving ware and one would expect elites to possess more of it. Twenty-four percent (n=41) of Coarse Gray was recovered from the central district of Totocapan, and another 13 percent was found at Cruz de Vidaña (n=22). These were the two largest sites in the region during the Picayo phase. Other notable quantities of Code 2111 ceramics were found at Tilzapote (n=7) and surrounding sites (n=10), Oteapan (n=8) just south of Totocapan, Site 17 (n=10) and Arroyo Salado (n=6). Of the 30 rim sherds of the Code 2111 ceramics, 40 percent are dishes with flat bottoms and straight divergent walls. The second most common form is closed bowl forms, but composite silhouette and jar forms are also present.

Code 2122.4 ceramics are distributed fairly evenly throughout the survey area. As expected, Totocapan (n=11) possesses more than any other site in the region. It is interesting to note that Cruz de Vidaña has only one specimen. The scarcity of this ware at this emerging center and its presence at Totocapan may suggest that communications and interaction between the two sites were not well developed, which raises doubts that they were connected politically during the Picayo phase. Coarse paste Differentially-Fired Black-and-Tan wares also were concentrated at larger sites, but any suggestion as to why would rely on the circular argument that large sites are large because of the prevalence of this ware. The most common vessel form for this type is the bowl with convex divergent walls. Flat-bottomed dishes with straight divergent walls, composite silhouette, and closed bowl forms are also present.

Unlike some of the other Picayo phase ceramics, Code 2519.11 ceramics were not evenly distributed throughout the survey area. A total of 71 percent of Incised Polished Medium Brown was found at Totocapan (n=17) and sites in the northern half of the survey area (n=8). The remaining five were dispersed throughout the southern half of the survey area. Again, a pattern appears with regard to Totocapan and Cruz de Vidaña, as only one instance of this ceramic type was recovered at the latter. As will be seen in the subsequent chapter, these are two of three political centers within the survey region during the Picayo phase and the selection of different decorated wares may be an important social difference between them. Only one Incised Medium Polished Brown sherd was recovered from settlement in the southeast third of the survey area along the Xoteapan River. Again this points to the importance of communication up and down the Tepango River that did not necessarily cross over the central uplands to the upper Xoteapan Valley. Since no centers were identified along the Xoteapan River, it also supports an interpretation that it was a prestige ware used only by political elites.

Of the 79 sherds of the Polished Orange type, 49 were found at the three largest sites in the Picayo phase survey area (Totocapan, Cruz de Vidaña, and Arroyo Salado). In total, the Polished Orange sample was found in four clusters. The first cluster consisted of Totocapan, Oteapan and Site 184 in the north of the survey area. The second cluster occurred within a 2-km radius of Cruz de Vidaña and consisted of the center, Chilchutiuca, Site 21, and Site 40. The third cluster was in the center of the southern half of the survey area consisting of Ocelota, Site 48, Site 51, and Site 54. Tilzapote (Site 139) and nearby Sites 107, 138, and 140 form the final cluster. Of the 23 Polished Orange rims, the most common form is a flat-bottomed dish with straight divergent walls. A few of these possessed "flying" rims. Second most popular is the *macetas* form. Also present are vertical-walled bowls, *tecomate*, and jar forms.

The distribution of all variants of 2904 forms an acute-angled "L"-shaped distribution that follows the Tepango and Xoteapan rivers. However, examining each variety separately produces different spatial patterns. The plain variety of Polished Orange is found almost exclusively along the Tepango River. Cloudy Polished Orange, on the other hand, is found exclusively at Tilzapote (Site 139), Totocapan, and Cruz de Vidaña.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH PICAYO PHASE MATERIALS

A total of 11 collections from seven sites (Arroyo Salado, Cruz de Vidaña, Chilchutiuca, Ocelota, and Sites 16, 73, and 158) display predominantly Picayo phase assemblages with a relatively robust sherd count. Among these collections, Picayo phase ceramics make up 13 percent of the sample, Initial Picayo and Chininita phase ceramics make up less than two percent each, and there less than two percent of the sample consist of Classic period markers.

The most prevalent ware during the Picayo phase was Coarse Brown (Code 2701 and all of its subtypes) making up 40 percent of the assemblage. This group can be further broken into plain (Code 2701; 88% of the ware), brushed (Code 2701.5; 11%), and minor percentages of red or white-slipped (Codes 2701.4 and 2701.7) and incised or punctate (Codes 2701.1 and 2701.2). A total of 73 percent of all Coarse Brown rims in this sample are necked jars, nine percent are open bowl or plate forms and a minor percent of other forms also are represented.

The second most prevalent ware was Coarse Brown with coarse white temper (Codes 2614 and 2654), making up eight percent of the assemblage. Both of these types are common to the Picayo phase through Late Classic periods in the TVAS survey region. The earlier varieties of both tend to be of dark color (mostly dark brown), while the later versions are much lighter (light brown to cream color pastes). Additionally, the forms of the Classic period varieties of Code 2614 are dominated by *cazuelas*. Unfortunately, the realization to separate the Classic and Formative varieties based on color did not come until after the analysis was over. Vessel form, however, is still a good indicator of time period. Of 27 rims for both Code 2614 and Code 2654 in the Picayo phase sample, only two (7%) were of the *cazuela* form, suggesting that much of the sample is Formative in date. The remainder of forms for these types consists of open bowls and plates (50%), closed bowl forms (15%), *tecomates* (11%) and a minority of others.

The third most prevalent ware is Irregularly-Fired Red-Slipped Coarse Brown (Codes 2821, 2821.12, and 2821.2). All of these were necked jars, as this form is a strong determinant of the type. At Matacapan, these were thought to be general Middle Classic markers (Ortiz and Santley 1988). While they are common during the Classic period, Pool and Loughlin (personal communication 2009) suggest that they were made during the Formative as well. The TVAS ceramic assemblage supports this assessment.

Plain Medium Polished Brown (Code 2519) makes up four percent of these 11 collections. The incised varieties of this type are most common during the of the Picayo phase, so the appearance of the plain variety here makes sense. Of six rims, five were plates with straight divergent walls, one with a widely-everted rim, and one was a closed bowl.

Several types appeared in proportions between 2-4 percent. These include Sandy Fine Orange (Code 1212), Smoothed Red (Code 2906.4), Coarse Red with white (Code 2651) and volcanic ash (2751) temper, and Coarse Polished Black (Code 2512). Together, red paste ceramics (Codes 2651, 2751, 2906.4) compose four percent of the sample. Code 2651 ceramics possess a red paste tempered with coarse quartz and feldspar. During the TVAS, I created a complimentary category named Coarse Red with Volcanic Ash Temper (Code 2751). Code 2751 ceramics may actually be eroded specimens of the Polished Red or Smoothed Red types (Codes 2906.2, 2906.3, 2906.4). Alternatively, they could be a reddish variant of Coarse Brown. Only three rims of the red paste types occurred among this Picayo phase sample, one is a *tecomate* supporting the interpretation that Code 2751 ceramics may be eroded Polished or Smoothed Red ceramics, which frequently occur in this form.

CHININITA PHASE (PROTOCLASSIC [1 – 300 CE])

The Chininita phase correlates with the Protoclassic period (also known as the Terminal Formative and early Early Classic). It is a time of both continuity and change. Many of the ceramic types and forms continue to be used, but fine paste Classic wares also appear. At Totocapan, Ortiz noted that the ceramics common to the previous phase remain dominant, but the Chininita phase is demarcated by the fusion of Formative and Classic period types. Fine paste Polished Black and fine paste Differentially-Fired wares are common in flat-bottomed plate forms, but composite silhouette and jar forms are also present.

At Tres Zapotes, the best indicator of the Nextepetl phase that Ortiz identified was the fine paste Differentially-Fired ware. Pool also finds that fine paste Black-and-Tan

Differentially-Fired ceramics were common to this phase, but the white-rimmed varieties tend to be more common in Hueyapan phase levels. Fine paste Polished Black is also common. More importantly, Sandy Fine Orange is most common during the Nextepetl phase and tends to disappear in the Classic periods. This is an observation first identified at Bezuapan in the late Bezuapan phase (Pool and Britt 2000, see Figures 6.2 and 6.3 above). The difference between Sandy Fine Orange and Fine Orange is slight. They are differentiated based on tactile evaluation. The sandy variety contains high amounts of very fine quartz and feldspar sand and silt, whereas the Fine Orange contains fewer of these inclusions. The gritty texture of Sandy Fine Orange contrasts with the more chalky texture of Fine Orange. It is doubtful that Sandy Fine Orange was intentionally tempered; rather the clays used to produce it were generally sandier. Clays used to produce it probably derive from the upper parts of the Concepción Formation near its transition with the Filisola Formation. Because of this, the regional distribution of Sandy Fine Orange may be partly due to absence of the finer textured clays of clays from lower deposits within the Concepción Formation. Additionally, the chance of analytical bias enters when one considers that the gradual texture transition with depth within the Concepción Formation will translate to a continuum of textures between the Fine Orange and Sandy Fine Orange types. For both of these reasons, I do not use Sandy Fine Orange as a chronological marker by itself. Instead, I examine its presence in conjunction with other Chininita phase ceramics. After all, a fusion of Classic and Formative ceramic types is the hallmark of the Protoclassic period throughout the Tuxtlas (Arnold and McCormack 2002, Ortiz 1975, Pool and Britt 2000).

Ceramic types used to represent the Chininita phase include fine paste Polished Black (Code 2122), Fine Paste Black-and-Tan Differentially-Fired (Code 2224), Coarse Orange with white temper and a dark core (Code 2653), and Coarse Orange with white temper (Code 2655) (Figures 6.8 and 6.9, Table 6.4). Coarse Brown with white temper (Code 2654) is also very popular at this time, but the mixing of Classic and Chininita sherds prevent it from being a temporal marker except where vessel form can be used to separate the assemblages. I include Sandy Fine Orange (Code 1212) and its white-slipped variant (Code 1240) as secondary markers of the Chininita phase. In general, my approach to the Chininita phase was to require at least two of the ceramic types presented

Figure 6.8. Sample of Chininita phase ceramics.

above, at least one of which was either Fine Polished Black of Fine Black-and-Tan. This ensures at least one "Formative" type in every collection assigned to the Chininita and reduces the possibility, or at least the effect, of misclassifying Fine Orange as Sandy Fine

Table 6.4. Chininita phase-sensitive ceramics itemized by site (sites that do not conforming to the selection criteria described above have been omitted from this table)

Site	1212	1240	2122	2224	2653	2655	Total
1 (Totocapan)	332(11)	11	18	17	1	12	**391**
2 (Oteapan)	84(4)		4	4		7	**99**
3	17			1			**18**
5	22	2	3	1		3	**31**
7	7			1	1	2	**11**
15	2		3				**5**
16	4		1			1	**6**
17	39	2	5				**46**
19	7		3	1	2		**13**
24 (Chilchutiuca)	42		6	6	4	2	**60**
26	19	2	2				**23**
28	5			1			**6**
29	23(4)	4	4	1	1	4	**37**
34	19		2				**21**
36	30	4	1				**35**
38/8 (Cruz de Vidaña)	31	1	30	23	4	3	**91**
40	4		1				**5**
42	20(3)		4	8			**32**
43	6			1			**7**
44	20	3	4	2			**29**
45	6			2			**8**
49	8		3	3			**14**
51	24(1)	4		6	1	3	**38**
53	1		2			2	**5**
57	2	1		1		1	**5**
58	1		1				**2**
65	13		1	1			**15**
70	1		1				**2**
71	3		2				**5**
74	2			1			**3**
77	5(2)		5	1			**11**
80	1			3		1	**5**
81	18		1			1	**20**
82 (Francisco Madero)	45			4		1	**50**
84			6		2		**8**
89	90(6)	6	1	1			**98**
93	1	1	1				**3**
100	13			2	1		**16**
102	1			1		16	**18**
106		1		10			**11**
107	1		1				**2**
112 (Bella Vista)		2	1	38		3	**44**
114	2	1		2		3	**8**
115	4	1	2				**7**
116			2	6			**8**
124	36	4		1			**41**
125	2		2	6			**10**
134	8	3	2	2			**15**
136	1			1	1		**3**
138				3			**3**
139 (Tilzapote)	60(1)		5	77	9		**151**
140	5		6	5			**16**
144	3	1	1	3			**8**
156	8			1		3	**12**
162	5			5			**10**
163				4	1		**5**
166	1		3				**4**
167 (La Cuchilla)	23		5	15		1	**44**
170	17		1	1		10	**29**

Table 6.4 (continued).

Site	1212	1240	2122	2224	2653	2655	Total
172	2		1				3
174	2		1	1	1		**5**
175			3	3			**6**
177	2			2		1	**5**
178				2	1		**3**
179	12(1)			1		1	**14**
184				7			**7**
Total	**1986**	**109**	**155**	**293**	**43**	**224**	**2810**

Orange. Inclusion of Sandy Fine Orange is important because Code 2122 and 2224 ceramics are not very popular within the survey region as a whole. Reliance on these two types exclusively will surely underestimate settlement in the survey region. The approach employed here probably also underestimates Chininita settlement, but few alternatives exist at this point in time.

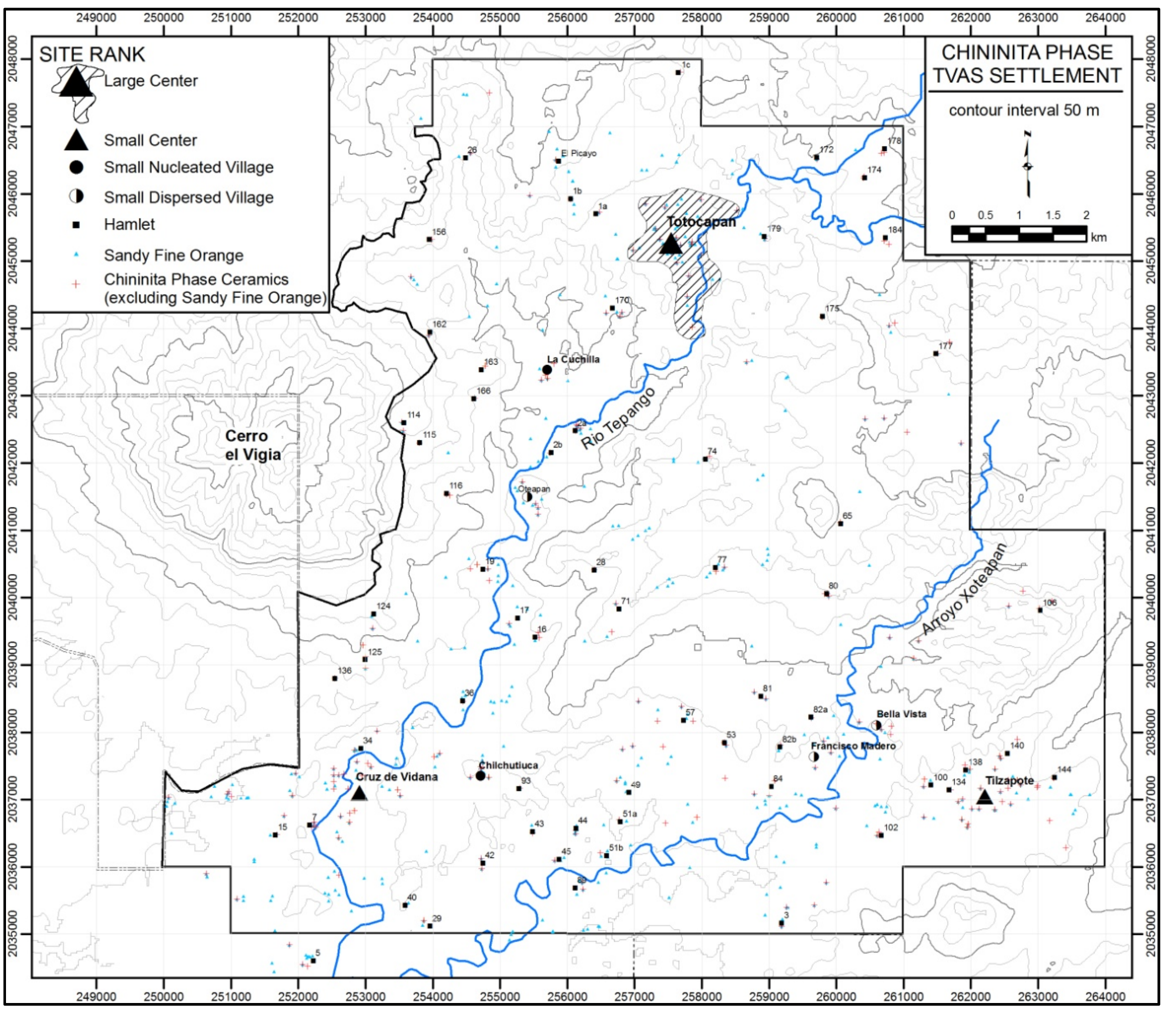

Figure 6.9. Distribution of Chininita phase (1 - 300 CE) sites and ceramics within the TVAS.

Of the 293 Code 2224 ceramics in the TVAS 31 almost half (48%) is concentrated at Tilzapote and its immediate hinterland. Sites along the Tepango River possessed Fine Paste Black-and-Tan but in much lower quantities than at Tilzapote and Bella Vista, though, Cruz de Vidaña and Totocapan possessed 14 percent of this type assemblage. The vast majority of all Code 2224 rim sherds are either flat-bottomed dishes with straight divergent walls, or bowls with convex divergent walls. Closed and composite silhouette bowl forms are also present in minor percentages.

Fine Polished Black ceramics were distributed throughout the survey area, but most closely followed the rivers. Only three specimens were found in the central uplands. It is interesting to note that Tilzapote and nearby Bella Vista only had six specimens apiece of Fine Polished Black, but the two together composed 47 percent of the Fine Paste Black-and-Tan assemblage (Code 2224) for the entire region. Cruz de Vidaña possessed the highest percentage of Fine Polished Black (19%), and Totocapan had the second highest percentage (12%). Interestingly, the majority of the Fine Polished Black ceramics are flat-bottomed dishes with concave divergent walls. These out-flaring walls are not very forms for any other ceramic type.

Totocapan possessed 17 percent of Sandy Fine Orange from sites with at least one ceramic sherd from either the Code 2122 or 2224 categories. Sandy Fine Orange as a whole is nearly ubiquitous in the TVAS area, though the white-slipped variety is more common in the southern half. Sandy Fine Orange presents a wide variety of forms, but closed bowls are the most common.

Coarse Orange with white temper (Code 2655) is fairly evenly distributed, but concentrations are apparent around Totocapan, the northeastern uplands, and the south-central portions of the survey area. Not a single specimen was recovered in the central uplands, reifying the function of valleys as transportation/communication conduits and the central uplands as some sort of physical and cultural barrier (considered below). Coarse Orange with white temper and black cores (Code 2563) shows a strong trend to occur in the southern extreme of the survey area. The complete sample of Code 2653 ceramics includes 43 specimens. Only five of these occur in the northern half of the survey area. The skew toward the southern half may represent technological interaction along the Xoteapan River, but the pattern does not closely conform to the river corridor.

Several Tertiary sandstone outcrops were observed in southern half of the TVAS area. These were identified as Tertiary formations based on the frequent inclusion of small marine shells within the sandstone. It is possible that the temper resource for this ceramic type is crushed sandstone found only to the south. If so, the five specimens found in the northern half of the survey area may have been traded from a production locality in the south. Forms among these two ceramic types consist of neckless jars, which may actually be large restricted orifice bowls, and open dish forms with flat bases and straight divergent walls.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH CHININITA MATERIALS

Separating Chininita collections to study ceramic associations is difficult because it marks the appearance of Fine Orange in small amounts, which is a marker of Classic period assemblages. To reduce the possibility of mixing phases, I looked for collections with few other phases represented. Of course, the Protoclassic is *defined* by a blending of Classic and Formative ceramic trends (Ortiz 1975, Pool and Britt 2000), so this sample may be biased. There are eight collections that had primarily Chininita ceramics[3], were relatively robust, and that had ceramics of relatively few other phases (usually three or less phases represented in each collection). These collections come from Totocapan, Cruz de Vidaña, Xiguipilincan, Sehualaca South, Site 8, Site 84, and Site 184. As a whole, these eight collections have ceramics represented for the Chininita (11%) and Initial Picayo (1%) phases; the remainder of the ceramics in these collections are not phase-specific.

The most common ware in the Chininita phase is Coarse Brown with volcanic ash temper (Code 2701 and its varieties). It actually rises in popularity to encompass 65 percent of these eight collections. Within the Coarse Brown ware, 50 percent display brushing on the shoulders of jars (Code 2701.5), 48 percent are plain (Code 2701), and two percent have a white slip. An interesting temporal pattern occurs here. The

[3] Sandy Fine Orange (Codes 1212 and 1240) was not used to define Chininita phase assemblages for this comparison.

incidence of brushing on the shoulder of Coarse Brown jars goes from 22 percent in the Initial Picayo phase, to 11 percent in the Picayo phase, to 50 percent in the Chininita phase. The brushing technique becomes most popular during the Classic period, gaining momentum by the Protoclassic. This follows ceramic technological patterns observed by Pool and Britt (2000) and Ortiz (1975) that the Protoclassic marks a transition period marked by continuation of old techniques with the addition of new techniques of pottery production. Despite the prevalence of Coarse Brown in these assemblages, only one rim sherd was present: a necked jar.

The second most prevalent (8%) ware is Coarse Brown with white temper (Code 2614). Only two vessel forms were identified among the rims of this type, one was a *cazuela*, which tends to be more indicative of the Classic period, and the other was an open plate form. Also present in minor percentages were Plain Polished Brown (Code 2519; 4%), Brown Slipped Coarse Brown (Code 2611; 3%), Coarse Red (Code 2651; 3%), and Irregularly-Fired Red-Slipped Coarse Brown (Code 2821; 2%).

SANTIAGO A (EARLY CLASSIC [300-450 CE])

At Totocapan, Ortiz (1987) defined the Santiago A phase to correlate with the Early Classic. He remarks that this is the first phase that the Formative and Classic are clearly differentiated, though some formative types surely continue to be used throughout the region, as seen at Bezuapan (Pool and Britt 2000). Ortiz notes that certain forms and decorative techniques carry over from the Formative period on new paste types. Much of what Ortiz (1975) observes within the Santiago A phase continues into the Santiago B phase, but certain elements are restricted to the former. High annular bases, rectangular supports, closed bowl forms on Fine Gray pastes, strap handles, and some composite silhouette forms all appear more common to the Santiago A phase (Ortiz 1975:181). The high annular bases and rectangular supports may be indications of Teotihuacan influence, but Ortiz does not actually call out any rectangular supports in his detailed type descriptions and the only annular support is a very low ring (Ortiz 1975: Figure 84h). While these do not speak strongly of Teotihuacan connections, several possible artifacts were detailed that may indicate central Mexican inspiration (discussed in Chapter 3 and Chapter 8).

Between his pits excavated at Totocapan and Matacapan, Ortiz notes that the former more clearly displays an Early and Middle Classic occupation while the later dates mainly to the Late Classic with minor representation in the Early Classic (1975:218-219). Of course, subsequent excavation at Matacapan shows that this center reaches its apogee during the Middle Classic and begins to decline by the Late Classic (Santley et al. 1985).

The Early Classic period in the Tuxtla Mountains is best known from Matacapan, though the foreign influence there may restrict the broad application of its ceramic types to the region at large. Phase C at Matacapan is best represented by Fine Buff and Coarse Brown with soft *rastreado* technique. Fine Buff is a cousin of Fine Orange, but it tends to be a more compact and micaceous paste that usually preserves surface treatment better than Fine Orange. Many of the Teotihuacan-style ceramic forms and designs occur on Fine Buff pastes. Fine Buff has many variants, including plain (Variant A), those with a light colored band along the rim (Variant B), circular depressions (Variant C), zoomorphic designs (Variant D), horizontal channeling (Variant E), symbolic or complicated designs (Variant F), brown interior red exterior simple (Variant G), brown interior red exterior with negative decoration (Variant H), simple incised lines (Variant I), and double incised lines and circular punctations (Variant J). At least six of these variants were identified within the TVAS assemblage, but Fine Buff in general was not very common. Coarse Brown with Soft *Rastreado* are jars with very shallow lines impressed onto the body of the jar. The lines travel horizontally across the vessel, but the neck and shoulders often do not display this surface treatment. Very few examples of this type were identified in the TVAS.

At this point, a major analytical difference must be discussed regarding the definition of the Early Classic in southern Veracruz. Only work at Matacapan and Totocapan has separated phases that differentiate a Middle Classic from the Early Classic. The former period corresponds to the time of greatest influence of Teotihuacan in Mesoamerica. Isolating this period at Matacapan was obviously important for answering question about Teotihuacan interaction. Likewise, Teotihuacan influence on the material culture of Matacapan began during the Early Classic, which would correspond to what some call an early pulse of interaction (Braswell 2003a). The ceramic types that represent Phase C at Matacapan do indeed date to the early part of the Classic period, but these are very rare ceramic types and certainly are not isolated from more pervasive indicators of Classic period assemblages. Fine Orange, for example, is introduced in significant quantities during the Chininita phase (Ortiz 1975) and reaches the peak of its popularity during the Middle Classic. Ignoring Fine Orange to reckon Santiago A phase settlement is therefore an analytical separation that does not reflect behavioral trends. Other work in the Tuxtlas leaves out the Middle Classic period and defines only an Early Classic period (and its corresponding phase) that begins around 300 CE and ends at 600 CE (see e.g., Knight 1999, Kruszczynski 2001, Pool 2007, and Loughlin 2005).

In an attempt to offset these biases in the ceramic chronology, I recognize that many of the Santiago B and Santiago A phase ceramic indicators overlap. In the following chapter, I present settlement patterns for each phase individually, but I also present a map of materials that span both phases. Ceramics that occur primarily in the Early Classic period are Fine Buff (Code 1213), Fine Buff Incised (Code 1223), Red on Fine Buff (Code 1265), and Coarse Brown with Soft *Rastreado* (Code 2616) (Figures 6.10 and 6.11, Table 6.5). I use the distributions of several Fine Orange types (Codes 1221, 1222, 1231, 1233, 1236, 1254, 1271, 1272, 1273, 1275, 1276, and 1277) to fill in the gaps for the Santiago A phase settlement.

Fine Buff and its varieties occur at every site deemed to have a Santiago A phase occupation. Totocapan, Oteapan, Site 49, Texcochapan, and Zezecapan possess a disproportionate amount of the type. However, all of these sites except Totocapan were among the first assemblages analyzed and the project before we had a comparative sample of Fine Buff on hand for reference. I do not doubt the presence of Fine Buff at these sites, but the quantities may be inflated[4]. Thirty percent of the Fine Buff rims found in the TVAS displays orientations indicative of closed bowls. Twenty-six percent

[4] To establish a settlement map for the Santiago A phase in Chapter 7, I eliminated ceramics codes as Fine Buff from the first three weeks of analysis.

are bowls with convex divergent walls, eight percent are vertical-walled bowls, and several

Figure 6.10. Sample of Santiago A phase ceramics.

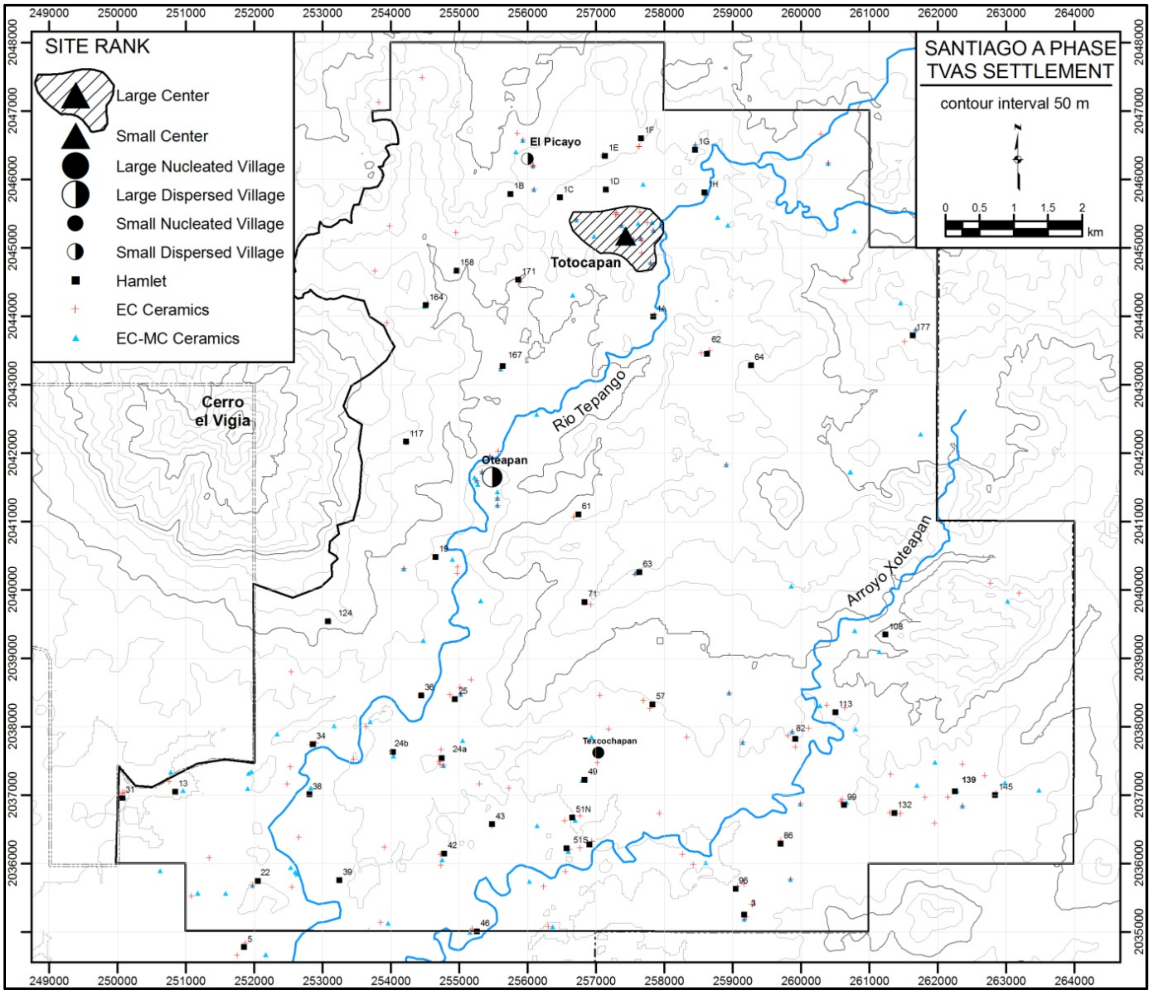

Figure 6.11. Distribution of Santiago A phase (300 – 450 CE) sites and ceramics within the TVAS.

Table 6.5. Santiago A phase-sensitive ceramics itemized by site. Totals in red italics represent only scant evidence of Santiago A phase occupation.

Site	1213	1223	1265	2616	Total
1 (Totocapan)	50	2	5		**57**
2 (Oteapan)	41	3	2	1	**47**
3	23			1	**24**
4	2			1	**3**
5	2				**2**
6	1				***1***
8	1				***1***
12			1		***1***
13	4	2			**6**
18			1		***1***
19	1	1			**2**
22	2				**2**
23	1				***1***
24	7				**7**
25	4				**4**
26	1				***1***
27		1			***1***
29	1				***1***
31	6	2			**8**
32	1				***1***
34	2				**2**
35	1				***1***
36	2	2			**4**
37	1				***1***
38 (Cruz de Vidaña)	1		1		**2**
39	4				**4**
42	2	1			**3**
43	10				**10**
46	9				**9**
48	1				***1***
49	33				**33**
50/58 (Texcochapan)	88				**88**
51	37				**37**
53	1				***1***
54	1				***1***
56	1				***1***
57	4			4	**8**
60	6				**6**
61	3		3		**6**
62	5				**5**
63	12				**12**
64	4				**4**
69	1				***1***
71	2				**2**
75	1				***1***
81	2				**2**
82	11				**11**
83	1				***1***
86	4				**4**
87	1				***1***
89	2				**2**
93	1				***1***
94	1				***1***
96	2				**2**
97	1				***1***
99	2				**2**
100	1				***1***
103	2				**2**
104	1				***1***

Table 6.5 (continued).

Site	1213	1223	1265	2616	Total
108	3				3
113	2				2
117	6				6
121		1			1
124	5				5
132	3				3
133	3	1			4
136	1				1
139	9				9
145	2				2
156	1				1
157			1		1
158	4				4
161	1				1
162	1				1
164	6				6
167	1			2	3
171	3				3
173	1				1
174	1				1
176	1				1
177	2				2
183	2				2
186	2				2
Total	476	16	13	8	511

jar forms are also present in minor percentages. The vertical-walled bowls (n=10) could be cylindrical vases of Teotihuacan inspiration, but only one of these strongly resembles these forms found at either Teotihuacan or Matacapan. This one Fine Buff cylindrical vase came from Totocapan, but no rectangular supports were identified there.

Only eight sherds of Code 2616 were identified from the survey, four of which were recovered at one site (Site 57). It is perhaps significant that Code 2616 ceramics were found in the Merchants Barrio at Teotihuacan (Rattray 1979, 2001). The lack of this ware within the TVAS may therefore indicate an absence of direct Teotihuacan interactions with the Tepango valley. No rim sherds were recovered.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH SANTIAGO A PHASE MATERIALS

In the following discussion, I remove the earliest three weeks of ceramics analysis from consideration for correlations with phase non-specific wares. This qualification leaves only four collections that were primarily Santiago A phase with enough sherds to be relatively robust. Even so, Fine Buff made up only 16% of these four collections and there were no sherds coded as 2616. Santiago B phase ceramics made up 9% of this sample. Of course, it may be impossible to truly rule out Santiago B phase components for collections containing Santiago A phase markers.

In these four collections, Coarse Brown with volcanic ash temper (Code 2701) composes 42 percent of the assemblage. Only 17 percent of the Coarse Brown type is *rastreado*; a drop from the preceding Chininita phase. Two rims were present among this ware group and both were dishes with straight divergent walls. A total of 16 percent of the sample is composed of Coarse Brown with white temper, one rim within this ware group was a restricted orifice bowl with convex convergent walls. A minority of other types also were present, these include Coarse Red with white temper (Code 2651; n=4 or 7%), Irregularly-Fired Red-Slipped Coarse Brown (Codes 2821, 2821.12, 2821.2; n=3 or 5%), Brown-Slipped Coarse Brown (Code 2611; n=2 or 4%), and Fine Gray (Code 1111; n=2 or 4%).

SANTIAGO B (MIDDLE CLASSIC [450-650 CE])

The Santiago B phase in the Tuxtlas is best known by comparison to excavations at Matacapan. At Matacapan, Phases D and E correlate with the Santiago B phase. Ortiz (1975) argues based on the prevalence of ceramics during the Santiago B phase that this was the period of Totocapan's fluorescence, though he only excavated one pit there. Types sensitive of this phase include Fine Orange (Code 1211), Red on Fine Orange (Codes 1261 and 1262 [incised]), Red Wash on Fine Orange (Code 1231), Brown-slipped Fine Orange (Code 1232), Orange-Slipped Fine Orange (Code 1234), "Brown-Slipped Coarse Brown" (Code 2611), White-Slipped "Brown-Slipped Coarse Brown) (Code 2612), and Matacapan Coarse Orange/White (Code 2811) (Figures 6.12 and 6.13, Table 6.6).

Ortiz and Santley (1988:109) note that Fine Orange was produced in a great variety of forms, but most common were bowls with convex convergent walls,

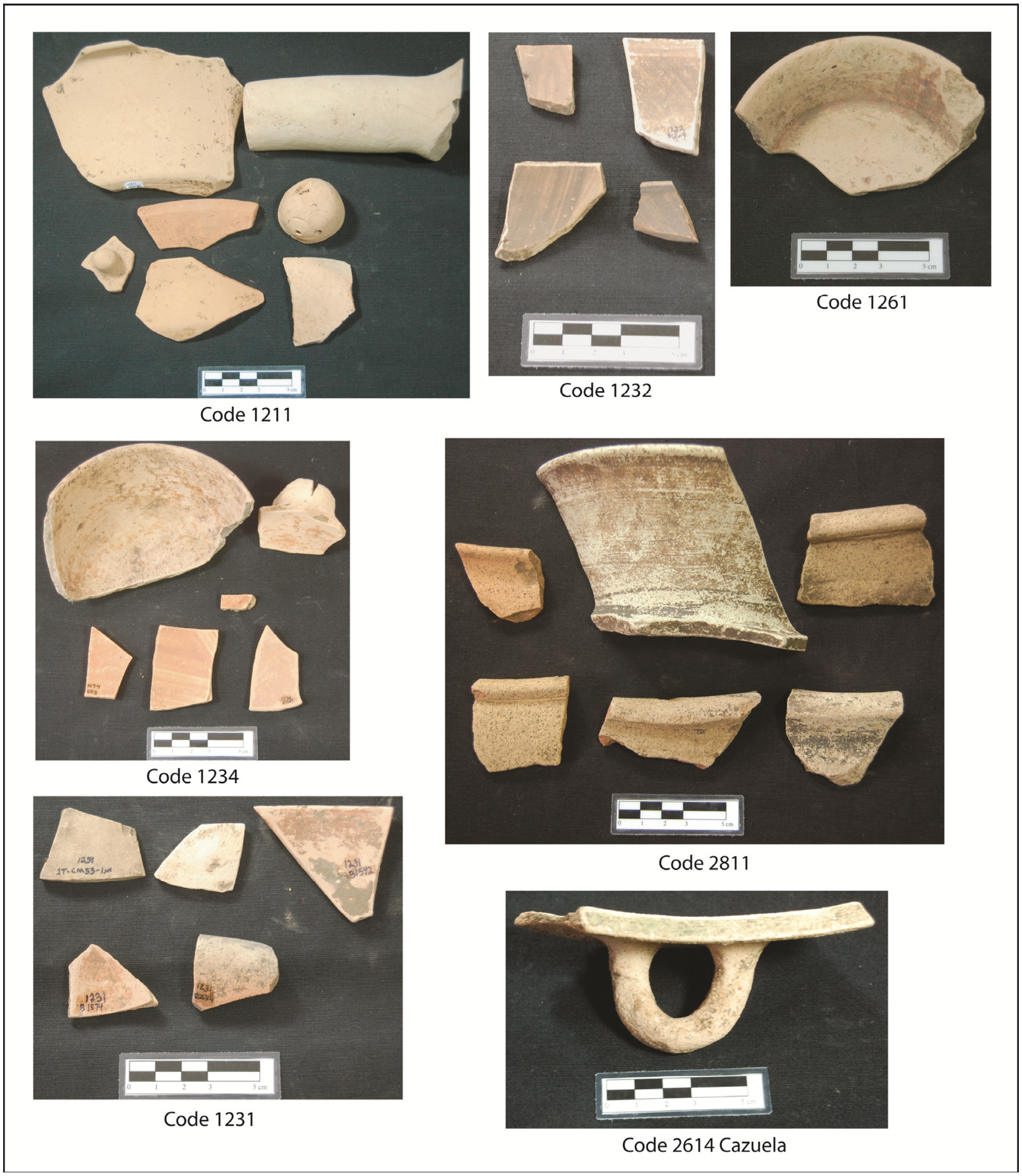

Figure 6.12. Sample of Santiago A phase ceramics.

hemispherical bowls, convex and lightly divergent walled bowls, plates with straight divergent walls and a flat base, plates with flat bases and straight divergent walls with an everted or flying lip, semi-globular restricted orifice bowls almost closed at the mouth, and miniature plates and jars. Wall thickness is almost always very thin. Fine orange is commonly found with incision, but Matacapan has had a greater impact on regional

Table 6.6. Santiago B phase-sensitive ceramics tabulated by site. Totals in red italics represent sites with only sparse evidence of Santiago B phase occupation.

Sites	1211	1231	1232	1234	1261	1262	2811	Cazuelas	2612	2611	Total
1 (Totocapan)	617	13	16	4	3		392	144	71	374	1634
2 (Oteapan)	152	2	2	3	5		65	21	3	49	302
3/4/96/100 (Pizapan)	99						42	36	1	49	217
5 (Xiguipilincan)	34				2		10	4	1	20	71
6	18							6	5	2	31
7	8	1					1	1		2	13
9	13			1			3		1		19
10	6			1			10	10	1	8	36
11	7				1			1	3	10	22
12	5							3		7	15
13	12							1		1	14
14	1									1	*2*
15	3									2	5
16/17 (Sehualaca)	32						21	14	2	23	92
18	5									5	10
19	11						5	1	2	3	22
20	4						7	2		10	23
21							1				*1*
22	2				1			1		1	5
23	18	8	1	1			7	15	14	9	73
24 (Chilchutiuca)	30	3	2	1	2		19	15		18	90
25 (Vista Hermosa)	31		1	2			13	5	4	6	62
26	71						5	2		11	89
27	6								1	3	10
28	7									3	10
29	14						5	6		3	28
31	66						4	7	3	27	108
32	12						1	1			14
33	8				6		2	3	1	2	23
34	8						2	3	1	9	23
35	3						1				4
36	35						13	7	3	10	68
37	3						1		2	3	9
8/34/38 (Cruz de Vidaña)	31	1			1		3	3	2	11	52
39	20						1			4	25
40								3			3
41								1			1
42	27	2	2	4	1		10		3	13	62
43	13						3	2		2	20
44	8					1	9	2	2	1	23
46	19	3	2				9		2	3	38
48	3									2	5
49	24								2	9	35
50/54/56/58 (Texcochapan)	71		2				52	14		18	168
51 (Zezecapan)	118			6	3		30	19	3	13	192
53	5						2			3	10
57	19						7				26
60							1			1	*2*
61	5	2								1	8
62 (La Cuesta)	24		1				21	8	1	13	68
63/77 (Tetax)	34		1	2			28	24	1	13	103
64	16						15	6		5	42
65 (Coyoltepec)	34						18	7		17	76
66	1									2	*3*
67	3										*3*
68					1					3	4
69	34		6				1		1	11	53

Table 6.6 (continued).

Sites	**1211**	**1231**	**1232**	**1234**	**1261**	**1262**	**2811**	**Cazuelas**	**2612**	**2611**	**Total**
70	5		2				2			1	**10**
71	7								1	1	**9**
72	12							1	1	8	**22**
73	4				1		3	1	1	4	**14**
74	1									2	***3***
75	30						5	1		3	**39**
76	4									1	**5**
78	7						1				**8**
79										1	***1***
80	4						2	1		4	**11**
81	48						7	1	1	1	**58**
82/112/113 (Francisco Madero)	219	1	1		1		126	49	5	126	**528**
83	18						12	3	1	9	**43**
84	1									1	***2***
85	24		1				3	4		18	**50**
86	13			1			5			4	**23**
87	60				1	1			2	31	**96**
88	1						1	1			**3**
89 (Maxyapan)	99	3	1	1	3		9	26	5	31	**180**
90	5	1								10	**16**
92	19			1	2		1			1	**24**
93	3									4	**7**
94	9			1			1	2		1	**14**
95									1	2	***3***
97	34						32	1		14	**81**
98	24						24	3		7	**58**
99	64	1		1			56	8	1	15	**146**
101	6						2			2	**10**
102	4						8	3		71	**86**
103	75				1		11	2		51	**140**
104	14						1	1		67	**83**
105	7				1		2	1		21	**32**
106	7									5	**12**
108	12							1		48	**61**
109	13									13	**26**
110	32						36	9	2	9	**88**
111							23	2		7	**32**
114	17			1			2			3	**23**
115	15						1		1	1	**19**
117	37		1	1			4	5	3	12	**63**
118	1									1	***2***
119	5						1			1	**7**
120	5										**5**
121	20	1	2	4			4			4	**35**
122	39		1				3	1	4	2	**50**
123	5								1	1	**7**
124	107		2				12		1	9	**131**
130	3				1					5	**9**
131	32									2	**34**
132	22	1					38	2	4	2	**69**
133	11						1			3	**15**
135	15						4	1			**20**
136	6									1	**7**
137	12		1				1	1	1	3	**19**
139/134/138/145 (Tilzapote)	273	1	3	1	4	2	66	7	4	39	**400**
140	11				2						**13**
141	42							1		1	**44**
142	1									12	**13**
143	19						94	5		11	**129**

Table 6.6 (continued).

Sites	1211	1231	1232	1234	1261	1262	2811	Cazuelas	2612	2611	Total
144	1									3	**4**
146							1			34	**35**
147	50						23	7	1	21	**102**
148	18							1		5	**24**
149										6	**6**
150	8						29		2	6	**45**
151										4	***4***
152	2						10		2	9	**23**
153			2								***2***
155	2			1						3	**6**
156	23			1			1	1		11	**38**
157	2										***2***
158	5						2	3	3	4	**17**
159	7							2			**9**
161	7						8	5		6	**26**
162	17						4	4		5	**30**
163									1		***1***
164	9						3	2		5	**19**
165	10						1		1		**12**
166	3						1	2		5	**11**
167	12						4	1	3	5	**25**
169	3									3	**6**
170 (Bustamante)	13			3			5	5	5	15	**46**
171	26						1	4	2	4	**37**
172	3						2				**5**
173	4								1	1	**6**
174	3						1			3	**7**
175	1						3			1	**5**
176	10						7				**17**
177	20	1					2			3	**26**
178	10						2			2	**14**
179 (Nancinapan)	22	3			1		28	10	4	9	**77**
180	2						4				**6**
181	6						2	1		4	**13**
182 (El Nopal)	77						33	18		13	**141**
183	25		1				27	2		4	**59**
184	4	1					10				**15**
185	3						4			6	**13**
186	8						4	1		1	**14**
Total	**4032**	**51**	**56**	**44**	**45**	**6**	**1723**	**607**	**204**	**1824**	**8248**

ceramic decorative trends adopted by other settlements in the Catemaco Valley with its bichrome painted bowls and plates. Additionally, recent research by Venter (2008) at Totogal suggests that many of the incised varieties also date to the Postclassic and are therefore not useful for chronological placement of collections.

Painted decoration on natural or polished Fine Orange paste creates several variants of bichrome decoration (Ortiz and Santley 1988). Red on Fine Orange is the most frequent bichrome ceramic dating to the Middle Classic. Matacapan Variant A consists of painted rectangles and vertical stripes. Variant B consists of globular or oval

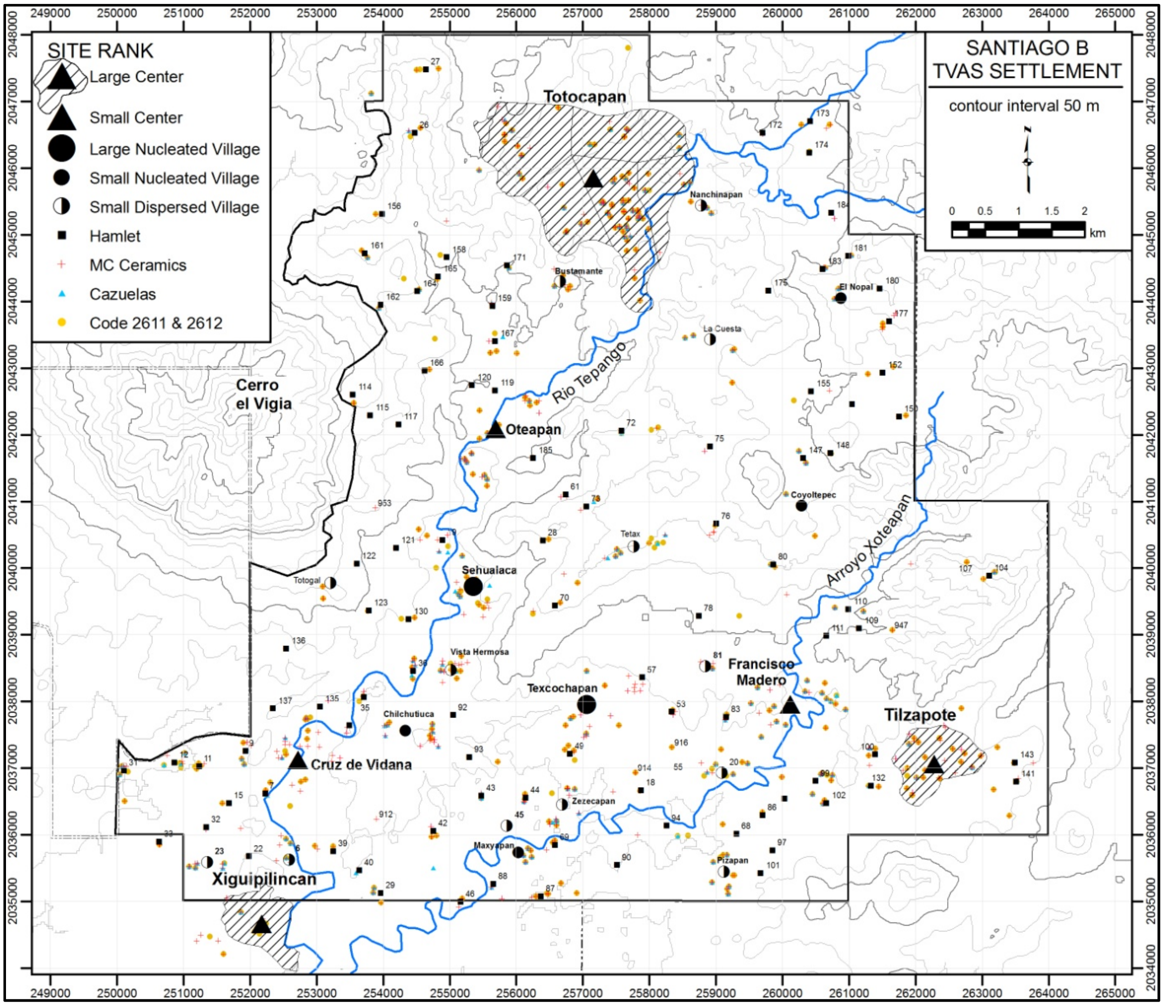

Figure 6.13. Distribution of Santiago B phase (450 – 650 CE) sites and ceramics within the TVAS.

designs combined with painted vertical lines. Within these painted forms sometimes occur engraved hooks or semicircular designs. A line is often painted on the exterior surface below the lip. The interior of this variant is never painted and is instead brilliantly burnished. Variant C consists of elongated spirals painted in red. The most common painted design preserved on Fine Orange for the TVAS was Variant D, which was a horizontal band of red that covers the superior part of the lip and rim and travels around the entire vessel. This simple decoration is often accompanied by complicated serpent designs or wide wavy lines applied to the interior surface of flat-based plates. Wide wavy lines were detected in small proportions during the TVAS, but no feathered serpent designs were identified.

Matacapan Coarse Orange (Code 2811) is very important for this research. It was the most intensively produced ware at the largest ceramic workshop complexes (Comoapan and Area 199) at Matacapan (Arnold et al. 1993, Pool 1990, Santley et al. 1989). My compositional analysis using instrumental neutron activation analysis and petrography showed that this ware was traded along the Catemaco River to the south of Matacapan (Stoner 2003, Stoner et al. 2008). A major objective of the TVAS materials analysis is to determine if these ceramics were also traded to settlements along the Tepango River. The paste is unique in the region. It always consists of a uniform fine to medium sand-sized (using the Wentworth scale) volcanic ash temper and almost no other inclusions visible to the naked eye. Its form is highly standardized. Coarse Orange is almost always found in necked or neckless jar forms, but a very minor percentage of convex divergent-walled bowls have also been observed. The necks of jars are straight and diverge as they approach the out-flaring lip. Neckless jars have a restricted orifice with a thickened lip that flares up and out subtly (Matacapan Form 38). Very few other pastes appear in these jar forms. Valenzuela's (1945b) research at Totocapan recovered a complete Coarse Orange jar that he suggests to resemble examples found in the northern Gulf Coast. However, the example photographed from Totocapan (Valenzuela 1945b: Figures 1 and 4) is identical to those produced at Matacapan. Coarse Orange is usually slipped in white or cream and geometric designs are painted in black, brown, or red over the slip.

The TVAS displays a tremendous amount of variation within the 2600 ware group. Ortiz and Santley (1988:116-117) include two varieties that are most abundant during Phase E, or the late Middle Classic. The first displays a red to yellowish-red paste color and is said to have a brown colored self-slip, but in reality the type is almost never slipped. The paste of this type (Code 2611) contains abundant very fine to fine quartz temper (which may include other white colored minerals). Moreover, the temper displays a highly uniform grain size within any given specimen. Ortiz and Santley's (1988) second variety has a cream or tan colored paste. This corresponds to the Code 2614 paste on the current project. Code 2614 is typically a little coarser than Code 2611, the temper grain size is less uniform within specimens, and the color is always lighter. The coarsest varieties of Code 2614 were put into Code 2654 during the TVAS analysis. Ortiz and

Santley (1988:117) note that the vessel form for these variants is almost always broad shallow dishes that resemble a frying pan in general form (i.e., *cazuelas*). The sides of these *cazuelas* are fitted with loop handles. Pool and Ortiz (n.d.) note that at Tres Zapotes, Code 2611 also occurs as small restricted orifice bowls and deep cylindrical vases with horizontal channels grooved into the side.

The Code 2611 paste occurred on a variety of forms, but the paste recipes were rather standardized from specimen to specimen. A surprisingly underrepresented form of the 2611 paste was the *cazuela*. Code 2614, on the other hand, was overwhelmingly dominated (54%) by the *cazuela* form, but displayed a greater amount of paste variation than Code 2611. To be conservative, I use only *cazuela* forms made from Code 2611, 2614, and 2654 pastes as phase markers. This excludes the majority of Code 2611, but I list Code 2611, and its white-slipped variant 2612, in Table 6.6 as a secondary phase marker. Within the TVAS, the Code 2611 paste also is formed into *incesarios* similar to Forms 103 and 108 at Matacapan.

I include Code 2611 in this discussion of Middle Classic ceramics for another reason. This was the paste used to produce a number of finely crafted, highly decorated serving bowls somewhat restricted in their distribution to Totocapan and its immediate hinterland, with a small minority found in other parts of the survey area. I believe the highly constricted distribution of these decorated bowls pertains to the formation of a clique of highly interconnected and cohesive nodes which acted as a mini-core in the Tepango valley. As I introduce below in this chapter, and elaborate further in Chapter 8, these bowls were likely produced and distributed by Totocapan. Its distribution may therefore be an indicator of relations between Totocapan and other centers in the region.

Fine Orange is distributed throughout the Middle Classic TVAS area. Slipped varieties are more restricted, but their distribution does not correspond to sites of higher rank. Painted decorations are more rare, and they were found almost exclusively at larger sites like Tilzapote, Oteapan, Xiguipilincan, and Cruz de Vidaña. The TVAS Fine Orange assemblage exhibits many vessel forms. The most popular (n=173 or 27%) was the bowl form with convex convergent walls and a variety of lip terminations. Next in frequency were plates with straight divergent walls and a variety of lip terminations (n=138 or 21%). Common among these plates were everted or ‘flying’ lips. Next in frequency were bowls with convex divergent walls (n=123 or 19%). These three general forms were the most popular by far. Several other forms were of moderate popularity among the Fine Orange types. These were flat-bottomed plates with concave divergent walls (n=49 or 8%), heavily-restricted-orifice bowls with a globular shape (n=42 or 6%), small and miniature necked jars (n=24 or 4%), and composite-silhouette bowls (n=17 or 3%). Finally, a number of Fine Orange appendages were coded. These include three lids (one of these may have been for a cylindrical vessel), four handles, four small solid supports, three rattle supports, one annular base, two hollow cylindrical supports, one small hollow support, one spout, and one spout handle.

Matacapan Coarse Orange was commonly found everywhere Fine Orange appeared. However, Totocapan possessed 23 percent of the Coarse Orange assemblage for the entire survey area. Totocapan possessed 19.8 percent of all Santiago B phase sensitive ceramics, so it used slightly more Coarse Orange than other sites in the region. I suggest in Chapter 9 that this indicates a direct economic relationship with Matacapan. Oteapan to the south of Totocapan also possessed a large portion of the Coarse Orange found on survey (4%; Oteapan possessed 3.6% of all Santiago B phase sensitive materials), but not as much as Site 143 (5%; Site 143 only possessed 1.6 % of all Santiago B phase sensitive materials) a small community located outside the large center of Tilzapote. Matacapan Coarse Orange occurs on a limited set of forms. Most common are globular jars with high straight or gently curving neck with and everted lip and neckless jars with a thickened rim and everted lip. Also occurring on a Coarse Orange paste are miniature jars that mimic the form of the larger varieties and large bowls. The better-preserved specimens preserve the white to cream-colored slip and remains of black and red paint. The crevices between the exterior surface of the rim where the lip is everted is a common place to find remains of paint.

Code 2611 is not used here as a primary marker of the Middle Classic, but based on previous research and associations with Middle Classic assemblages in TVAS collections it is primarily considered a Middle Classic ware. There is a tremendous amount of variety among ceramics with this paste recipe. All of this variation will be detailed here, but only the plain Code 2611 and the white-slipped variety (Code 2612) are used as secondary markers.

As treated in the TVAS analysis, Codes 2611, 2612, and 2613 and all of their varieties have similar paste recipes. Color ranges from yellowish-red to reddish orange. Paste color is uniform from each surface through the core. These types have a very compact paste brought about by abundant fine to medium quartz temper. The quartz temper is always very uniform, indicating that it was well-sorted through some natural or cultural process. There may also be minor amounts of visible feldspar inclusions. Ortiz and Santley (1988) note that the colors of their Type 22 can also range to light brown or cream, but these were typically coded as 2614 in the current analysis.

Surfaces of the unslipped variants of Code 2611 are typically smoothed, but never burnished or polished. Scraping is apparent on some vessels. The white-slipped type (Code 2612) is often highly polished on slipped surfaces, but there are some examples of a matte finish. A minority of the white-slipped with matte finish specimens may actually belong to Code 2405, though the forms for most are not typical of Initial Picayo ceramics. The red-slipped type (Code 2613) possesses a red slip, which may often be a self-slip of the same clay. However, some red slips are specular and take on a deeper red hue than the paste. The finish of most of the red slips is simply smoothed, but some exhibit burnishing. Brown slips over a reddish paste are also present (Code 2611.2) but rare.

The 261x typology became very complex when analysts began to recognize several double slipped (where one slip overlaps another) and half-and-half slipped (where one slip covers the exterior surface and a different color slip covers the base and interior) varieties. All double slipped and half-and-half slipped variants possessed a characteristic thick white slip as one of their components. Additionally, all of these complex-slipped variants were found on the same vessel form: shallow bowls with gently curved or flat bases with straight vertical or slightly convergent walls and direct lips. An example of these types and this form was illustrated by Valenzuela (1945b). Based on his photograph of one of these vessels (Valenzuela 1945b: Figure 16), it can be determined that they possessed large hollow spherical supports that may or may not be rattle supports. A large number of these supports were recovered during the TVAS on this paste, but without this photograph it would have been difficult to connect them to this particular vessel form.

Code 2611.2 shows a thick white slip covering the entire interior surface, but only the exterior surface of the base is slipped white. All white portions of this variant were usually highly polished. The exterior surface of the vessel wall was slipped brown with a smoothed finish. Code 2612.2 exhibits a double slip of orange over thick white on the interior but the exterior only displays the thick white slip. Code 2613.1 has a thick white slip on the interior surfaces of the bowl and on the exterior surface of the base, but the exterior surface above the base is coated in a red slip. Code 2613.3 is the same as 2613.1 but with the addition of black painted designs over the red-slipped portions of the bowl. Code 2612.3 may have been intended as the same as 2613.3, but the black pigment is painted over the smoothed surface of the natural paste color. Code 2613.4 exhibits a red over white double slip and is often incised (Code 2613.41). All of these ceramic codes appear to be most popular in the Middle Classic, but some may have occurred later. Stark (2001:109-110) describes similar double-slipped and bi-slipped ceramics for the Late Classic period in the Mixtequilla area (600-900 CE). Incised double-slipped varieties tend to be later, but double-slipped ceramics are rare elements of the general Classic ceramic assemblage.

There is a lot of variability in decoration of these types. The simplest decoration consists of simple horizontal lines engraved about 2-3 mm below the lip on the exterior. More complex designs consist of zigzags, reptilian themes, panel dividers in the form of reptilian scales, scrolls, a punctate starburst pattern, and wavy lines, among others. Decoration is most often engraved through the thick white slip creating a contrast with the underlying red paste. Incision is also common on the unslipped varieties. None of the painted designs were complete enough to discern motifs.

The simple variants of Codes 2611 and 2612 were found throughout the survey area. They show a strong positive correlation with the appearance of general Middle Classic ceramics. However, as alluded to above, the distribution of double slipped and half-and-half slipped varieties with reptilian designs are strongly skewed towards the center and immediate hinterland of Totocapan. Hollow globular supports, some of which were rattles) of the same paste and slip are even more greatly skewed toward Totocapan. However, they are present in smaller percentages at the other centers in the region. This pattern suggests that Totocapan was the center of production for this material set, and they maintained connections with the largest centers in the region and spread their ideology, in part, through these vessels. This is discussed in more detail in Chapter 8.

The form and decorative techniques observed on these ceramics are not the only connection to the Western Lower Papaloapan Basin identified within the TVAS. Versions of Acula Red-Orange have rarely been identified (Stark 1989, 2001). Also, Escolleras Chalk appears in minor percentages (discussed below). Interestingly, both the Acula Red-Orange and the bi-slipped and double slipped varieties show a strong fall-off pattern with distance from Totocapan. Together these data suggest that the TVAS engaged in informational and technological interactions with the Western Lower Papaloapan Basing during the Middle and Late Classic. Totocapan appears to have been the node that initiated this interaction within the TVAS. Loughlin has identified similar ceramic types in the area surrounding El Mesón situated at the other end of the northwestern transportation corridor from Totocapan (discussed in Chapter 4), so this may have been an important route of exchange and communication.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH SANTIAGO B PHASE MATERIALS

Collections with exclusively Santiago B phase ceramics are more common than any other phase. A total of 49 collections were selected to identify phase non-specific ceramic types that were employed during the Santiago B phase. Twenty-six percent of the ceramics from these 49 collections were Santiago B phase ceramics. This is a conservative percentage estimate that does not include types from the 2600 ware group, nor does it include *cazuelas*. If these were included, Santiago B phase ceramics would constitute more than half of the sample. Chaneque phase ceramics are the second most abundant phase-sensitive category composing two percent of the entire sample. Present in quantities of less than one percent of the sample were Picayo phase, Chininita, Santiago A, and the combined Santiago A and Santiago B phase.

Aside from the Santiago B phase ceramics, the most popular ceramic ware group was Coarse Brown with volcanic ash temper. Code 2701 composed 62 percent of the Coarse Brown ware group, followed in order of descending proportion by *rastreado* sherds (Code 2701.5; 37%), White-Slipped Coarse Brown (Code 2701.7; <1%), and Red-Slipped Coarse Brown (Code 2701.4; <1%). *Rastreado* on necked jars was considered to be a general indicator of the Middle Classic at Matacapan, but in the TVAS it occurs in lower percentages in the Middle Classic than in the Chininita. Only 33 rims were identified among the Code 2701 varieties. Twenty were necked jar forms, three were neckless jars, six were plates with straight divergent walls, one was a restricted orifice bowl, one was a very open plate form, and one was a *comal*.

The second most prevalent phase non-specific ware were the combined Code 2611, 2612, and 2613 category. Of course, this ware was described above as a secondary marker, so it is not surprising that they were popular during the Middle Classic. As a whole, this ware composed 17 percent of the 49 collections sampled here. The majority of these (94%) were plain (Code 2611), with plain White-Slipped (Code 2612; 3%), and several other variants making up less than one percent of the ware group (Codes 2611.11, 2612.11, 2613.11, 2611.2, 2613). Forms consisted primarily of jars (23%), bowls with convex divergent walls (15%), restricted orifice bowls (14%), very open forms such as *comales*[5] and *escudillas* (12%), flat-bottomed plates with concave divergent (7%) and straight divergent walls (5%), and a handful of other forms that make up small percentages of the ware. The *escudillas* recognized on this paste may actually be *incensario* lids. "Spiked censers" also were identified on this paste in the TVAS assemblage and elsewhere (Venter 2008). If they are *incensarios*, they may be useful for delineating the ritual landscape in the future. Also present are several miniature plates, one loop handle, a spout, and a hollow globular support. It is possible that loop handles made from the Code 2611 paste were either *incensario* lid handles or loop supports from Teotihuacan-like censers (Rattray 2001, Stark 1990).

Coarse Brown with fine to medium white temper (Codes 2614) and coarse white temper (Codes 2654, 2654.1) are the next most frequent ware in the Santiago B phase. All three of these Codes typically have the same color, which is cream to light brown. The difference between Code 2614 and 2654 is the grain size of the quartz temper; the latter is much coarser than the former. I lump them here because they present very similar colors and vessel forms. Code 2654.1 are sherds with *rastreado*, the white-

[5] These are probably Late Postclassic.

tempered equivalent of Code 2701.5[6]. *Rastreado* sherds make up 21 percent of the all Code 2654 varieties. This is the first phase that possessed significant percentages of Code 2654.1. The forms present among this ware are necked jars (25%), neckless jars (16%), restricted orifice bowls (19%; many of these resemble Middle to Late Classic forms [42B5]), plates with straight divergent walls (16%), *cazuelas* (13%), bowls with convex divergent walls (8%), and very open plates or *escudillas* (6%), as well as a handful of several other forms.

Sandy Fine Orange formed five percent of the sample and occurred primarily in restricted orifice bowls (36%), plates and bowls with straight divergent (23%), concave divergent (14%), convex divergent (13%), a small necked jar (5%), one small neckless jar (5%), and a hollow globular support (5%). Six sherds in the sample were Fine Orange that emits a metallic sound when struck (Code 1214). This is a non-tempered type that is very compact. It usually has a dark core and the surfaces range from orange to reddish orange.

Three percent of the sample was constituted by Irregularly-Fired Red-Slipped Coarse Brown jars (Codes 2821, 2821.12, 2821.2). Equal portions of this ware displayed channeled (Code 2821) and non-channeled (Code 2821.12) necks (35% each). Twenty-two percent displayed *rastreado* (Code 2821.2). Eight percent were irregularly fired but could not be attributed to a specific variety (Code 2820).

Two percent of the sample consisted of coarse red-paste vessels with white temper (Codes 2651, 2651.1, 2651.2) and volcanic ash temper (Codes 2751, 2751.1). Fourteen percent of this general red paste category was brushed (Codes 2651.2, 2751.1). Jars make up 78 percent of this category, the remainder is open bowls.

A number of Codes make up less than one percent of the sample. These include Coarse Pink (Code 2615), Coarse Light Brown (Code 2825), Red Slipped and Incised Fine Orange (Code 1251), Black Slipped and Incised Fine Orange (Code 1252), Polished Coarse Buff (Code 2824), Coarse Orange with Fine White Temper (Code 2655), and Tepango Coarse Orange with volcanic ash temper (Code 2813)[7].

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[6] 2701.5 also has white mineral inclusions, but 2654.1 is typically a much lighter color and does not contain any volcanic ash.

[7] Code 2813 is a type created for the TVAS to keep Matacapan Coarse Orange (Code 2811) a relatively pure category.

COMBINED SANTIAGO A AND SANTIAGO B PHASE (EARLY TO MIDDLE CLASSIC [300 - 650 CE])

There are several ceramic types that are most popular in the first half of the Classic period, but are not useful to separate Santiago A and Santiago B phases. These types include Fine Orange with Simple Incised (Code 1221) and Complex Incised (Code 1222[8]) Incision, Polished Brown-Slipped Fine Orange (Code 1233), White-Slipped Fine Orange (Code 1236), Red on White-Slipped Fine Orange (Code 1271), Orange on White-Slipped Fine Orange (Code 1272), and Incised Orange on White-Slipped Fine Orange (Code 1273) (Table 6.7). Caution must be used with regard to complex incised Fine Orange because many of these specimens may date to the Postclassic. During the Vigía and Totogal phases at Totogal, Black Red and White-slipped Fine Orange are found engraved with complex designs, discussed below. If the slip has eroded then the only way to place these ceramics chronologically is through a motif analysis, which I do in Chapter 7 to derive my settlement maps and in Chapter 8 to reconstruct social boundaries. Until then, I leave the Code 1222 unmodified in the current summary.

Table 6.7. Ceramics common to the Santiago A and B phases sorted by site.

Site	1221	1222	1233	1236	1271	1272	1275	1276	Total
1 (Totocapan)	16	1	2	17	1	1		1	**39**
2 (Oteapan)	4	4		16	1				**9**
3	1			2					**3**
4		1							**1**
5 (Xiguipilincan)	4	4							**8**
6				2		5			**7**
8		1							**1**
9	1								**1**
10				6					**6**
11		1							**1**
12				2					**2**
13		1					1		**2**
16/17 (Sehualaca)	1						1	1	**5**
18		2							**2**
19				1					**1**
22	1								**1**
23	1			7	1				**9**
24	2			1	1				**4**
25	2			3					**5**
27		1							**1**
29						1			**1**

[8] Complex incised Fine Orange occurs in the Classic period but is also common in the Postclassic (Venter 2008).

Table 6.7 (continued).

Site	1221	1222	1233	1236	1271	1272	1275	1276	Total
31				3					**3**
33				1					**1**
34	1								**1**
36	2			1	1				**4**
37	1								**1**
38 (Crux de Vidaña)	1	2		3					**6**
39	2								**2**
42	1	2	1						**4**
43				1					**1**
44					1				**1**
46	2	3	2	1					**8**
49	1			2					**3**
50 (Texcochapan)	1			2					**3**
51 (Zezecapan)				7			1		**8**
55		1							**1**
63/77 (Tetax)	16	1					1		**18**
69		1							**1**
71		1							**1**
73		1							**1**
75				2					**2**
80		1					1		**2**
81	4								**4**
82 (Francisco Madero)	5	2		1	1				**9**
83				2					**2**
84		1							**1**
85		3							**3**
87	1								**1**
89 (Maxyapan)					1				**1**
92	1	2							**3**
95				1					**1**
97	2	1							**3**
99	3								**3**
103	6								**6**
106		1					1		**2**
108			2						**2**
109	3								**3**
110	2								**2**
112 (Bella Vista)	1								**1**
113							3		**3**
117	1		1						**2**
120			1						**1**
121		2		3					**5**
124	1	10		4					**15**
130		1		1					**2**
133		1	2						**3**
134		2			1				**3**
135	1	1							**2**
137				1					**1**
138				1					**1**
139 (Tilzapote)	8	4		9	1		1		**23**
143	1								**1**
145					1				**1**
148	2								**2**
150	1								**1**
156		3							**3**
158	1						1		**2**
164	1								**1**
167	1	1							**2**
170	1			2					**3**
174				1					**1**

Table 6.7 (continued).

Site	1221	1222	1233	1236	1271	1272	1275	1276	Total
176				2					**2**
177		1							**1**
179	2	1	1	3	1				**8**
180	1								**1**
183		7							**7**
184				1					**1**
185								1	**1**
902				1					**1**
934			1						**1**
942				1					**1**
963	1				1				**2**
968		1							**1**
Total	**112**	**74**	**13**	**114**	**13**	**7**	**11**	**3**	**333**

CHANEQUE (LATE CLASSIC [650-800?])

Ortiz argues based on the "great" decrease of material densities that the Chaneque phase at Totocapan represents relative depopulation from the preceding phase. In comparison, he argues that Matacapan reaches its apogee (Ortiz 1975:201). We now know that this does not accurately describe the pattern of growth and decline for Matacapan as a whole. Ortiz's comparison is important here because the ceramic markers of the Chaneque phase are similar to those found at Matacapan, only there are many fewer ceramics in his Totocapan excavation pit. He notes that the ceramic types are basically the same as observed in the Santiago B phase, but certain decorations are more common. These include incised geometric symbols, naturalistic motifs, and complex stylized decorations, which are better developed at Matacapan. In general, Ortiz notes that Matacapan and Totocapan participated in similar stylistic traditions during the Late Classic that indicates they were occupied contemporaneously. I would extend this statement further to suggest that they engaged in some form of direct or indirect interaction. Forms identified during the Chaneque phase at Totocapan include plated with straight divergent walls and widely-everted rims on Fine Orange and Fine Gray pastes, *cazuelas*, and *incensarios* on a paste described much like Code 2611 (Ortiz 1975). Other forms are represented, but widely-everted rims on fine paste ceramics are very indicative of the Late Classic period.

At Matacapan, Phase F is marked by an increase in the popularity of Fine Gray ceramics. Phase D and E ceramics are still present, but in lower proportion due to the rise in Fine Gray percentage (Ortiz and Santley 1988, Pool and Britt 2000: Figure 10). Also, Tuxtlas Polychrome appears in small amounts. Equally good chronological markers are certain forms. As discussed above, plates with straight divergent walls and widely-everted rims (Matacapan Form 7; Form 10 is similar but the everted lip is shorter), straight or concave divergent-walled plates with 'droopy' everted lips (Matacapan Form 5), and flat-bottomed plates with concave (i.e., bowed inward) divergent walls (Matacapan Forms 4 and 8). Also common, though present in higher frequencies during the Middle Classic, are bowls with straight divergent walls that are 'rolled' sharply inward about 4-5 cm from the lip (Matacapan Forms 12 and 13). Many of the flat-bottomed plates have small solid spherical supports that occur on Fine Gray and Fine Orange pastes. Rattle supports on Fine Gray paste are also popular. While rattle supports were frequently identified on the Code 2612 paste, and more rarely Code 1236, none were found within the TVAS with a Fine Gray paste.

The paste on Plain Fine Gray is the same paste that occurs on most, but not all, of the Late Classic gray varieties (Figure 6.14). In contrast to Fine Orange, the type of Fine Gray was reserved only for those specimens that evinced a single color that varies only on a continuum between light and dark gray. The core is usually the same color as the surfaces. The principal of keeping Fine Gray a relatively pure color category is that it reflects a reducing firing environment that be most easily produced by use of a kiln where atmosphere can be closely controlled. Codes 1111, 1121, 1122, 1124, 1131, 1132, and 1143 all share the basic untempered Fine Gray paste. Codes 1121 and 1122 are simple incised (1121) and complex incised (1122) Fine Gray respectively. Code 1124 displays incisions with red powdered hematite rubbed into them. Codes 1131 and 1132 are white-slipped and brown-slipped types respectively. Code 1143 displays red paint over the Fine Gray paste.

The remainder of the types used to represent the Chaneque phase has somewhat different pastes, though most are fine textured. Black-slipped Fine Orange (Code 1112) and its incised variant (Code 1125) display a compact fine paste ranging from orange to brown colors at the core. The exterior surfaces are reduced to black. Almost all of these specimens found in the TVAS are of bowls of forms like Matacapan Forms 12 and 13 as described above. Burnished Fine Gray (Code 1113) has colors ranging greatly from light

Figure 6.14. Sample of Chaneque phase ceramics.

to dark brown, reddish orange, to light to dark gray. For the TVAS assemblage, analysts were conservative with their color assessments and assigned only relatively gray variants to this type. The paste is similar to Fine Gray, but tends to be more compact. Code 1114 refers to Burnished Milky Light Brown. Mottled Light Brown with a Matte Finish (Code 1115) displays a brown to reddish orange soft paste with no temper added. The exterior surface is splotchy and has variable dark and light colors appearing. Polychromes (Codes 1281 and 1291) are probably the best markers of the later half Phase F at Matacapan (also referred to as the late Late Classic), though these were very rare in any case within the TVAS. Code 1253 is “Tajín White”, which is carved through white slip. Pool demonstrated that the “Tajín White” identified at Matacapan was locally produced (1990).

Fine Gray is nearly ubiquitous in the Chaneque phase (Figure 6.15, Table 6.8). The most popular form from the TVAS assemblage was the restricted orifice bowl (36%), which ranged from almost closed forms with globular bodies, to only slightly restricted openings. Among the restricted bowls, one of the most common forms was 42B5, which is relatively open form but the rim turns sharply inward about 4-5 cm below the lip and is usually thickened on the inside. The second most popular form was the plate with straight divergent walls (26%), many of which had flying or everted lips (Form 48N). Fourteen percent of rims were plates with concave divergent walls and flat bases. On this form it was common to see inverted, or hooked, lips like those seen on Matacapan Form 54. A minority of other forms was present, but most tended to be open bowl or plate forms. The relative absence of jar forms is something that is not seen with Fine Orange. Also missing are hollow globular supports, hollow cylindrical supports, rattle supports, and conical supports. All of the supports made from the Fine Gray paste are small solid balls. There are also a higher proportion of flat-based plates among the Fine Gray specimens than among Fine Orange. The most common decoration present among the Fine Gray is simple parallel horizontal lines incised along the exterior surface of the rim (Code 1121). More rarely, complex designs are incised into the Fine Gray paste (Code 1122). Many of the complex incised specimens, particularly those executed in very fine lines, may date to the Postclassic period (discussed further below and in Chapter 8). Very rarely, sculpted decoration occurs on Fine Gray paste. One specimen had specular hematite rubbed into the incisions (Code 1124).

Codes 1112 and 1125 are not geographically or hierarchically restricted in their distribution, but they are more common in the southern half of the survey area, suggesting Totocapan may have been in a comparatively rapid decline relative to other centers, like Francisco Madero, Maxyapan, Tilzapote, and Xiguipilincan. Alternatively,

Table 6.8. Chaneque phase-sensitive ceramics tabulated by site. Totals in red italics represent sites with sparse evidence for Chaneque phase occupation.

Site	1111	1112	1113	1114	1115	1121	1122	1124	1125	1131	1132	1143	1253	Poly-chrome	Total
1 (Totocapan)	273	36		1	2	4	1			2	2				321
2 (Oteapan)	74	21	1			1	1			2	1				101
3/4/96/100 (Pizapan)	52	25	5	4	4	5	2		1	1					98
5 (Xiguipilincan)	14	11	1				1							1	28
6	14	10		4	3					1					32
7	4														*4*
9	5				1										6
10	19	15			2										36
11	6			1											7
12	5	1							1						7
13	2			1											3
14						1									*1*
15			1												*1*
17 (Sehualaca)	19	9	1			1				1					31
18	1			1											*2*
19	6	1	2												9
20	4	1													5
22	4				1										5
23	13	8			1										22
24	8				2										10
25	18	7	2	2	4				1						34
26	16		1												17
27	5	3													8
28		2													*2*
29	18	9			3	1									31
31	15	20			5	2			2						44
32		4													*4*
33	14	5									1				20
35	2														*2*
36	19	9			2										30
37		2													*2*
38/8/34 (Cruz de Vidaña)	18	14	3	9	5						1				44
39	6	3	1	3											13
40		1			1										*2*
41	2													1	3
42	9				1										10
43	1	2			1										4
44	10	3													13
45	1														1
46	2	1	3	1	3										10
47	1														*1*
49	17			2											19
50/54 (Texcochapan)	90	18			1										109
41 (Zezecapan)	69	25			1										95
53	1														*1*
55	1														*1*
57	3														*3*
59	1														*1*
60	1													1	*2*
61	6														6
62	20	3			1										24
63/77 (Tetax)	22	3	5			6								2	38
64	23	1													24
65	23														23
69	1	2		5	4										12
71	2	1			1										4
72	2														*2*
73	3	1	2	1											7
7	20														20

Table 6.8 (continued).

Site	1111	1112	1113	1114	1115	1121	1122	1124	1125	1131	1132	1143	1253	Poly-chrome	Total
76	8														**8**
78	1				1										**2**
80	1	1													**2**
81	9	1													**10**
82/112/113 (Francisco Madero)	89	11			1								1		**102**
83	22			5											**27**
85	8	3													**11**
86	2	2													**4**
87	4	5													**9**
88	1	1													**2**
89 (Maxyapan)	31	8			2										**41**
90	2														**2**
93	1									1					**2**
95	1														**1**
97	4														**4**
98	25	2													**27**
99	68	3			2										**73**
101	2														**2**
102	15														**15**
103	29	2			1	2			3						**37**
104	2														**2**
105		1	1												**2**
106	2	3		2		1									**8**
108	2			1											**3**
109	2	2				4									**8**
110	29														**29**
111	13	1													**14**
112	56	11							4						**71**
113	46	4		8											**58**
114	4	5													**9**
115	8	3													**11**
116	2														**2**
117	22	8			16										**46**
119	3														**3**
120	1	1			1										**3**
121	7	1			1										**9**
122	12	2			1		1								**16**
123	3														**3**
124 (Totogal)	16	5			2			1				1			**25**
125	2	1													**3**
131	5				3	1									**9**
132	7	1			2										**10**
133	2														**2**
135	11	5													**16**
137	2	1													**3**
139/138/134/145 (Tilzapote)	185	24	2	1		10	1		1					3	**228**
140	1														**1**
141	29	1													**30**
142					1										**1**
143	34														**34**
144	66	4	2												**72**
146	1														**1**
147	37	1													**38**
148	7														**7**
152	2														**2**
153	1														**1**
155	79	4	1	1											**85**
156	3														**3**
158	4														**4**
159		1													**1**

Table 6.8 (continued).

Site	1111	1112	1113	1114	1115	1121	1122	1124	1125	1131	1132	1143	1253	Poly-chrome	Total
161	1														**10**
162	2														***2***
164	6								1						**7**
165	2														***2***
166	3	1													**4**
167	9														**9**
170	1	1			2										**14**
171	1	1													**17**
172	3														***3***
173	5														**5**
174	2														***2***
175	1					1									***2***
176	2														***2***
178				1											***1***
179	1				1	1								1	**22**
180		1													***1***
182 (El Nopal)	2	4	8				4					1			**257**
183	4	1													**5**
184		1													***1***
186		1													***1***
Total	**2**	**420**	**43**	**55**	**88**	**42**	**10**	**1**	**14**	**8**	**11**	**2**	**1**	**9**	**3039**

the southern centers adopted new ceramic technologies while Totocapan was more prone to continue with the same traditions. All Code 1112 rims (n=41) were bowls with straight everted walls and strongly inverted rims. The incised varieties almost always presented multiple parallel horizontal incisions running around the superior part of the inverted rim.

Burnished Gray is not restricted to any given segment of the TVAS settlement system, but it is more common south of Oteapan. In fact neither the plain or incised versions of Burnished Gray are found at Totocapan. Again this may point to a faster decline at Totocapan than other centers in the TVAS region. Seventeen rim sherds were recovered of Code 1113 or 1123 for the TVAS. Forty-four percent were restricted orifice bowls, with the remainder made up by open bowl forms. A few specimens displayed simple incised horizontal lines on the exterior surface below the lip. Incised Burnished Gray was assigned to the Code 1123.

Only one sherd of this Burnished Milky Light Brown was recovered from Totocapan. The other 54 specimens were identified primarily in the southern portion of the TVAS area. The most common forms in the TVAS assemblage are closed bowls with

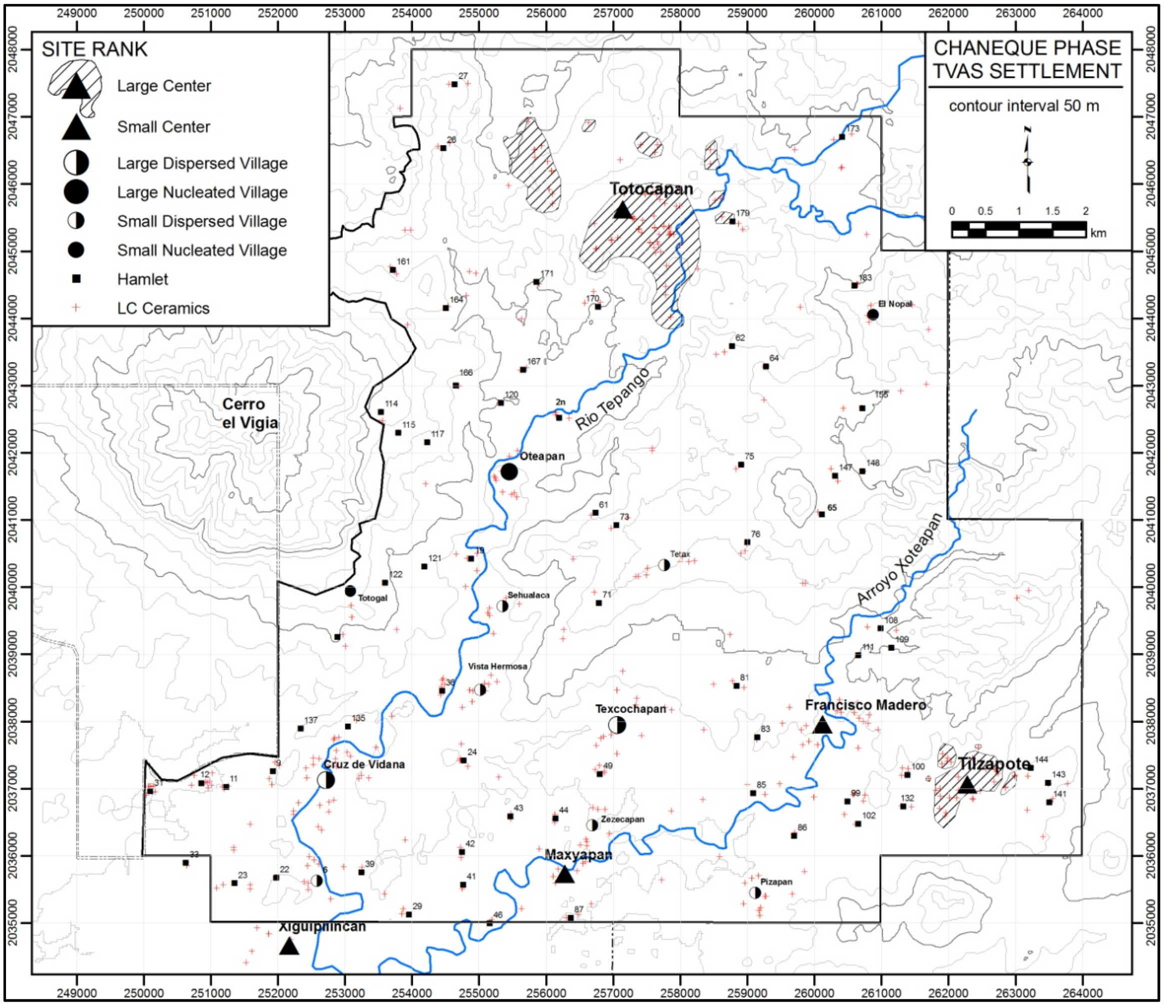

Figure 6.15. Distribution of Chaneque phase (650 - 800? CE) sites and ceramics within the TVAS.

globular bodies and more open bowls with restricted orifices. Plates with straight divergent walls and bowls with convex divergent walls were

Only two sherds of Code 1115 ceramics were recovered at Totocapan. Like Codes 1112, 1113, and 1114, it is much more prevalent in the southern half of the survey area. At Matacapan, the most prevalent form was of bowls with convex divergent walls and a slightly everted lip. This form was not found in the TVAS on this type, but restricted-orifice bowls and plates with straight, concave, and convex divergent walls were.

Thirty-seven percent of the white-slipped and brown-slipped Fine Gray sherds were found at Totocapan and Oteapan, but the small sample size prevents any conclusions about this skewed distribution. All but one of this type was identified at sites that sit on the Tepango River. Only four white-slipped rims and one brown-slipped rim were recovered. Three of the white-slipped rims were closed bowl forms with the other rim in the form of a vertical-walled bowl. The only brown-slipped specimen was in the form of a bowl with convex divergent walls.

Of the nine polychrome sherds recovered, all but one occur in the southern half of the survey area. No polychrome ceramics were recovered at Totocapan. This follows the pattern seen with other Chaneque ceramics. No polychrome designs were identified in the TVAS assemblage. At Matacapan, a great variety of designs were documented. These include rectangular frames, half circles, volutes, zoomorphic and anthropomorphic designs, U-shaped motifs. At Matacapan, vessel forms consisted of plates with straight divergent walls and rounded, flat, or everted lips; and bowls with a lightly concave bottoms. Only a handful of polychromes were identified in the TVAS. Among these forms were bowls with convex convergent and convex divergent walls. Also present was a dish with straight divergent walls.

NON-TEMPORALLY SENSITIVE TYPES ASSOCIATED WITH CHANEQUE PHASE MATERIALS

For the Chaneque phase is it difficult to separate collections that had no other occupations because Fine Orange, a Santiago B phase ceramic, is a major part of almost all Chaneque phase assemblages. For this reason, I selected collections that had predominantly ceramics sensitive to the Chaneque phase with a minor portion of Santiago B phase ceramics and where no other phases were represented. This limited the current sample to 15 collections that will be explored for ceramic correlations below. Within these 15 collections, 49 percent consists of Chaneque phase ceramics, 20 percent is Santiago B phase ceramics (mostly Fine Orange and Matacapan Coarse Orange), 0.003 percent is Chininita phase ceramics, and 0.001 percent is Santiago A phase ceramics.

Aside from phase-specific ceramics, the most prevalent (14%) phase non-specific ware was Coarse Brown with volcanic ash temper (Codes 2701 and 2701.5). Forty-two percent of this ware group was *rastreado* (Code 2701.5) an increase over the Santiago B proportion. Of the rims present in this ware group, 82 percent were necked jars with the remaining 18 percent in the form of restricted orifice bowls. Coarse Brown makes up a much smaller portion of the total assemblage than in other periods.

The second most prevalent (10%) phase non-specific ware is the Coarse Brown with white temper ware group (Codes 2614, 2615, and 2654). Code 2615 is actually named Coarse Pink and is very common to Late Classic assemblages at El Salado (Santley 2004). Other than its pinkish hue, it is identical to Code 2614, with the most common form of both being the *cazuela*. Unlike the Santiago B phase, there were no *rastreado* sherds found in this ware group during the Chaneque phase. *Cazuelas* were the most prevalent form among these types, suggesting that they may pertain to the Santiago B phase component of the collections. Also present were restricted orifice bowls, necked jars, and a single bowl with convex divergent walls.

Interestingly, the next most prevalent ware in the Chaneque phase collections is Brown-Slipped Coarse Brown (Codes 2611 and 2612). Recall the discussion above suggested that these types were best represented in the Middle Classic collections. The fact that these two types combined only made up 2 percent of the Chaneque phase collections may support this conclusion, but their use certainly extends into the Late Classic. All of the forms of this ware were open plates, some were very open in the form of *comales* or *escudillas*. Again, the *comales* may be Late Postclassic in date.

Present as one percent of the sample each were Coarse Orange with white temper (Code 2655), Irregularly-Fired Red-Slipped Coarse Brown (Codes 2821, 2821.12, and 2821.2), and Coarse Red with volcanic ash temper (Code 2751). Present percentages of less than one percent were Fine Orange with Metallic Paint (Code 1239), Plain Polished Medium Brown (Code 2519), Polished Coarse Buff (Code 2824), Scored Coarse Red (Code 2907.1), Coarse Red with Coarse White Temper (Code 2651), and Red-Slipped Coarse Orange (Code 2624). This last type is actually very similar to Acula Red-Orange as defined in the Western Lower Papaloapan Basin (Stark 1989, 2001) and should probably be recorded for future investigations.

VIGÍA AND TOTOGAL PHASES (EARLY [800?-1250 CE] AND LATE [1250-1521 CE] POSTCLASSIC)

Vigía phase ceramics are determined differently from the other phases. Until recently (Arnold 2007, Venter 2008) researchers had little knowledge of what the Postclassic Tuxtlas material expressions looked like. Now, excavations at Totogal and Agaltepec have given us a better look. Unfortunately, the most common ware in the Postclassic was Fine Orange, which makes it difficult to separate it from Classic period collections. A combination of motif analysis, slipping and incising techniques, ground platforms on clear and green obsidian blades, high percentages of Pachuca and Pico de Orizaba obsidian within collections with other Postclassic ceramics, *comal* vessel forms, and presence of certain foreign-inspired styles (e.g., Texcoco Molded) were used to separate Postclassic from Classic collections and Vigía from Totogal phases of the Postclassic (Figures 6.16, 6.17, and 6.18).

In particular, the Vigía phase markers were separated based on temporally restricted motifs that appear on Fine Orange, Fine Gray, Black-Slipped Fine Orange, Brown-Slipped Fine Orange, Black-Slipped Fine Gray, and Brown-Slipped Fine Gray (Venter 2008) and ground obsidian platforms on Pico de Orizaba clear obsidian blades. There are no motifs exclusively representative of the Vigía phase, but many were shared across Vigía and Totogal phases. Motifs that were not strongly indicative of the Late Postclassic, but appeared common to the Postclassic in general were assigned to the Vigía phase unless other Late Postclassic ceramic or obsidian characteristics were present.

Additionally, a small quantity of Escolleras Chalk ceramics were recovered within the TVAS. This ceramic type has been defined in the Mixtequilla region in the western lower Papaloapan Basin (Stark 2001). This type has a very compact paste that displays laminar fractures when broken. Both surfaces are black, but the core is usually light gray to buff. Vessel walls are typically thin. While the descriptions are similar to what Arnold calls Alacrón Gris, the paste of sherds identified as Escolleras Chalk were very different from any of the other pastes identified in the region, so they could actually be imports. Escolleras Chalk is present in the Late Classic and Early Postclassic in the Mixtequilla region, so it was not used in isolation to identify Vigía phase collections.

Figure 6.16. Sample of Postclassic ceramics.

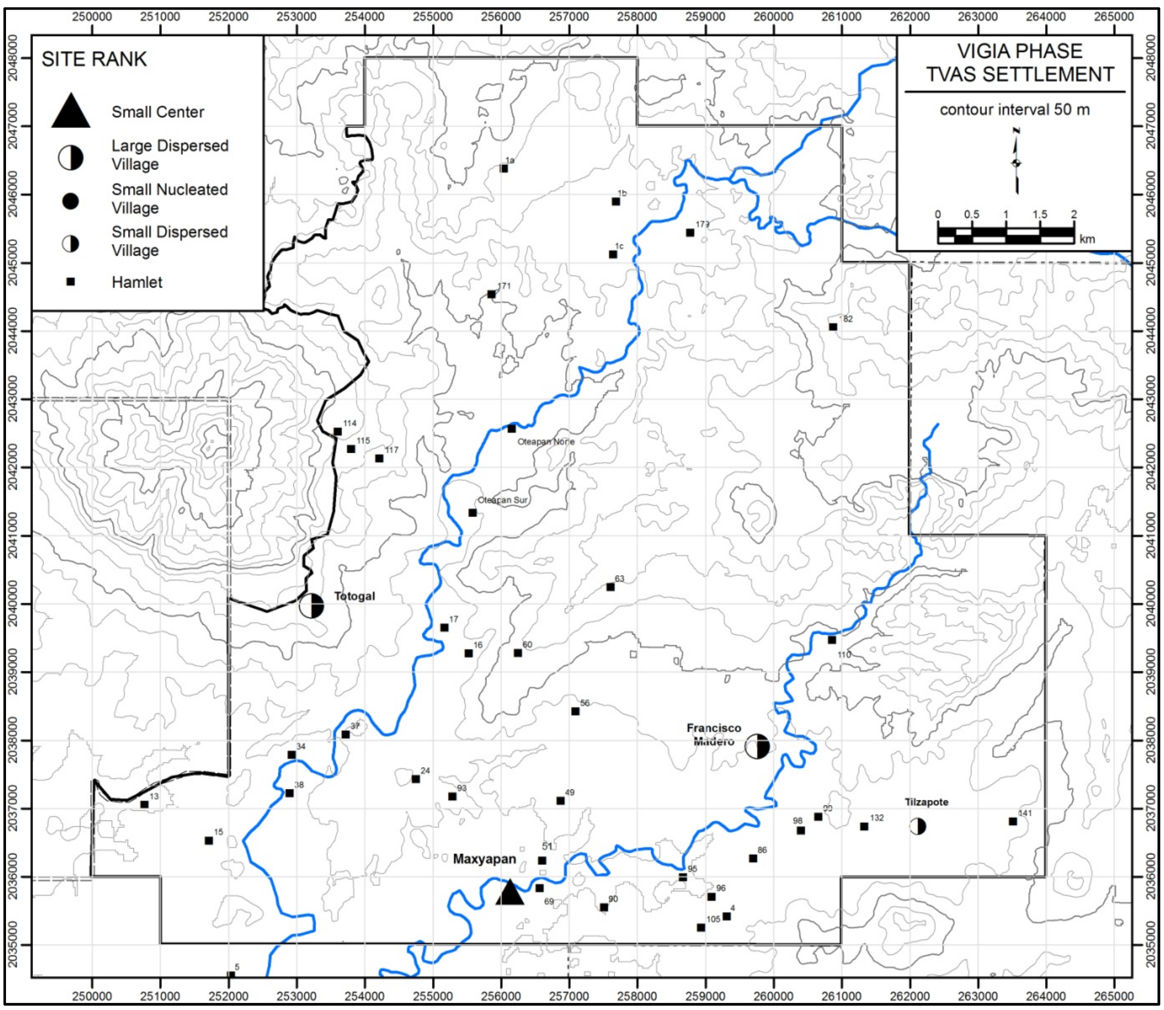

Figure 6.17. Distribution of Vigía phase (800? - 1250 CE) sites within the TVAS.

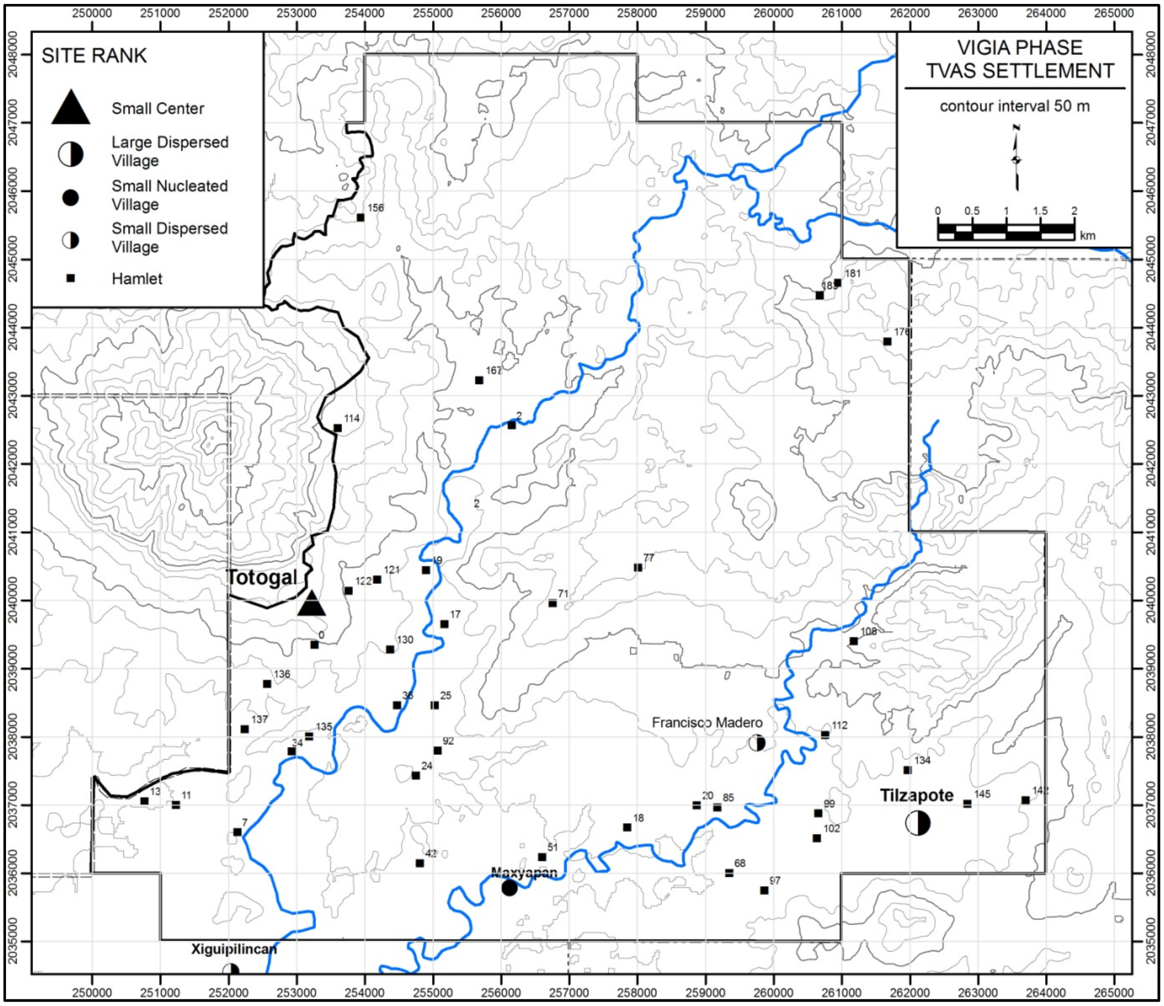

Figure 6.18. Distribution of Totogal phase (1250 - 1521 CE) sites within the TVAS.

Markers sensitive to the Vigía phase are found primarily in the southern half of the survey area, following the pattern initiated in the Chaneque phase. As will be discussed in Chapter 7, only one regional center, Maxyapan, existed during this time. The remainder of the settlement system comprised of villages and hamlets. Only eight specimens of Escolleras Chalk were identified, but their distribution was restricted to the southwestern corner of the survey area.

The Totogal phase was determined based on decorative motifs identified by Venter, presence of Texcoco molded ceramics, ground platforms on Pachuca obsidian, high percentages of Pachuca obsidian in conjunction with other Postclassic markers, and *comal* vessel forms. The distributions of these markers form two nucleated settlement clusters with a few sites occurring elsewhere in the region. One cluster surrounded Totogal in the southwest corner of the TVAS area, the other surrounded Tilzapote in the southeast corner. Both settlement clusters contained rare examples of Texcoco Molded ceramics, which represents a central Mexican stylistic appropriation.

CERAMIC DISTRIBUTIONS AND SOCIAL BOUNDARIES

The functional benefit of detailing the chronology of the Tuxtlas in this chapter is to provide the basis to assign collections to phases. These phases will be employed throughout the remainder of this dissertation. The additional design of this chapter is to define the Tuxtlas as a network of interactions based on, among many things, the material expressions commonly employed by the populace over time. Most of the ceramic types described above are held in common by all Tuxtlecos during each time period. This provides a baseline with which to both recognize cultural styles that are intrusive into the region and to identify patterns of symbolic expression within the region that may represent social boundaries. A few general patterns are highlighted here for the TVAS area that portray paths of interaction among sites. More specific patterns are discussed for a limited set of styles in Chapter 8.

First, a number of styles and ceramic types primarily follow the Tepango river, but tend to be rare along the Xoteapan River and the southeast quadrant of the TVAS (Figure 6.19). Importantly, most of the ceramics that pattern exclusively around the Tepango River date to the Formative period. Pendant lines incised diagonally beneath horizontal lines on Coarse (n=1) and Medium (n=1) Polished Black, Medium Polished Brown (n=4), Polished Red (n=1), Fine Paste Differentially-Fired (n=1), Fine Orange (n=1), and Coarse Orange (n=1) are absent in the southeast quadrant. Seventy percent of sherds with this design motif occur in the southwest quadrant, while the remaining 30 percent were recovered at or near Totocapan. Polished Red ceramics (n=52), most of them *tecomate* forms, also display a strong pattern skewed toward the Tepango River. Only three sherds of this type were identified in the southeast quadrant of the survey, 24 were identified in the southwest quadrant, and 24 come from the northern half of the

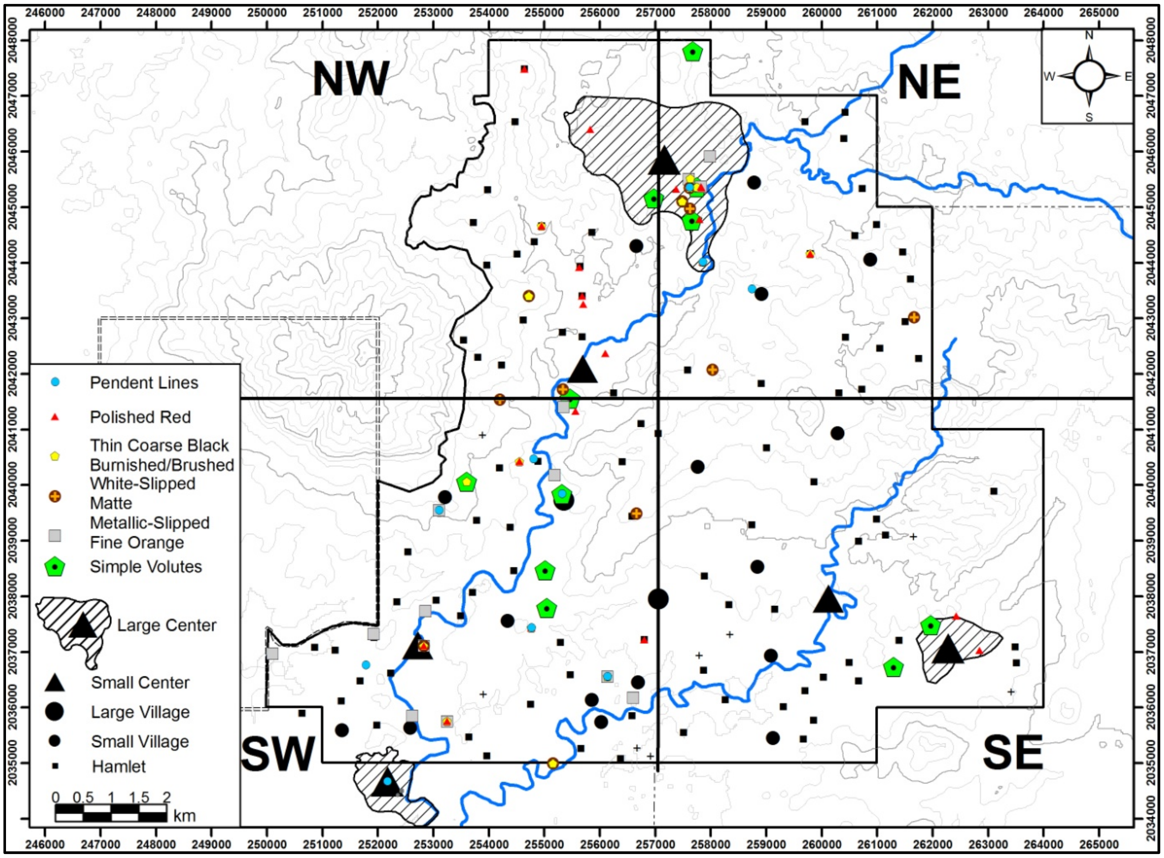

Figure 6.19. Ceramic types and decorations that primarily follow the Tepango River.

survey. As mentioned above, Polished Red *tecomates* may date to the Early Formative period. Although not temporally diagnostic to a specific phase, Burnished or Brushed Thin Coarse Black generally occur within the Formative period. Twelve sherds of these combined types come from the northern half of the TVAS around Totocapan, the remaining 22 derive from collections in the southwest quadrant. White-Slipped Coarse Brown with a Matte Finish also follows the Tepango River found in roughly equal proportions in the northern half and southwest quadrant. It is absent in the southeast quadrant. Also showing a strong Tepango River distribution were Fine Orange with a metallic silver slip, Coarse Orange with White Temper or Fine Orange that display a band painted in red or black along the lip, and decorative motifs of simple scrolls or volutes. All three of these likely date to the Classic period. The volutes mentioned above are not the interlaced varieties often found to the west and north on the Gulf Coast, but like those described by Stark for Patarata (1998). Patarata-like volutes are one of many links to the western lower Papaloapan Basin that will be discussed through this text.

Pottery types and decorative motifs that show distributions strongly clustering around the Tepango River span the Early Formative through Classic Periods. In the earlier phases of the Formative period, settlement in the southeastern quadrant was sparse, so it is natural that more stylistic information was shared along the Tepango River. This pattern continued into the Classic period, though, as evidenced by the distributions of several ceramic types. These patterns indicate that the greatest path of information exchange followed the Tepango River. This is hardly an earth-shattering conclusion, considering that 1) large centers were positioned along the river; and 2) it was the most easily traveled transportation route within the TVAS. This pattern of interaction may have added social, political, and economic, implications. Another important aspect of the distributional patterns described above is the near absence of these ceramic categories in the central uplands. While this is not an insurmountable ridge system, it may have inhibited movement between the two rivers enough to prevent style sharing, particularly during the Formative periods.

A second clear pattern forms with several types that are found almost exclusively in the lowlands of the TVAS (Figure 6.20). Red Paint on Coarse Brown, White-Slipped Fine Orange, Polished Orange, Fine Orange Bichromes with red paint (combined Codes 1261, 1262, and 1271), paste types associated with the Cipactli Cult (discussed in Chapter 8), and Red-Slipped Coarse Orange (similar to Acula Red-Orange from the Patarata and Mixtequilla areas [Stark 1989, 2000]) all cluster closely to the main rivers in the survey area and are nearly absent in the central uplands (Figure 6.20). These types span the Formative and Classic periods. Again, a pattern emerges heralding the importance of rivers as paths connecting places in the survey region. It supports an interpretation of these waterways as routes of transportation, communication, and social networking. Perhaps more interesting is that the central uplands carried a substantial population but lacked these ceramic types. The upland inhabitants may have remained somewhat on the margin of the mainstream social networks that operated in the valley bottoms. It must be emphasized, however, that these patterns represent only a small fraction of the material culture recovered during the TVAS. Other ceramic types are

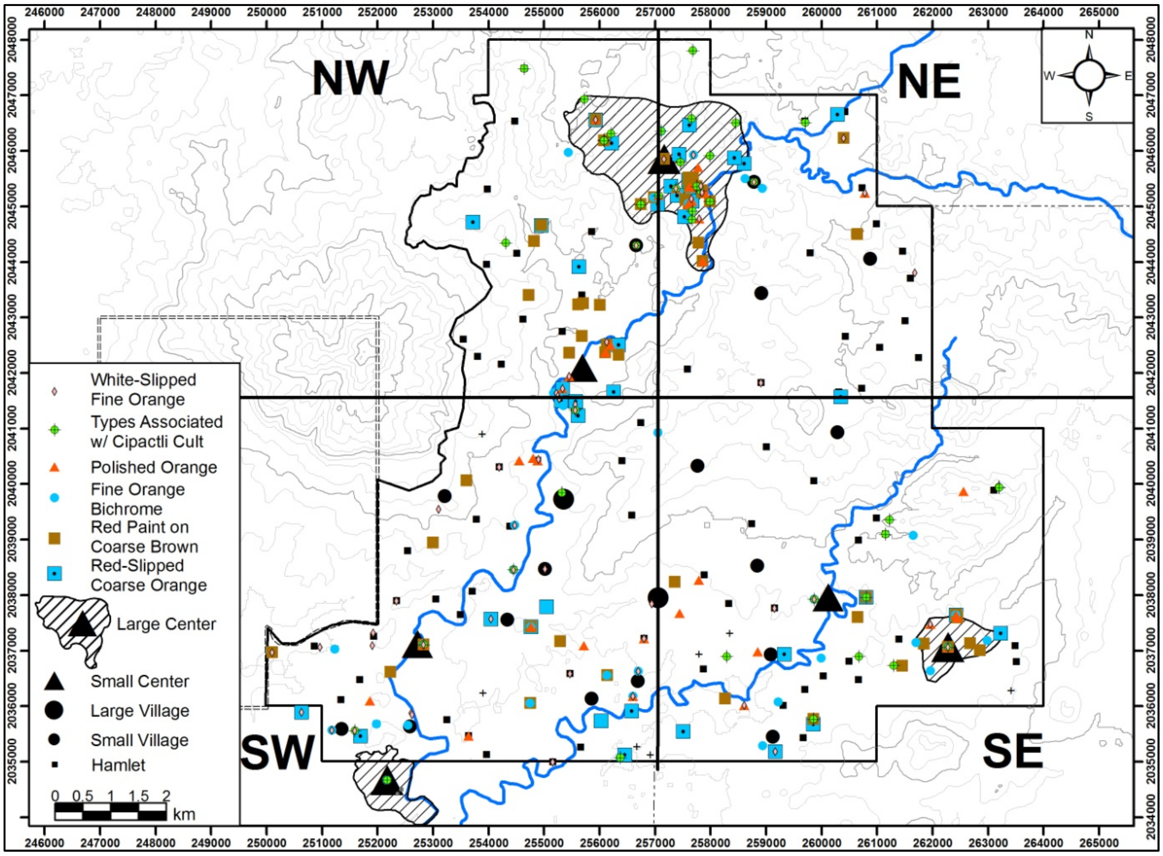

Figure 6.20. Distribution of ceramic types that strongly cluster closely to both the Tepango and Xoteapan Rivers.

pervasive for each phase of occupation. The apparent choice of upland inhabitants to ignore these particular ceramic types, though, is telling of the selective interactions that groups within the TVAS enacted.

While a limited set of ceramic homologues adhere to the Tepango River or both the Tepango and Xoteapan rivers, no patterns exclusively cluster along Xoteapan River or the central uplands. This discrepancy indicates a greater level of network cohesion along rivers, in general, and the Tepango River, in particular, than anywhere else in the survey area. It follows that groups situated along the Tepango River engaged in more frequent social interactions with each other than with groups situated away from the river. The same might be said for settlements positioned along the Xoteapan River. Does this mean that a social boundary formed along the central uplands, dividing settlement in the two valleys into distinct social groups?

The only patterns involving decorative motifs described above (pendent lines and Patarata-like volutes) may reflect overt, consciously negotiated social identities that connected people along the Tepango River during the Formative and Classic periods. However, the other patterns were observed at the ceramic "type" or "ware" level. Since types and wares are based more on paste recipe and vessel forming techniques – aspects of the production sequence that are not as readily imitable as decoration – they may indicate more stable, deeply-rooted aspects of social identity (see Gosselain 2000). The shared *habitus* that led to these ceramic similarities stretched at least from Totocapan to Xiguipilincan, signifying lines of communication. I believe that this argument can be taken a step further to suggest that peoples settled in the study area recognized a higher degree of social relatedness with others living inside the same valley than with those outside.

The final set of material distributions that I will discuss in this chapter appear to have been influenced by one of three major centers during the Classic or Postclassic periods (Figure 6.21). Rattle and solid conical supports cluster tightly around Totocapan. These support forms almost always appear on the Code 2611 paste (though Fine Orange is also present), and they usually display a thick white slip (Code 2612, though some were coded as Code 1240). As mentioned above, these supports were utilized on Cipactli Cult ceramics, supplying another line of evidence supporting the origin of this pottery style at Totocapan. The adoption of these support styles in the TVAS area may be useful as a proxy to delineate Totocapan's primary hinterland. The distribution of these highly distinctive supports in combination with the Code 2611 paste is strongly skewed toward Totocapan. I suggest that this technological style spread through economic exchange with, or stylistic emulation of Totocapan. Sites to adopt the style were likely those with the most frequent interactions with the large center. It therefore follows that Totocapan was at the center of a cohesive social unit that extended to the uplands in the northeast quadrant and to the small center of Oteapan at the southern limits of the northwest quadrant. A few of these supports occur outside the core style zone suggesting a lesser degree of cohesion outside the primary hinterland.

Potentially related to the distributions of rattle and solid conical supports is that of miniature plates made from the same Code 2611 paste. These miniatures form a

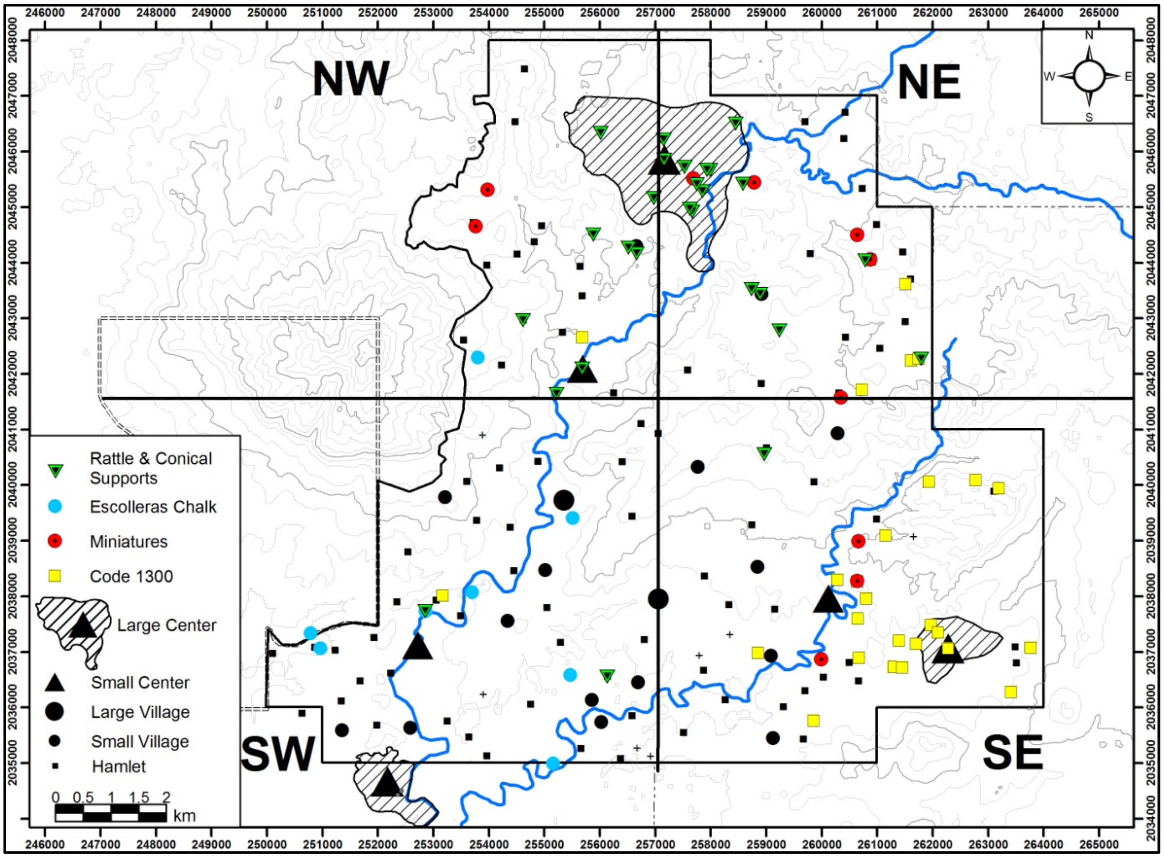

Figure 6.21. Ceramic types and forms that display spatially restricted distributions.

distributional arc form the northern half of the TVAS area to the southeast quadrant along the Xoteapan River. Though the sample size is small, this pattern is different from the others because it implies an overland path of communication.

Escolleras Chalk is a very distinctive ceramic type defined by Stark for the western lower Papaloapan Basin (Stark 1989:63-65). It is similar to Prieto Grey-Black, but the Escolleras Chalk have a very dense fine paste, break along lamellar fracture planes, and have a satiny texture. The five specimens recovered during the TVAS have dense pastes with a satiny surface finish unlike any other ceramic recovered on survey. The surface color is dark gray, but they have light gray colored cores. These may not be imports from the Patarata area, where Stark defined the type, but the paste is clearly aberrant within the broader scope of Tuxtlas paste recipes. The strong spatial pattern formed by the distribution of these imported ceramics is likely eastern terminus of a social network that extends into the Tepango Valley from the Western Lower Papaloapan Basin.

Perhaps the strongest spatial clustering of pottery pertains to a newly defined ware group, Code 13xx. There are a number of types within this category that range from very fine compact paste to coarse paste. The finest paste ceramics of this ware group are as dense as stoneware. In fact many display gray cores that resemble stoneware, which is why I suspect that these may be early historic ceramics. The outer surfaces display smoothing striations, sometimes appearing as if wheel-thrown. Bowls are the dominant form. The overwhelming majority of these specimens appear clustered around Tilzapote in the southeastern quadrant. Because of the uncertainty of the age of this pottery, significance for this pattern must be addressed with additional research in the future. If they are early historic or colonial in age, this distribution may be influenced by proximity to San Andres Tuxtla just beyond the survey area to the east.

SUMMARY

In this chapter, I have discussed the ceramic chronology employed to assign collections to phases of occupation. I have also presented several ceramic distributional patterns that may be significant for understanding patterns of social interaction and boundaries to that interaction. In general, settlements throughout the southwestern Tuxtla region present similar material cultural styles, suggesting some level of interaction that unites the region into a cohesive social network. Subregional distributional patterns within the TVAS, however, show some variation at the ceramic type level that potentially indicates social differentiation. Social boundaries may have developed to contrast groups living in the uplands from those living in larger settlements near rivers. It also appears that people may have interacted more closely with others living within the same river valley, with less interaction between valleys. Finally, the presence of certain ceramic types defined for the western lower Papaloapan Basin within the TVAS, particularly at Totocapan, hints at relationships with groups that developed to the west of the Tuxtla Mountains. As I will discuss in Chapter 8, the presence of certain ceramic decorative motifs common to Patarata (Stark 1989, 1998) and the area around Cerro de las Mesas (Sánchez 1999), as well as architectural similarities to the Mixtequilla (Stark 1999, 2003), the Cotaxtla Basin (Daneels 2002a), and Tres Zapotes (Pool 2008), all point to an interest by those living within the Tepango Valley to pursue relationships with groups to the west.

CHAPTER 7: EXPERIENCE OF POLITY AND THE TUXTLA POLITICAL LANDSCAPE

The Tuxtla political landscape comprises hundreds of places interlinked through relations of dominance, subordination, and peer competition or cooperation. Political regimes occupied seats of authority fixed in space where its power was most greatly invested. While authority itself is not restricted to specific loci, one immovable expression of political power is monumental architecture. In the Tuxtlas, palaces, administrative buildings, temples, altars, and ball courts are politically-charged sites on the landscape. Monumental constructions were built using the labor of a relatively large segment of the population. The ability to mobilize such labor rested in the hands of capable political agents. These architectures of power can be ranked in order of regional importance by using quantitative comparisons, such as the size and layouts of administrative buildings. By contrast, sites with little to no evidence of regional authority were likely occupied by subjects of regimes in nearby political centers.

In this chapter I catalog the settlement and, by extension, the political organization of the Tepango Valley Archaeological Survey (TVAS) for each major phase of occupation. Basic settlement data – such as site size, architectural complexity, number and layout of mounds, and location – are presented. Based on these data, I rank each site according to the criteria detailed in Chapter 5. The most important data for discerning TVAS political organization are architectural complexity, the number and size of mounds, and other landscape modifications. For a site to be considered a political center, I require presence of at least one formal architectural complex, which consists of mounds arranged into a formal pattern that often had political, ritual, and elite residential functions. Furthermore, relative position in the settlement hierarchy may be indicated by the relative number and size of mound constructions.

Important to the current political reconstruction is a consideration of relative political centralization within the TVAS. Political centralization is indicated by two complimentary techniques in this chapter. First, a general sense of political centralization is depicted through rank-size analysis using site area as the input data. Rank-size graphs are presented for each phase of occupation for the TVAS. Relatively concave plots suggest that one site possessed a disproportionate amount of political power. This is dependent on the assumptions that site area positively correlates with population, and that population nucleation, in turn, represents latent human labor that can be appropriated for personal elite or state projects (e.g., monumental construction, military, economic surplus through taxation or tribute). There are problems with inferring political centralization based on plots of site area alone. I examine a second rank-size plot using material density-weighted site area, which is thought to be a more accurate approximation of relative population among sites. A more direct measure of political centralization is quantitative examination of mound construction. The relative number and size of mounds per site are used to refine the rank size results.

After presentation of TVAS settlement results, I contextualize the data into a broader regional framework to deduce diachronic political relationships over the central and western Tuxtlas. To achieve this goal, I consider archaeological work conducted by Santley and Arnold (1996; Santley 1991, 1994, 2007), Kruszczynski (2001), Pool (2007), Loughlin (n.d.,), Venter (2008), and to a lesser extent Killion and Urcid (2001; Urcid and Killion 2008) and Borstein (2001). Together these projects provide a rather large window into the Tuxtlas region and surrounding foothills that can be used to reconstruct political boundaries and interpolity relationships. The Hueyapan Survey area revealed many secondary regional centers during the Classic period that were probably subordinate to Laguna de los Cerros, a primary center that fell within Borstein's (2001) survey area. While surveys in the southern foothills are not drawn upon to reconstruct TVAS political boundaries, they are very important for a more qualitative comparison of political authority within the Tuxtlas massif, undertaken in Chapter 8. Architectural configurations of sites within these southern surveys were highly standardized into what Urcid and Killion (2008) refer to as "Plaza Groups", which I refer to as "Long Plaza Groups" in this dissertation. These Long Plaza Groups have correlates at Teotepec, and other regional centers within the Tuxtlas massif. A detailed architectural analysis will be undertaken in the following chapter. It must be stressed that the geopolitical models constructed in this chapter are only considered hypotheses that will continually be evaluated throughout this dissertation and by future projects.

In total, the TVAS documented 176 sites plus an additional 46 isolated collections[1]. Isolated collections are not presented here unless they can be associated with nearby sites, in which case they are combined under the site name or number. Occupation of the Tepango Valley begins during the Initial Picayo phase and population levels remain relatively steady through the Chininita phase. The Santiago A phase was an episode of depopulation and polarization as distinct settlement clusters form in the northern and southern halves of the survey area. The following Santiago B phase saw a population explosion and the emergence of three large centers that commanded the settlement hierarchy of the study area. The Chaneque phase marked a population decrease and large centers began to fragment and lose their political importance, led by Totocapan. During the Vigía phase, regional populations plunge. The majority of the survey area was occupied by hamlets, but one small center was established at Maxyapan. The Totogal phase was a period of population consolidation into two settlement clusters in the southwest and southeast corners of the survey region. One of these, Totogal, functioned as a tribute collection node for the Aztec Triple Alliance (Venter 2008). The foreign influence in the region likely contributed to the nucleated settlement patterns observed during the Totogal phase.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE INITIAL PICAYO PHASE

The first evidence of occupation within the survey area pertains to the Initial Picayo phase, which can be attributed to the Middle Formative period (900-400 BCE)[2]. The general settlement pattern was very dispersed. A total of 48 sites were assigned to this time period, covering 1.74 percent of the total survey area (Table 7.1, see Figure 6.5). Regional settlement consisted of one large nucleated village (Totocapan), one large dispersed village (Cruz de Vidaña), one small nucleated village (Ocelota), four small dispersed villages (Arroyo Salado, Bella Vista, Oteapan Sur, and Sehualaca), and 41

[1] Isolated collections are those where 'site' limits could not be confidently delineated based on surface remains.
[2] No clearly Early Formative (1500-900 BCE) diagnostics were identified.

Table 7.1. Initial Picayo phase sites sorted by material density-weighted site area.

Site	Area (ha)	Settlement Rank	Phase Ceramics/Collection	DWSA
1 (Totocapan)	42.98	Large Nucleated Village	8.58	368.75
95 (Ocelota)	9.53	Small Nucleated Village	17.00	162.07
16/17 (Sehualaca)	13.30	Small Dispersed Village	8.00	106.43
38/8/34 (Cruz de Vidaña)	53.12	Large Dispersed Village	2.00	106.25
112 (Bella Vista)	10.53	Small Dispersed Village	6.33	66.72
19 (Arroyo Salado)	11.87	Small Dispersed Village	4.50	53.39
2 (Oteapan Sur)	12.49	Small Dispersed Village	2.17	27.06
152	2.50	Hamlet	10.00	25.00
178	2.84	Hamlet	4.50	12.78
167	3.24	Hamlet	3.50	11.34
77	4.09	Hamlet	2.67	10.91
54	3.98	Hamlet	2.50	9.95
139b	3.00	Hamlet	3.00	9.00
57	3.47	Hamlet	2.50	8.67
89	1.66	Hamlet	5.00	8.29
1 (El Picayo)	3.86	Hamlet	2.00	7.73
2 (Oteapan Norte)	2.57	Hamlet	3.00	7.70
76	2.53	Hamlet	3.00	7.60
24b	3.20	Hamlet	2.00	6.39
96	2.02	Hamlet	3.00	6.05
1 (Totocapan Sur)	1.03	Hamlet	5.00	5.16
27	2.95	Hamlet	1.75	5.16
139a	1.62	Hamlet	3.00	4.87
49	2.07	Hamlet	2.33	4.83
106	0.60	Hamlet	8.00	4.80
74	1.07	Hamlet	4.00	4.29
29	0.85	Hamlet	5.00	4.23
151	0.78	Hamlet	5.00	3.91
158	0.54	Hamlet	7.00	3.79
24a	3.27	Hamlet	1.00	3.27
163	0.62	Hamlet	5.00	3.08
177	0.25	Hamlet	9.00	2.25
84	0.26	Hamlet	8.00	2.11
48	0.55	Hamlet	3.00	1.65
85	0.54	Hamlet	3.00	1.63
1c	0.51	Hamlet	3.00	1.53
184	0.25	Hamlet	5.00	1.25
51n	0.25	Hamlet	5.00	1.25
1e	0.42	Hamlet	3.00	1.25
1f	0.39	Hamlet	3.00	1.17
1c	0.39	Hamlet	3.00	1.16
1a	0.30	Hamlet	3.00	0.89
1b	0.26	Hamlet	3.00	0.78
37	0.25	Hamlet	3.00	0.75
169	0.25	Hamlet	3.00	0.75
51	0.25	Hamlet	3.00	0.75
116	0.30	Hamlet	2.00	0.60
147	0.25	Hamlet	1.50	0.38
Total area	214 ha		Percent of Survey Area Occupied	1.74%

hamlets (see Figure 7.1). Mean site size was 4.5 ha, with a median size of 1.4 ha. The greatest portion of the Valley's population was concentrated along the Tepango River in the north due to the early influence of Totocapan. All villages were positioned directly adjacent to either the Tepango or Xoteapan rivers.

Totocapan, which covered almost 43 hectares, emerged as a large nucleated village near the northern survey boundary. Although it was not yet a regional center, Totocapan probably hosted a substantial population. Two mounds at Totocapan were associated primarily with Middle Formative diagnostics. Mound 9 and Mound 37 form part of an open plaza located a few meters east of what later became the principal long mound of the site (Mound 34) (Figure 7.20). Mound 9 is a low long mound oriented at about 4-5 degrees east of north, which is approximately the same orientation of the most monumental structures at the site. Mound 9 is only about one meter tall, 38 meters long and 17 meters wide. The northern end of this small plaza was enclosed by an oblong mound. Mound 37 was probably a platform of some kind, but the shape is difficult to discern given that the north side of the mound is destroyed. Mound 37 measures 3.4 meters in height, 31 meters on an axis oriented at 94 degrees, and 19 meters on its perpendicular axis. The western and southern edges of plaza were left open. No other sites within the TVAS have evidence of mound building during the Initial Picayo phase.

While the potential presence of mounds at Totocapan during the Middle Formative is the earliest potential mound building activity in the TVAS region, it is unlikely that this site exerted political influence far into the region. The construction of the Mound 9/37 plaza likely served local administrative functions. Ceramics recovered in collections associated with Mounds 9 and 37 included high percentages of *tecomates* of both Coarse Brown and Polished Red pastes as well as serving bowls in Coarse Polished Black, Medium Polished Black, and Coarse Gray with volcanic ash temper.

Cruz de Vidaña displays a broad, but very low-density, distribution of Initial Picayo phase-sensitive materials. The area covered by phase-sensitive ceramics is larger than Totocapan, but it probably supported a much lower population, as reflected through a much lower material density. Contrasting Cruz de Vidaña, Ocelota is a small village with a very high density of phase-sensitive ceramics.

The two rank-size plots calculated for the Initial Picayo phase present contrasting pictures. The material density-weighted plot presents a log-normal distribution, with a Mehta ratio of 0.49 (Figure 7.2). The data closely conform to the regression line, with an R^2 value of 0.9752 and a slope of -0.1597. There was no single site that clearly boasted a disproportionately high population. The plot using only site area shows greater deviations from the regression line (R^2=0.8925) and the Mehta ratio is more convex (0.44) (Figure 7.3). Due to the fact that Cruz de Vidaña covered the greatest area, but had among the lowest material densities of the largest 10 sites, I believe the density-weighted plot to be more plausible. Neither Cruz de Vidaña nor Totocapan held political influence over an area the extended beyond their immediate hinterlands

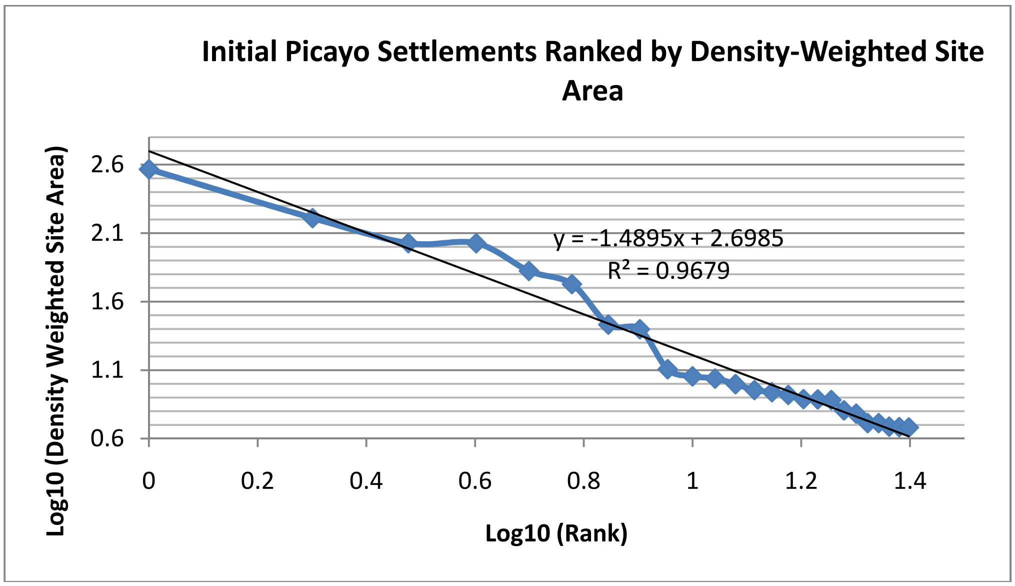

Figure 7.1. Rank-Size Plot of Initial Picayo Phase Sites using Density-Weighted Site Area.

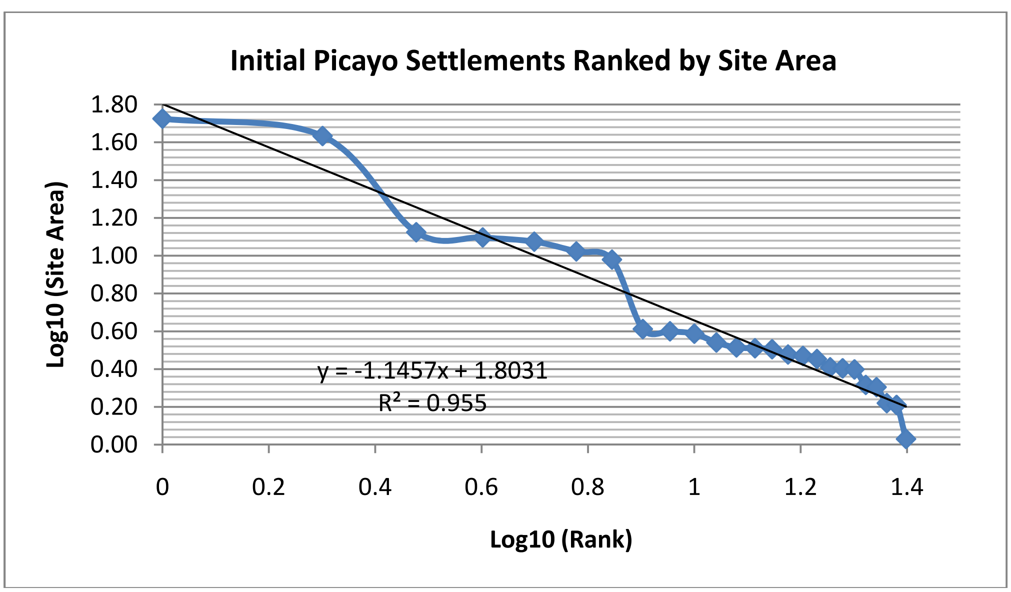

Figure 7.2. Rank-Size Plot of Initial Picayo Phase Sites using Site Area.

REGIONAL POLITY BOUNDARIES DURING THE MIDDLE FORMATIVE (900-400 BCE)

The only regional center in the Tuxtlas or its surrounding environs during the Middle Formative period was Tres Zapotes. Tres Zapotes had reached a size of 80 hectares with an established tradition of mound building and monumental art (Pool [ed.] 2007, Pool 2007). The political boundaries of Tres Zapotes likely encroached somewhat on the Tepango Valley. Because there were no other regional centers in the study area, no detailed analysis of political boundaries is given. However, it is interesting that the Cobata Head, which was surely sculpted by artisans from Tres Zapotes, was found on a saddle ridge between Cerro el Vigía and Cerro Azul (Figure 7.4). This massive carved boulder, the largest of the Olmec Colossal heads, fits well within the Middle Formative Olmec stylistic canon found at Tres Zapotes or La Venta. The Cobata head could have held ritual significance, but if the interpretations of Colossal Heads as portraits of leaders is correct (de la Fuente 1996:48-49, Pool 2007b:117-118), then it was an important political marker defining Tres Zapotes' eastern boundary.

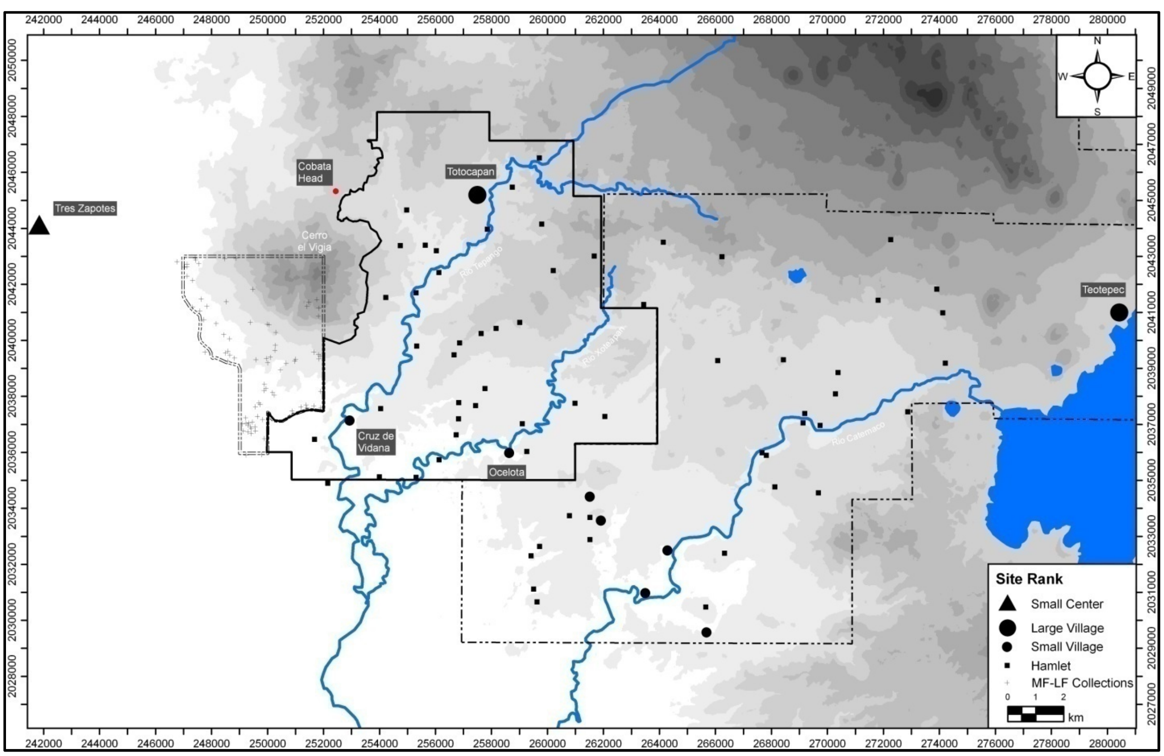

Figure 7.3. Middle Formative settlements in the southwestern Tuxtla Mountains (Kruszczynski's [2001] survey south of Cerro el Vigía did not distinguish Middle and Late Formative collections).

Figure 7.4. Monument 1 and sample of petroglyphs found in a boulder field east of Cobata.

The TVAS survey led us briefly to inspect the areas to the east of the modern area of Cobata, a saddle ridge between Cerro el Vigía and Cerro Azul. We observed hundreds of petroglyphs and documented a sample of those (Figure 7.4). Since all of these finds occurred above ground, it is difficult to date them. Some of the petroglyph designs depict deities popular in the Postclassic, such as Xipe Totec and Huehueteotl. Also featured are stylized images of Tlaloc, spirals, and naturalistic images such as rabbits, birds, human "stick-figures", and humanoid faces often paired as if depicting twins. The unfinished monument shown in the top left corner of Figure 7.4 was the only carved boulder with more than superficial markings discovered during the TVAS survey. As such, it is more reminiscent of the sculpted art found at Tres Zapotes than anything found within the TVAS area (Porter 1989). Clearly the saddle ridge on which Cobata sits was an important ritual location throughout the Prehispanic occupation of the Tuxtlas. In addition to its importance on the ritual landscape, it may have also served as an important political marker, particularly during the Middle Formative when the Cobata Head was likely carved.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE PICAYO PHASE

During the Picayo phase, populations within the survey area increase slightly, but the site total decreases. A total of 42 sites contain Picayo phase collections, which account for 2.49 percent of the total survey area (see Figure 6.7). The survey region during the Picayo phase consisted of a single large center (Totocapan), two small centers (Cruz de Vidaña and Arroyo Salado), two small nucleated villages (Chilchutiuca and Ocelota), one small dispersed village (Oteapan) and 36 hamlets (Table 7.2). Mean site size rose to 7.3 ha with a median size of 2.0 ha. The increase in relative population over the Initial Picayo-Picayo phase transition is therefore explained more by growth of existing sites than by establishment of new ones. This disparity between the mean and median sizes suggests that more growth took place at the largest few sites in the region. Settlement remained heavily skewed toward the Tepango River. With the exception of Ocelota, only hamlets were positioned near the Xoteapan River. The central uplands and

Table 7.2. Picayo phase sites sorted by material density-weighted site area.

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
1 (Totocapan)	90.60	Large Center	4.32	391.39
19 (Arroyo Salado)	40.25	Small Center	6.6	265.67
38/8/34 (Cruz de Vidaña)	60.31	Small Center	4.3125	260.08
95 (Ocelota)	12.00	Small Nucleated Village	12.5	150.00
24 (Chilchutiuca)	12.94	Small Nucleated Village	10.33333333	133.70
2 (Oteapan)	11.28	Small Dispersed Village	5.333333333	60.14
139a	8.97	Hamlet	5.333333333	47.85
167	3.83	Hamlet	11	42.12
112	5.43	Hamlet	3	16.30
89	2.67	Hamlet	5	13.34
17	5.00	Hamlet	2.666666667	13.33
49	2.98	Hamlet	4	11.90
20	6.78	Hamlet	1.5	10.17
1 (El Picayo)	8.20	Hamlet	1	8.20
54	2.29	Hamlet	3.5	8.00
139b	3.47	Hamlet	2	6.93
72	1.78	Hamlet	3	5.35
5	3.19	Hamlet	1.666666667	5.31
48	1.13	Hamlet	4	4.52
68	2.94	Hamlet	1.5	4.40
184	0.85	Hamlet	5	4.26
125	2.05	Hamlet	2	4.10
76	2.29	Hamlet	1.75	4.01
144	0.65	Hamlet	5	3.24
2b	2.69	Hamlet	1	2.69
163	0.85	Hamlet	3	2.54
51	0.54	Hamlet	4	2.17
158	0.53	Hamlet	4	2.12
2a	2.00	Hamlet	1	2.00
139c	0.66	Hamlet	3	1.98
2c	0.96	Hamlet	2	1.91
42	0.28	Hamlet	5	1.39
152	0.34	Hamlet	4	1.35
1d	0.67	Hamlet	2	1.33
1e	0.67	Hamlet	2	1.33
1f	0.67	Hamlet	2	1.33
16	1.00	Hamlet	1.333333333	1.33
24w	1.29	Hamlet	1	1.29
44	0.42	Hamlet	3	1.27
181	0.27	Hamlet	3	0.82
106	0.24	Hamlet	3	0.71
1a	0.67	Hamlet	1	0.67
Total Occupied Area	**307 ha**		**Percent of Survey Area Occupied**	**2.49%**

the southeast corner of the survey area were nearly abandoned.

The Totocapan core grew to cover 90 ha, a figure that does not include the satellite hamlets and villages surrounding the center's core. Its classification as a large center is based mainly on its size, but the southern end of the site appears to have experienced an increase in mound building activities. Collections associated with Mounds 22 through 27 contained primarily Picayo phase ceramics, though it should be noted that relatively few collections were made toward the southern segment of the site. This tentatively brings the total mound count at the Totocapan Core to eight. Mounds 9 and 37, as mentioned above, form a very small open plaza. Mounds 22, 23, and 24 were probably simple house mounds, but mounds 25, 26 and 27 may have formed part of a second plaza group (see Figure 7.20). The tallest of the three was Mound 25, which currently reaches about four meters in height. A trench has been excavated through the center of this mound, so it is difficult to determine the original height and shape of the mound. Mound 25 is flanked closely to the southwest by a smaller mound (Mound 26) that stood about 2.2 meters tall. The summit of Mound 26 is capped with a water tank, making its original height and shape speculative as well. Mound 27 was constructed at the tip of the floodplain terrace that directly overlooks the Tepango River. This is the southernmost mound known for Totocapan. It measures about 3.8 meters in height on the south side, but is somewhat smaller from the northern perspective. Many hamlets and small villages emerged in the immediate hinterland of Totocapan, including the initial occupation near the ranch of El Picayo.

Arroyo Salado achieved its maximum size during the Late Formative. The maximal site area covered about 40 hectares, but it is possible that Sehualaca Norte (Site 17) on the other side of the Tepango River was either closely related or was part of the same site. Arroyo Salado had one small mound group, but modern construction of a road and houses in the area raise the possibility that there may have been more (Figure 7.5). Mound 3 is the principal pyramidal/conical mound. It stands seven meters tall and measures 37 meters north-south and 32 meters east-west. Enclosing a small plaza to the south is a one-meter tall long mound (Mound 4) that extends 35 meters east-west and is 15 meters wide. It is possible that the construction of the road that runs through Arroyo Salado has truncated the length of this mound. Across the road, Mounds 1 and 2 are both circular structures. Mound 1 stands 2.7 meters tall and measures 34 meters diameter with a rather flat top. It likely served as a platform to support a superstructure. Mound 2 was smaller (1.8 m height, 29 m diameter) and more rounded at the top. As a whole, these four mounds form a plaza group that is very similar to Plaza Group 2 at Tres Zapotes. The scale of the plaza group is much smaller at Arroyo Salado, and the long mound borders the plaza to the south rather than the north (cf. Pool and Ohnersorgen 2007:

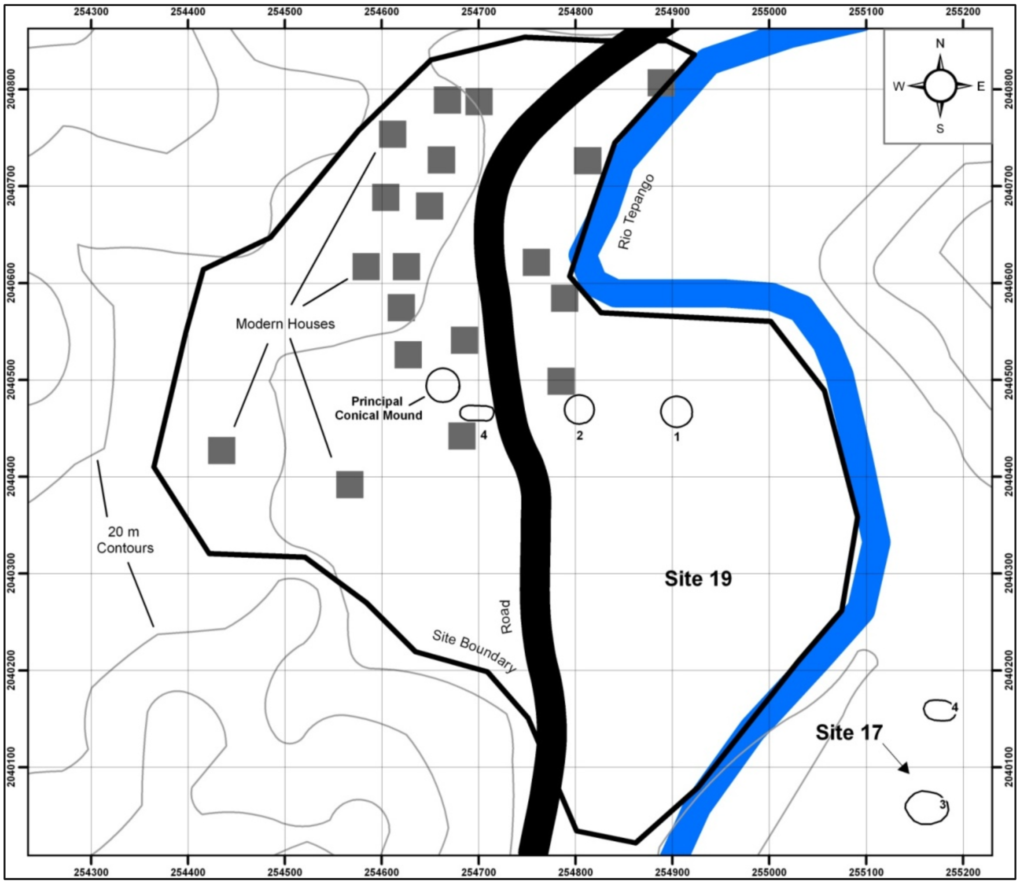

Figure 7.5. Plan view of Arroyo Salado.

Figure 2.2). While these variations remove from its consideration as a Tres Zapotes Plaza Group, there may still be potential that the architectural plans of the larger center were reinterpreted at Arroyo Salado.

Further south, Cruz de Vidaña, at 60 ha, begins to approach its maximum size by the Picayo phase. All 13 mounds mapped at Cruz de Vidaña are associated with collections dominated by Picayo and Chininita phase ceramics. Several of these mounds formed a plaza group where the elite of the site must have lived. The eastern edge of this plaza group is bounded by a small ball court (Mounds 2A and 2B) (Figure 7.6). The two mounds of the ball court average to a height of 2.4 meters. Ball courts do not commonly date to the Formative period in the Tuxtlas, but the site of Chuniapan de Abajo in the Catemaco Valley contains one that probably dates to the Late Formative (Santley 1991:6). A small dome-shaped mound (1.8 m height) is situated about 18 meters north of Mound 2B of the ball court. The northern edge of the plaza is enclosed by a small conical or dome-shaped mound (3.3 m height) which has a platform (0.75 m height) extending from it at an angle of about 95 degrees. This mound is similar to the keyhole-shaped structures identified in the Catemaco Valley (Santley and Arnold 1996). The orientation of Mound 1, and the plaza in general, is within a degree of the orientation of the Plaza Group 1 at Totocapan. The western edge of the plaza is enclosed by a series of mounds. Mound 3 is located about 25 meters southwest of Mound 1. This is a dome-shaped mound about three meters tall and 36 meters diameter. South of Mound 3 is a low platform that is angled off the main axis of the plaza group. The platform is about 77 meters long and 58 meters wide, but only stands about one meter tall. Mounds 4 and 5 sit on top of this platform. It is a monumental platform that may have served as a "palace" housing the regime leaders.

The tallest mound at Cruz de Vidaña is Mound 10. Mound 10 is the site's principal conical mound standing 6 m tall and measuring about 55 meters diameter at the base. About 50 meters south of Mound 10 sits a long mound oriented at about 93 degrees and measuring 65 meters on its long axis and 34 meters wide. The mound was constructed atop a natural rise and stood about four meters tall in total. Mound 7 is 70 meters west of Mound 9. This is a small dome-shaped mound 2.4 meters tall with a diameter of 24 meters. Together, Mounds 7, 9, and 10 form a second plaza that remained open to the north and west with a view of the Tepango River.

In the northeast section of Cruz de Vidaña, Mounds 11, 12 and 13 were constructed atop natural topographic rises, like Mound 9. It is difficult to estimate the constructed height of these mounds, but from the lowest point looking up, Mound 11 stands 8 meters tall. The cultural construction of Mound 8, though, is only about 3 meters on top of the natural rise. Mounds 12 and 13 are shorter in height, but they are long mounds. Mound 12 measures 72 meters east-west and 35 meters north-south. Mound 13 measures 74 meters north-south and 37 meters east-west. Both mounds are rather low, only standing about 2-3 meters above the natural landforms. It is possible that these three mounds formed a third plaza group, but the intent of the landscape modification is not currently evident.

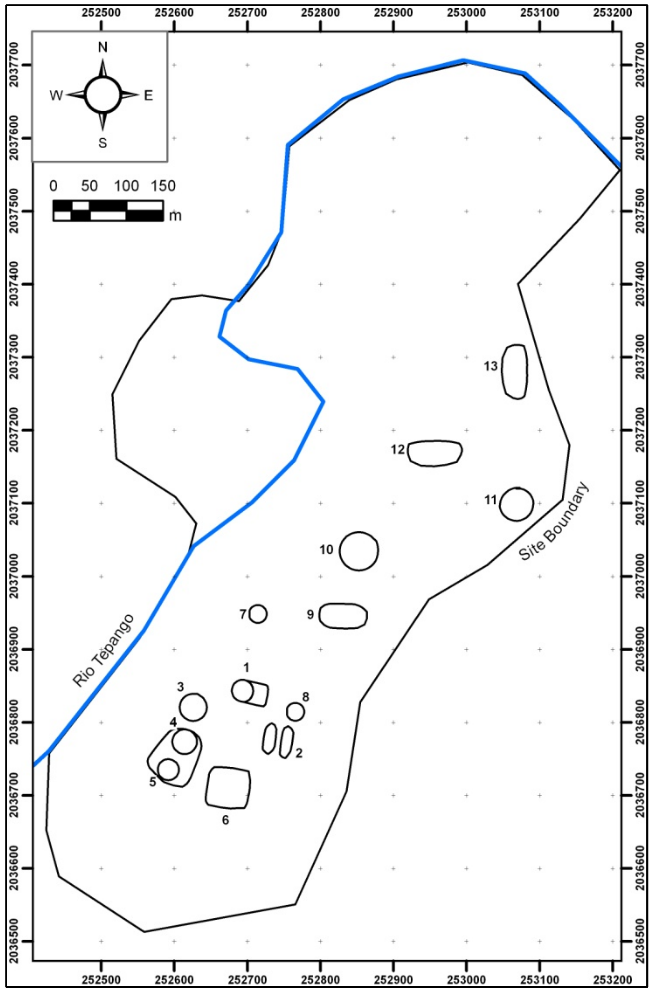

Figure 7.6. Map of Cruz de Vidaña showing the locations of mounds.

TVAS POLITICAL CENTRALIZATION DURING THE PICAYO PHASE

The rank-size plots of Picayo phase settlement are both convex, suggesting political power was not strongly centralized at Totocapan. The relatively even distribution of mound construction activity across the three centers along the Tepango River supports a conclusion that no center possessed a disproportionate amount of political authority. It is doubtful that any of the political centers within the TVAS were subordinate to either of the others, though Tres Zapotes may have exerted influence in the Tepango Valley. The material density-weighted site area plot is the more convex of the two, with a Mehta ratio of 0.36 (Figure 7.7). Arroyo Salado covers less area than Cruz de Vidaña, but it has higher material densities and occupies the second spot on this plot.

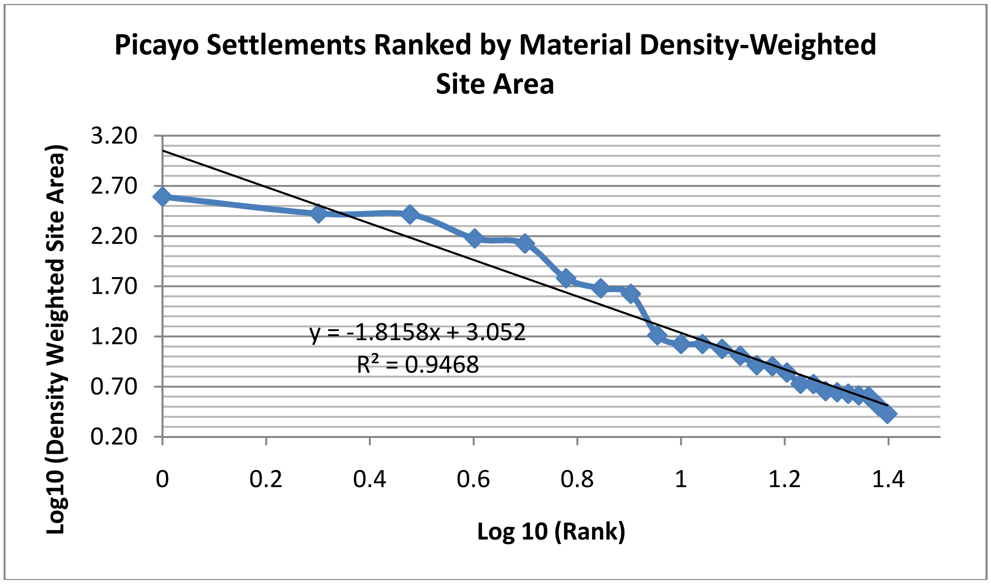

Figure 7.7. Rank-size plot of Picayo phase sites using density-weighted site area.

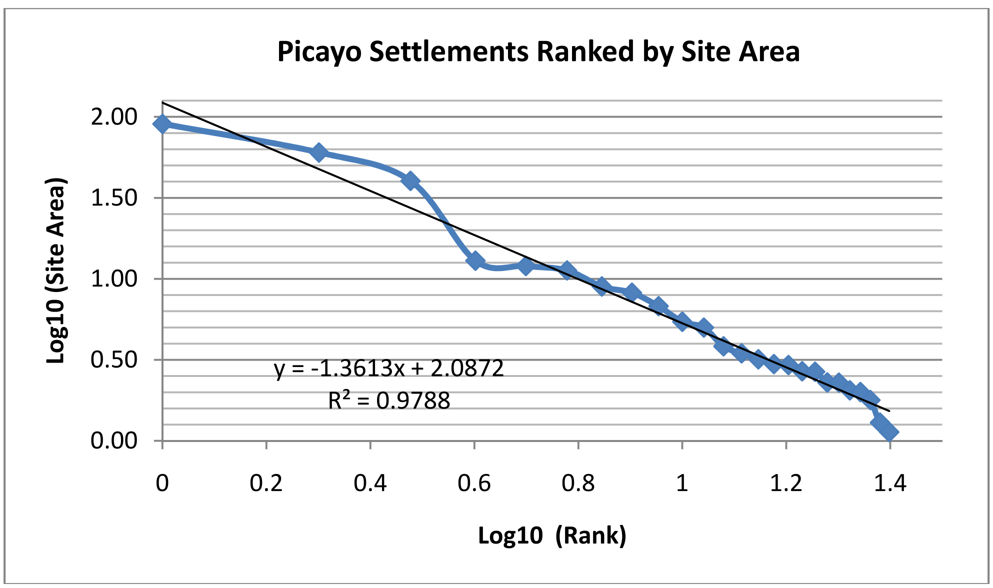

Figure7.8. Rank size plot of Picayo phase sites using site area.

The slope of the regression line is much steeper than that for the Initial Picayo phase, indicating greater political control of hinterlands within the political territories of each center. This all indicates that several small, but likely interconnected, political domains functioned within the TVAS area during the Late Formative. The rank-size plot using site area is only slightly convex, with a Mehta ratio of 0.44.

REGIONAL POLITY BOUNDARIES DURING THE LATE FORMATIVE (400-1 BCE)

The political landscape of the larger Tuxtla region during the Late Formative period was dominated by Tres Zapotes. Tres Zapotes grew to its maximum size of 500 hectares (Pool and Ohnersorgen 2007:24). It was over five times larger than Totocapan, which was the second largest center in the study area. In Figures 7.9 and 7.10, I present a hypothetical model of political influence based on the modified Xtent formula described in Chapter 5. All scenarios of the Xtent model were run with the "*k*" value held constant at 0.5. Model LF1 (Figure 7.9) was calculated using an "*a*" value of 0.5 while model LF2 (Figure 7.10) used an "*a*" of 0.6. The formula was also calculated with an "*a*" of 0.65, but this solution projected Tres Zapotes dominance over entire study region. This last model is coded LF3.

Model LF1 (Figure 7.9) depicts what should be considered as the primary hinterland for each center weighted by its relative size. This model likely, and intentionally, underestimates the political influence of the largest sites in order to define the fundamental center/hinterland unit. Even so, most settlements identified by Kruszczynski (2001) on the southwest flanks of Cerro el Vigía fall within the primary hinterland of Tres Zapotes. Not much is known about settlement in the hinterland immediately surrounding Tres Zapotes, but it is assumed that population levels within the Tres Zapotes hinterland were higher than the Totocapan hinterland based on the relative size of the centers. Totocapan likely controlled the second largest primary hinterland. The next most populous "territory" was that predicted for Cruz de Vidaña. Arroyo Salado possesses the smallest hinterland due to its size and position between the two largest centers in the TVAS.

Outside the TVAS boundary, La Mechuda is a site described by Valenzuela (1945b) to have a number of Tres Zapotes style figurines and a carved basalt column. During a visit to the town of Xiguipilincan (Site 5) north of La Mechuda, the son of the town's *comisariado* described a carved basalt column found in the area, but we did not directly observe the column. Xiguipilincan, which grows into a large center during the Santiago B phase, may be a northern extension of La Mechuda. In the Catemaco Valley,

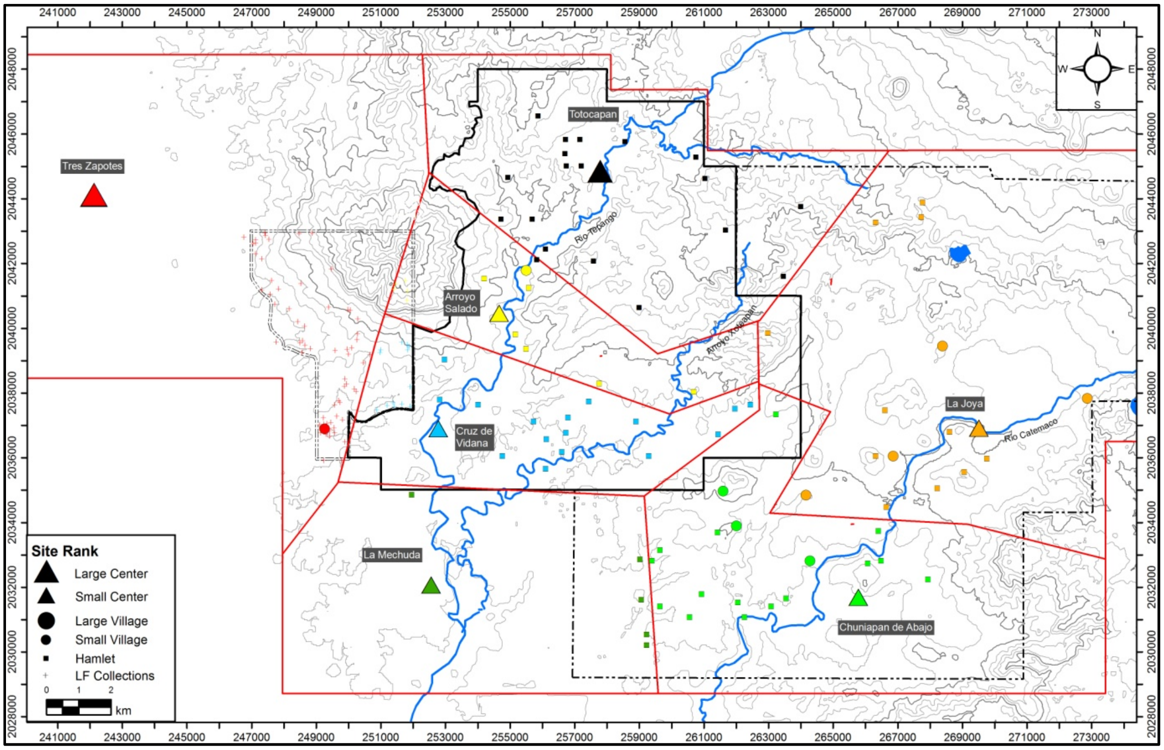

Figure 7.9. Xtent model LF1 results with *a*=0.5 and *k*=0.5.

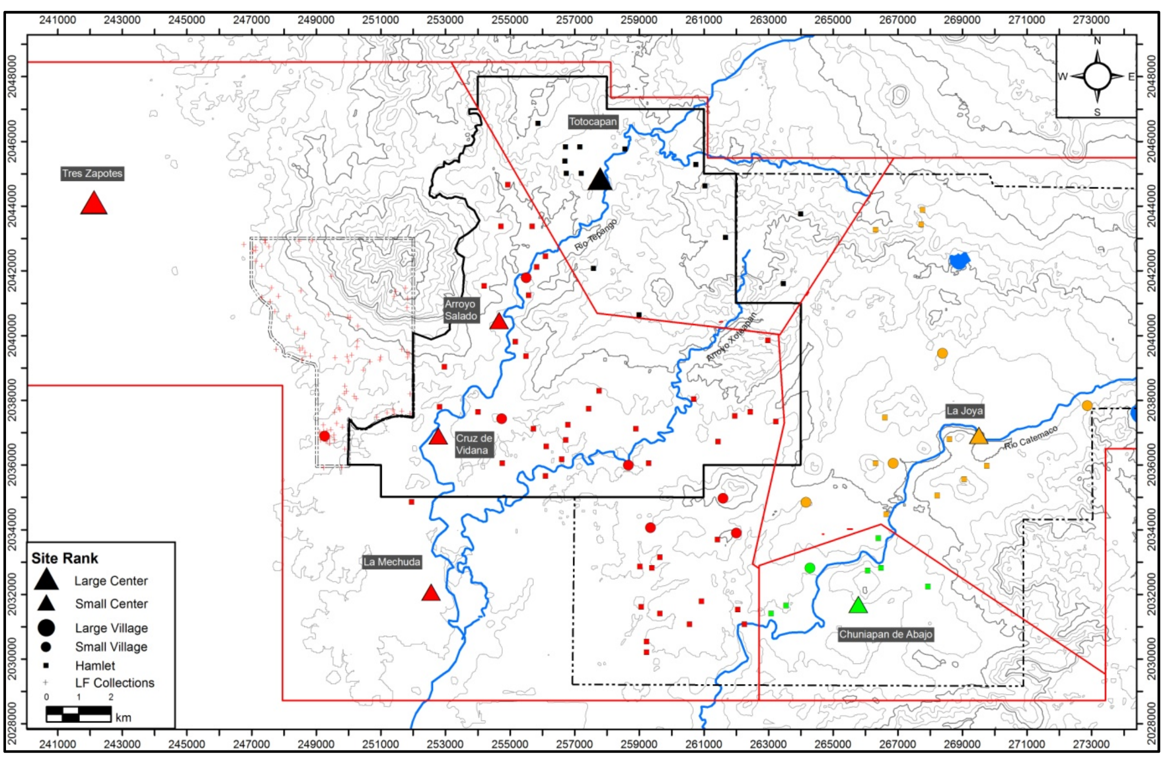

Figure 7.10. Xtent model LF2 results with *a*=0.6 and *k*=0.5.

Chuniapan de Abajo serves as a small center with its hinterland spreading out along the foothills in the lower portion of the valley. This center possessed several mounds. Interestingly, two of these mounds are reminiscent of the Plaza Group 1 at Cruz de Vidaña. Mound 3 at Chuniapan de Abajo was a ball court with another mound (Mound 2) placed few meters east of the southern mound, but in line with its axis. Further east, Mound 1 is a keyhole-shaped structure with a platform extending southwest from a dome-shaped mound. Architectural elements shared between Cruz de Vidaña and Chuniapan de Abajo indicates sharing of political and ritual information between valleys during the Late Formative period, but the roughly equal sizes and architectural complexity of the two centers does not indicate a relationship of dominance and subordination. Farther up the Catemaco River, La Joya covered 50 ha and may have served as a small center with its hinterland in the upper portion of the valley. Santley speculates that there were mounds at this site destroyed for agricultural purposes (2007).

In model LF2 (Figure 7.10), which weights site size more heavily, Tres Zapotes is seen to have influence over several other territories in the study area. Due to the relative size of the centers and cost distance concerns, the likely trajectory of this influence follows a path to the south of Cerro el Vigía first along the foothills and then up the river valleys. La Mechuda, Cruz de Vidaña, and Arroyo Salado are all secondary centers to Tres Zapotes in this scenario. Despite the proximity of the two centers, Arroyo Salado did not fall under the administration of Totocapan in any of the Xtent solutions. Arroyo Salado either remained independent or was subjugated by Tres Zapotes regardless of what weights are attributed to size and distance in the Xtent model. Due to the architectural similarities between Arroyo Salado and Tres Zapotes (mentioned above), the former may have been a subordinate administrator. Further supporting this conclusion is the fact that the growth and decline of Arroyo Salado followed the same temporal pattern as Tres Zapotes. Totocapan, because of its size and position within the upper Tepango Valley, was able to resist Tres Zapotes in this scenario. The potential independence of Totocapan during the Late Formative may be supported if the Cobata Head continued to function as a political marker, as suggested above for the Middle Formative. Of course, the regional centers Tres Zapotes may have targeted for political action is an emic concern that cannot be fully understood with objective models.

What of the other centers? La Mechuda was easily accessible from Tres Zapotes. Valenzuela's work there identified a carved basalt column and Tres Zapotes-style figurines. Urcid and Killion (2008), however, include the mound group at La Mechuda as a "Plaza Group" similar to those found farther south in their Hueyapan survey area and as far east as San Lorenzo. This is not an architectural configuration known at Tres Zapotes, but it is possible that the mounds at La Mechuda date to the Classic period. Cruz de Vidaña also constructed a mound group that does not resemble Tres Zapotes Plaza Groups. Instead, the presence of a ball court draws a connection between Cruz de Vidaña and Chuniapan de Abajo (Santley and Arnold 1996).

Model LF3, with the "*a*" valued at 0.65, suggests that Tres Zapotes had some influence over the entire study area (no map presented). This is a plausible situation given the unrivaled size and monumentality of Tres Zapotes. Loughlin (personal communication) suggests that El Mesón to the north of Tres Zapotes fell under its political control during this period based on architectural and sculptural similarities.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE CHININITA PHASE

The Chininita phase marks a gradual increase in settlement density. The survey region consisted of a single large center (Totocapan), two small centers (Tilzapote and Cruz de Vidaña), two small nucleated villages (Chilchutiuca and La Cuchilla), three small dispersed villages (Francisco Madero, Oteapan, and Bella Vista), and 64 hamlets (Table 7.3, see Figure 6.9). Mean site size (7.7 ha) increases due mainly to Totocapan, which doubled in size. The median site size decreases to 1.6 ha. The increasing separation between mean and median site sizes suggests greater population nucleation in the larger sites. Total area occupied increased to 4.49% of the total survey area. New hamlets were mainly established around the small center of Tilzapote, the central uplands, and around the small village of Francisco Madero.

Totocapan grew to cover 131 ha. Most of this growth resulted from the initial occupation of the Chaneque district to the west of the Totocapan civic/ceremonial core. However, the distribution of Chininita phase material l is discontinuous between

Table 7.3. Chininita sites sorted by density-weighted site area.

Site	Area (ha)	Settlement Rank	Phase Ceramics/Collection	DWSA
1 (Totocapan)	178.20	Large Center	6.53	1163.37
139/145 (Tilzapote)	78.60	Small Center	6.86	539.45
38/8 (Cruz de Vidaña)	71.17	Small Center	3.37	239.89
112 (Bella Vista)	20.16	Small Dispersed Village	7.33	147.85
82 (Francisco Madero)	25.02	Small Dispersed Village	5.00	125.12
2 (Oteapan)	22.00	Small Dispersed Village	5.36	118.00
167 (La Cuchilla)	10.02	Small Nucleated Village	7.33	73.50
24 (Chilchutiuca)	14.20	Small Nucleated Village	5.00	71.01
89	2.18	Hamlet	19.60	42.82
42	2.26	Hamlet	16.00	36.13
2a	9.00	Hamlet	3.75	33.75
5	12.75	Hamlet	2.38	30.40
65	3.00	Hamlet	7.50	22.50
170	2.83	Hamlet	7.25	20.55
17	2.96	Hamlet	6.57	19.44
114	4.12	Hamlet	4.00	16.49
100	3.02	Hamlet	5.33	16.12
19	9.72	Hamlet	1.63	15.79
51b	2.47	Hamlet	5.80	14.32
36	1.92	Hamlet	7.00	13.42
166	3.20	Hamlet	4.00	12.80
77	6.58	Hamlet	1.83	12.07
81	1.78	Hamlet	6.67	11.88
115	3.22	Hamlet	3.50	11.28
49	3.86	Hamlet	2.80	10.80
1b	1.70	Hamlet	6.33	10.77
102	1.10	Hamlet	9.00	9.89
26	1.24	Hamlet	7.67	9.54
34	1.35	Hamlet	7.00	9.44
179	1.97	Hamlet	4.67	9.19
44	1.25	Hamlet	7.25	9.09
177	3.46	Hamlet	2.50	8.64
15	3.05	Hamlet	2.50	7.61
2b	3.00	Hamlet	2.50	7.50
125	2.05	Hamlet	3.33	6.83
57	5.39	Hamlet	1.25	6.74
71	1.28	Hamlet	5.00	6.38
1 (El Picayo)	2.93	Hamlet	2.14	6.29
144	1.51	Hamlet	4.00	6.06
162	1.01	Hamlet	5.00	5.05
175	1.58	Hamlet	3.00	4.73
124	0.33	Hamlet	13.67	4.52
29	0.37	Hamlet	12.33	4.51
16	2.20	Hamlet	2.00	4.39
163	0.85	Hamlet	5.00	4.23
1c	0.70	Hamlet	6.00	4.20
156	1.00	Hamlet	4.00	4.00
74	3.78	Hamlet	1.00	3.78
45	1.37	Hamlet	2.67	3.66
7	1.63	Hamlet	2.20	3.59
43	1.42	Hamlet	2.33	3.32
116	0.82	Hamlet	4.00	3.26
184	0.85	Hamlet	3.50	2.98
84	0.73	Hamlet	4.00	2.91
134	0.38	Hamlet	7.50	2.88
140	0.51	Hamlet	5.33	2.72
82a	0.50	Hamlet	5.00	2.50
174	0.99	Hamlet	2.50	2.49
93	0.54	Hamlet	3.00	1.63
172	1.00	Hamlet	1.50	1.50
40	0.55	Hamlet	2.50	1.38

Table 7.3 (continued).

Site	Area (ha)	Settlement Rank	Phase Ceramics/Collection	DWSA
106	0.25	Hamlet	5.50	1.31
1a	0.25	Hamlet	5.00	1.25
82b	0.50	Hamlet	2.50	1.24
3	0.31	Hamlet	3.60	1.11
53	0.40	Hamlet	2.50	1.01
28	0.33	Hamlet	3.00	0.99
178	0.65	Hamlet	1.50	0.97
136	0.28	Hamlet	3.00	0.83
138	0.56	Hamlet	1.00	0.56
80	0.25	Hamlet	1.67	0.36
51a	0.25	Hamlet	3.00	0.00
Total Occupied Area	**553 ha**		**Percent of Survey Area Occupied**	**4.49%**

Totocapan and Kingdian Ranch to the south. At Totocapan, no new mounds were constructed. To the northwest, El Picayo continues to be a small nucleated village distinct from the Totocapan core.

Arroyo Salado (10 ha) declined greatly in size and in material density. This is interesting considering that in the Late Formative period it may have been contested land in a power struggle between Tres Zapotes and Totocapan. Perhaps part of the reason for the growth of Totocapan in the Chininita phase is population migration from Arroyo Salado.

Cruz de Vidaña (71 ha) increases slightly in size and material density. It is likely that the mound building activities described for the Picayo phase continues into the Chininita. Tilzapote grows rapidly to cover 78 ha. Several mounds there are associated primarily with Chininita phase ceramics, but all of them are part of plaza groups that primarily date to the Classic period. Its relative size and evidence that mound construction may have begun by the Chininita phase qualify Tilzapote as a small center.

TVAS POLITICAL CENTRALIZATION DURING THE CHININITA PHASE

The Chininita rank-size plot demonstrates a somewhat different picture than the Picayo plot (Figures 7.11 and 7.12). The overall shape on the density-weighted plot is log normal (Figure 7.11). The area plot is similar with a slight departure at the third rank with Cruz de Vidaña (Figure 7.12). Log normal settlement distribution may indicate greater interaction among centers within the TVAS region. Totocapan may have begun to exercise influence on a regional scale, particularly to the south along the Tepango River. The decline of Arroyo Salado as a significant political center may have left the door open for Totocapan to expand its area of influence, but Tres Zapotes was still by far the largest center in the broader region (discussed below). If the region was integrated into a single polity, it would have been a confederation with no clearly dominant political center. Totocapan may have controlled the largest territory of the three centers, but they did not likely control either of the other centers. Patterns of center/hinterland settlement distribution, however, appear to display a primate pattern, with authority clearly centralized within each of the three centers.

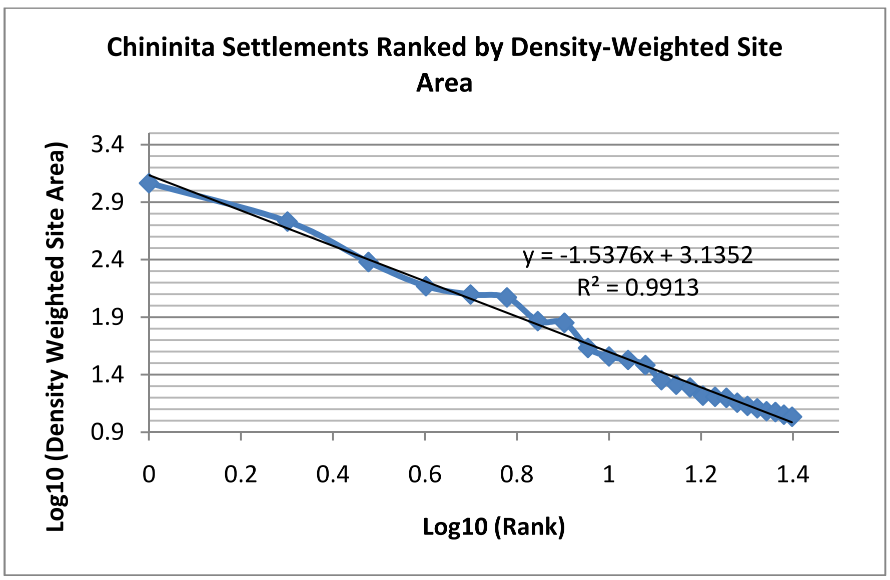

Figure 7.11. Rank-size plot of Chininita phase sites using density-weighted site area.

REGIONAL POLITY BOUNDARIES DURING THE PROTOCLASSIC (1-300 CE)

The Xtent formula was run for the Protoclassic using the same values for *a* (0.50, 0.60, and 0.65) and *k* (0.5) as the Late Formative. The results differ greatly different due to the shifting composition of the political landscape.

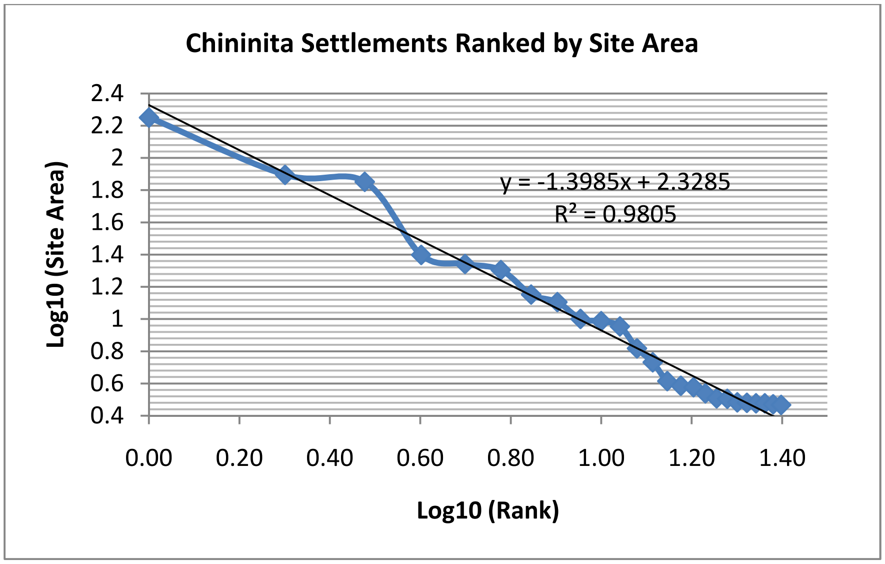

Figure 7.12. Chininita phase rank-size plot using site area.

Tres Zapotes began to decline gradually to 400 ha in size. While this represents a 20 percent decline in site area, it was still by far the largest and most politically important center in the region. In the Catemaco Valley, Chuniapan de Abajo and La Joya declined dramatically and gave way to a small center (30 ha) at Chuniapan de Arriba (Santley 2007). Population levels for the whole Catemaco Valley survey area declined greatly in the Protoclassic. Along the Tepango River south of the TVAS boundary, La Mechuda is assumed to have still been occupied. For the purpose of calculating the Xtent model it is assigned an area of 35 hectares, though it should be noted that the size of La Mechuda does not have a great affect on the resulting models.

The PTC1 model (*a*=0.50 | *k*=0.50) projects hinterlands around each center where each territory was an autonomous unit able to control its own hinterland without incorporation into larger neighboring polities (Figure 7.13). Land controlled by Arroyo Salado in the previous phase now mostly falls under the control of Totocapan. The boundary between the Totocapan and Cruz de Vidaña hinterlands falls around the hamlet Site 19, which is what remains of Arroyo Salado. The boundary between Totocapan and Tres Zapotes remains on Cerro el Vigía around Cobata. Tilzapote is projected to control a rather large area because of its size and central location within the study area. Cruz de Vidaña controls a territory to the east and south that can be drawn at approximately the halfway point to the centers of Tilzapote and La Mechuda respectively. However, its

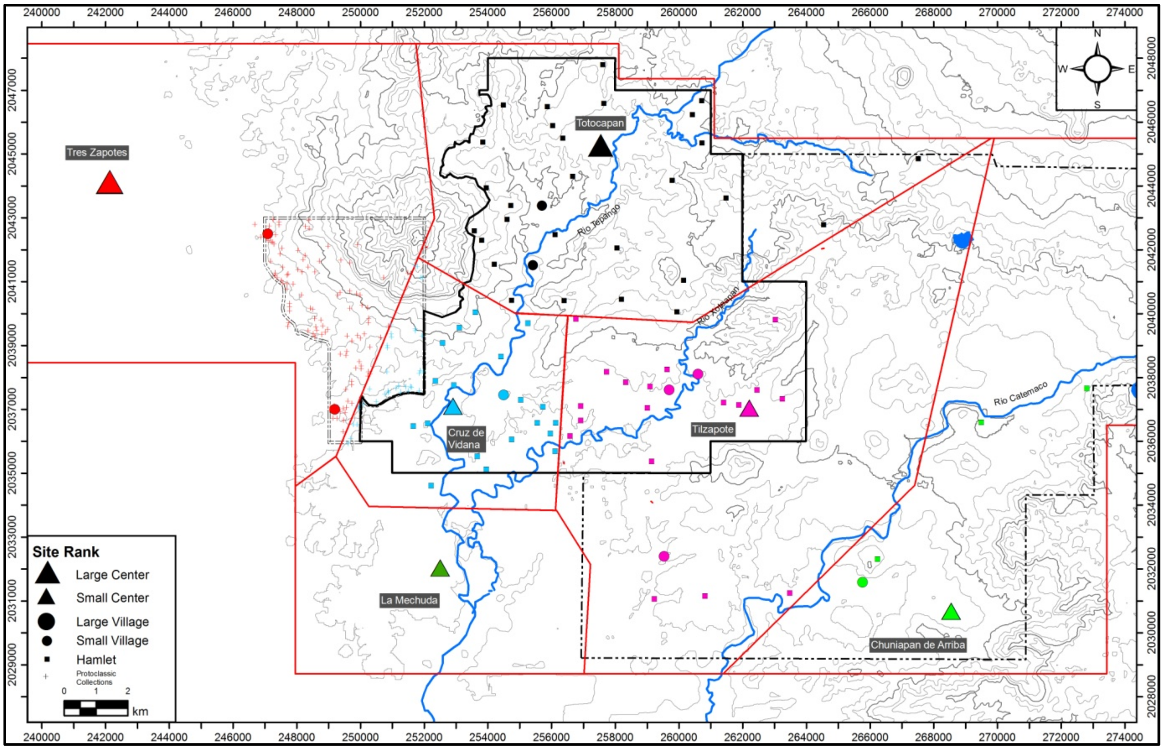

Figure 7.13. Xtent model PTC1 results with *a*=0.5 and *k*=0.5.

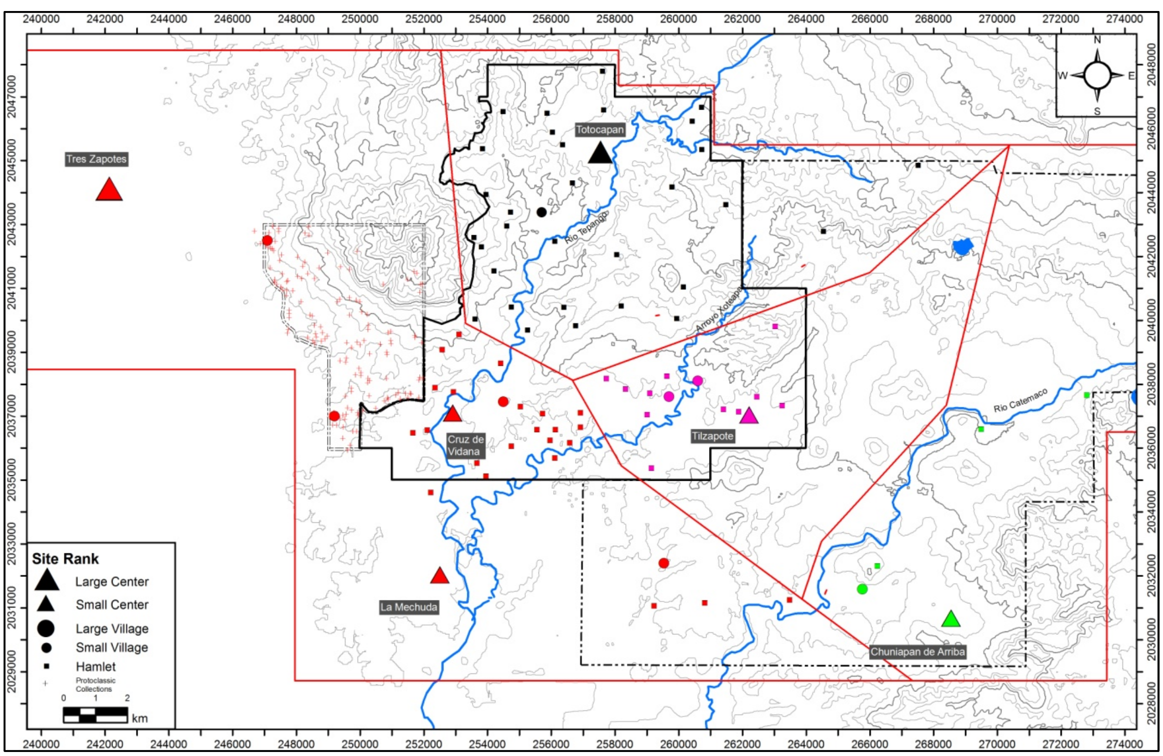

Figure 7.14. Xtent model PTC2 results with *a*=0.6 and *k*=0.5.

western boundary is truncated severely by the influence of Tres Zapotes. Most of Kruszczynski's (2001) survey area falls under Tres Zapotes' core territory.

In the PTC2 solution (a=0.60 | k=0.50), Tres Zapotes overtakes both Cruz de Vidaña and La Mechuda (Figure 7.14). While Tilzapote and Chuniapan de Arriba remain independent, they both lose significant territory to Tres Zapotes. Totocapan, though, stays relatively stable.

In the PTC3 solution (a=0.65 | k=0.50), Tres Zapotes dominated everything except a small Totocapan territory (map not presented). Totocapan's territory was greatly reduced to the west and south. Again here, the Xtent model using cost distance suggests the hypothetical path of expansion from Tres Zapotes follows the foothills to the southeast, rather than the rugged pass north, of Cerro el Vigía. Its influence then spread up the river valleys. A fourth Xtent solution (PTC4) where a=0.70 shows Totocapan coming under the influence of Tres Zapotes.

Why did Totocapan, Cruz de Vidaña, and Tilzapote grow while Arroyo Salado declined? One hypothesis is that these centers absorbed some of the surrounding populations in effort to fend off Tres Zapotes influence. At the same time, the regime at Late Formative Arroyo Salado, which may have drawn upon Tres Zapotes to legitimate their political authority, suffered from the increasing factionalism taking place at the source of its political legitimation. As Pool demonstrates, distinct mound groups at Tres Zapotes presented a coherent architectural pattern during the Late Formative known as the Tres Zapotes Plaza Group (TZPG). This was also the time of Tres Zapotes's greatest size, and presumably its greatest influence throughout the regional political landscape. During the Protoclassic, Tres Zapotes displays a lot of modifications to the core TZPG architectural layout that may represent exclusionary political strategies within the large center (Pool 2008). The distinction of different lineages or corporate groups at Tres Zapotes may have negatively impacted their influence outside the site. If the regime at Arroyo Salado was tied to Tres Zapotes as a source of political legitimation, the infighting at Tres Zapotes may have called into question the authority of regime leaders at Arroyo Salado. The other three centers within the TVAS benefitted as a result.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE SANTIAGO A PHASE

The Santiago A phase is marked by the fewest, and some of the most rare, ceramic types. The drop in population seen during this period may therefore result partially from a bias in the chronological typology. On the other hand, if population levels were higher, these ceramics categories would be more prevalent. On the map in Figure 6.11, I include collections that possessed ceramics common to the first half of the Classic period but that could not be confidently placed in either the Santiago A or Santiago B phases. These collections should be interpreted as the maximal potential extent of Santiago A phase occupation in the TVAS region. However, in summarizing Santiago A occupation I use only the distribution of ceramic diagnostics that fall under the Santiago A phase as discussed in Chapter 6.

Two settlement clusters developed during the Santiago A phase: one that was concentrated to the north around Totocapan and the second was a more dispersed occupation of the southern half of the TVAS (see Figure 6.11). The uplands to the northeast of the mean survey center were nearly abandoned. A total of 54 sites were occupied during the Early Classic: one large center (Totocapan), one large dispersed village (Oteapan), one small nucleated village (Texcochapan), one small dispersed village (El Picayo), and 50 hamlets (Table 7.4). The percent of the total survey area that displays Santiago A phase occupation declines to 2.2 percent during the Santiago A phase. The mean (5.1 ha) site size declines while the median (2.17 ha) increases significantly. The closing gap between these two simple statistics indicates a more evenly dispersed population among average-sized sites. The majority of the region's population lived in the northern half of the survey area at Totocapan, El Picayo, and Oteapan.

Totocapan lost a little over half its total size to occupy an area of 85 ha, which corresponds to a proportional drop in population size. It was still the largest site in the region, though. There is no evidence of new mound construction anywhere in the TVAS during the Santiago A phase. Many hamlets and villages crop up around Totocapan, many of which become integrated by the large center during the Santiago B phase. These settlements undoubtedly formed its sustaining hinterland, which in turn looked to Totocapan to fulfill various economic and ritual services. Furthermore, the gap in

Table 7.4. Santiago A phase sites sorted by area.

Site	Area (ha)	Settlement Rank	Phase Ceramics/Collection	DWSA
1 (Totocapan)	84.90	Large Center	2.36	200.12
2 (Oteapan)	25.00	Large Dispersed Village	7.33	183.33
50/56 (Texcochapan)	11.97	Small Nucleated Village	11.83	141.62
3	6.97	Hamlet	8.00	55.76
51n	3.81	Hamlet	7.67	29.24
49	2.40	Hamlet	11.00	26.39
1 (El Picayo)	12.00	Small Dispersed Village	2.00	24.00
139	4.98	Hamlet	4.50	22.42
1g	6.71	Hamlet	2.00	13.41
51s	2.65	Hamlet	4.67	12.35
25	12.31	Hamlet	1.00	12.31
13	3.72	Hamlet	3.00	11.15
1f	4.51	Hamlet	2.00	9.02
43	0.87	Hamlet	10.00	8.70
5	8.21	Hamlet	1.00	8.21
177	3.97	Hamlet	2.00	7.94
24	7.58	Hamlet	1.00	7.58
1e	2.35	Hamlet	3.00	7.05
145	3.49	Hamlet	2.00	6.98
61	1.16	Hamlet	6.00	6.97
19	6.64	Hamlet	1.00	6.64
132	4.42	Hamlet	1.50	6.63
63	1.09	Hamlet	6.00	6.54
113	6.54	Hamlet	1.00	6.54
1a	6.30	Hamlet	1.00	6.30
64	1.55	Hamlet	4.00	6.21
96	2.92	Hamlet	2.00	5.83
124	1.15	Hamlet	5.00	5.75
164	0.93	Hamlet	6.00	5.60
62	2.07	Hamlet	2.50	5.16
1c	2.38	Hamlet	2.00	4.77
42	3.15	Hamlet	1.50	4.72
86	1.14	Hamlet	4.00	4.57
1d	2.20	Hamlet	2.00	4.40
71	2.17	Hamlet	2.00	4.34
39	1.07	Hamlet	4.00	4.27
46	0.91	Hamlet	4.50	4.07
34	1.84	Hamlet	2.00	3.69
57	1.35	Hamlet	2.67	3.61
38	1.69	Hamlet	2.00	3.37
117	0.55	Hamlet	6.00	3.32
36	0.80	Hamlet	4.00	3.19
108	0.96	Hamlet	3.00	2.88
31	0.92	Hamlet	2.67	2.45
167	0.80	Hamlet	3.00	2.39
158	0.53	Hamlet	4.00	2.12
24	1.20	Hamlet	1.75	2.10
1h	1.68	Hamlet	1.00	1.68
22	0.75	Hamlet	2.00	1.50
171	0.47	Hamlet	3.00	1.41
99	0.94	Hamlet	1.00	0.94
176	0.25	Hamlet	1.00	0.25
1b	0.21	Hamlet	1.00	0.21
Total Occupied Area	**271 ha**		**Percent of Survey Area Occupied**	**2.20%**

settlement between the north and south settlement clusters suggests that a political divide had formed. El Picayo (12 ha) was the fourth largest site in the region by the Santiago A phase. It would be negligent to not consider that the close proximity of El Picayo and Totocapan suggests they are parts of the same site. However, material distribution between them is discontinuous. Totocapan and El Picayo are undeniably related in some way, but the nature of that relationship is unknown at this point.

Oteapan, located to the south of Totocapan, experienced slight growth (25 ha) as well. The absence of mound building, though, suggests that it did not serve regional administrative functions. It is a remote possibility that Oteapan becomes a southern extension of Totocapan during the subsequent Santiago B phase. The only thing separating the two sites is the modern town of Santiago Tuxtla. During the Santiago A phase, Oteapan may represent some kind of political buffer between the northern and southern settlement clusters, or simply a large village settled closely to Totocapan in order to take advantage of its services.

Tilzapote disappeared as a regional center and came only to be occupied by a single hamlet. This pattern is suspicious. It is possible that the political center that had developed here during the Chininita phase was extant but Fine Buff pottery was simply rare at the site. A number of the hamlets surrounding Tilzapote also disappeared. Cruz de Vidaña also virtually disappeared. In fact, the southern half of the survey region experienced relative depopulation at almost every site. One exception is the growth of Texcochapan (12 ha) into a densely occupied village where no settlement was detected during the preceding phase. This villages continued to grow rapidly into the Santiago B phase.

TVAS POLITICAL CENTRALIZATION DURING THE SANTIAGO A PHASE

The Santiago A phase rank-size plots are both composite and suggest very different patterns of political organization (Figures 7.15 and 7.16). On the material density-weighted plot, the top four sites display a convex plot with a Mehta's ratio of 0.34. While Totocapan was much larger than any other site, phase-sensitive ceramics were much more concentrated at Oteapan and Texcochapan. With regard to relative population, these two villages probably housed nearly as many people as the large center.

This plot would indicate that political authority was dispersed among the top four sites in the region, but Totocapan was the only political center. Visual inspection of the plot shows that the fifth and sixth ranking sites level off at the second tier of settlement. There is no seat of political authority in the southern half of the survey area, just dispersed habitation sites. Considering this geographic pattern, a picture of relative political centralization appears with Totocapan acting as the only authority in the TVAS region. The rank-size plot using only site area (Figure 7.16) supports this assertion as the

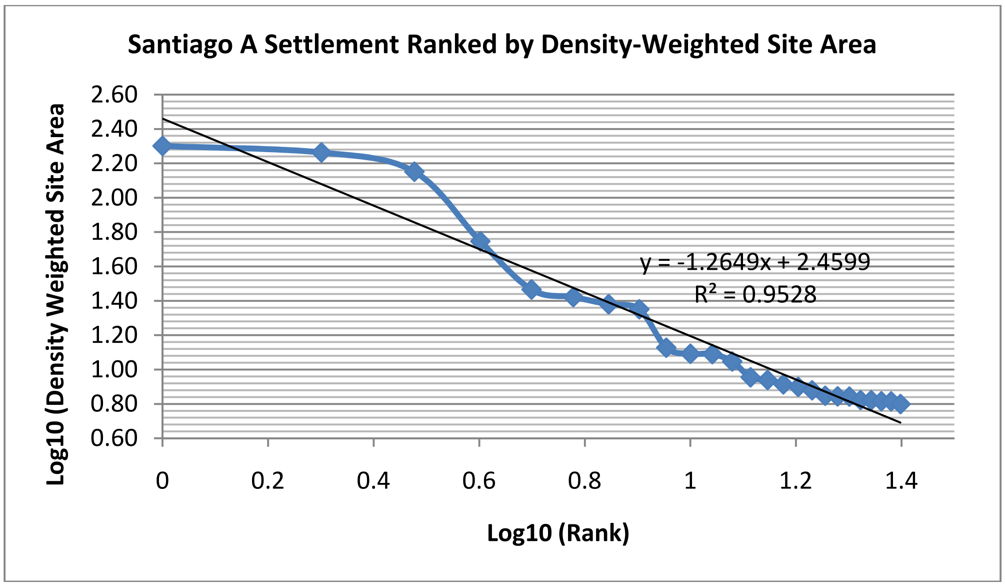

Figure 7.15. Rank-size plot of Santiago A phase sites using density-weighted site area.

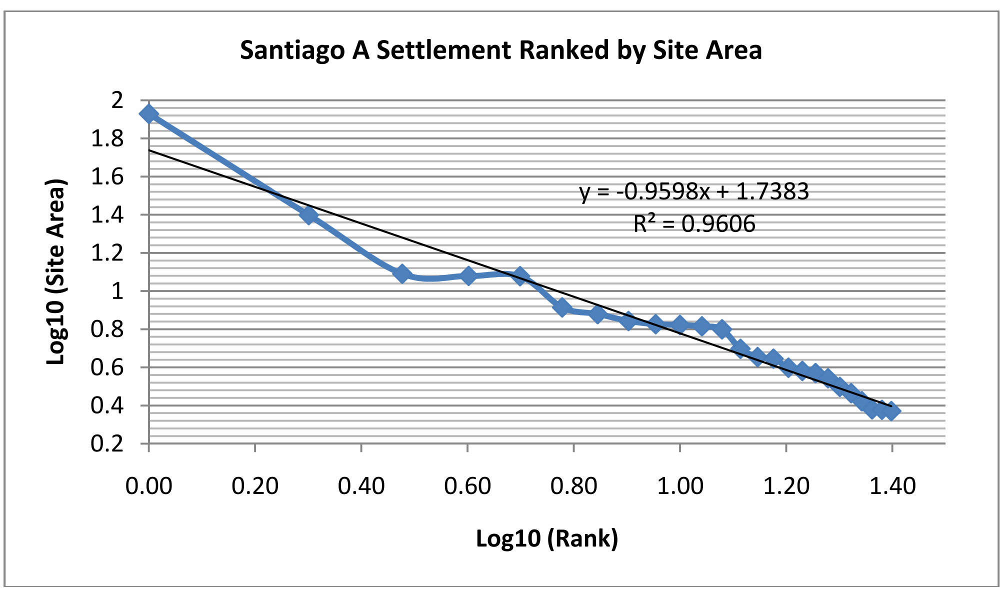

Figure 7.16. Rank-size plot of Santiago A phase sites using site area.

line is relatively concave with a Mehta ratio of 0.63. Here, Smith and Schreiber's (2006) critique of Santley's (1994) rank size analysis is pertinent. They point out that the tool was developed for use only with centers or cities within a region. To include villages and hamlets with little or no regional political economic power creates the illusion of dispersed authority during the Santiago A phase, which may not reflect reality.

The Santiago A phase rank-size plot that Santley calculates (using population) for the Catemaco Valley is concave, indicating a primate settlement pattern headed by Matacapan (Santley and Richards 2007:124-125). That a volcanic eruption and ash fall cleared the upper Catemaco Valley of settlement about 50 years prior to the founding of Matacapan is significant to understand this pattern (Pool and Britt 2000, Santley et al. 2000). Matacapan regime leaders rose to prominence unopposed by regimes elsewhere in the valley. While the plots for the Catemaco and Tepango Valleys are quite different, knowledge of the archaeology and visual inspection of settlement distribution reveal a similar political situation. Both valleys had only a single seat of political authority during the Early Classic. While this indicates centralized political authority for both polities, populations were more dispersed in the Tepango Valley due to the occupation of several villages. Additionally, Santley suggests that the strongly convex shape of the lower portion of the Early Classic plot for the Catemaco Valley indicates a "regional economy" that was not well integrated. It can be reasoned that the TVAS region was not well politically integrated due to the relative gap in settlement between the north and south halves.

REGIONAL POLITY BOUNDARIES DURING THE EARLY CLASSIC (300-450 CE)

The political landscape in the Tuxtla region changes composition considerably from the Protoclassic. While Tres Zapotes continues as the largest center, it declined in size to roughly 200 ha (Pool personal communication). In the first EC1 Xtent model run for the Early Classic (a=0.5 | k=0.5), Tres Zapotes still has some influence on the southern flanks of Cerro el Vigía and the lower Tepango and Xoteapan rivers (Figure 7.17). It may be this remnant influence that determined the positioning of the only other two regional centers in the uplands. Totocapan displayed considerable durability in the face of a dominant Tres Zapotes polity over the centuries from the Middle Formative through the Early Classic. This is not to say that Totocapan was successful in resisting, or even wanted to resist, Tres Zapotes influences over the Formative periods. Whatever strategy Totocapan employed was successful from the stand point that it continued to grow into the Middle Classic as Tres Zapotes declined. Perhaps its positioning in the upper segment of the Tepango Valley contributed to that success.

If the Xtent models are correct in predicting that the path of Tres Zapotes influence was first to the south and then up the river valleys, it is possible that the occupants of the Catemaco Valley recognized Totocapan's success and established Matacapan in a comparably similar location. Location may be one of many factors that influenced the development of Matacapan into a regional center. Santley (2007) points toward the fertility of the soils around Matacapan as another influence, but the soils were not necessarily more fertile than those found in the southern foothills or the alluvial plains farther south. Proximity to Lake Catemaco may also have been a significant factor to procure aquatic resources. Finally, a volcanic eruption during the Protoclassic caused

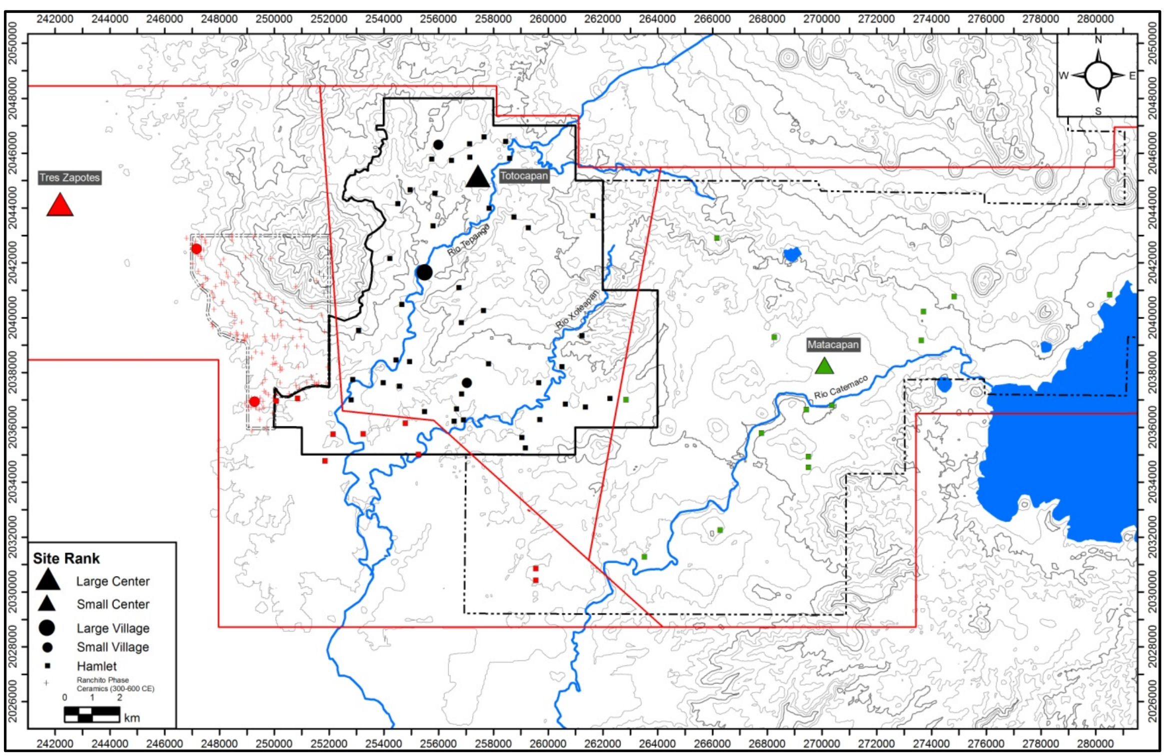

Figure 7.17. Xtent model EC1 results with *a*=0.5 and *k*=0.5.

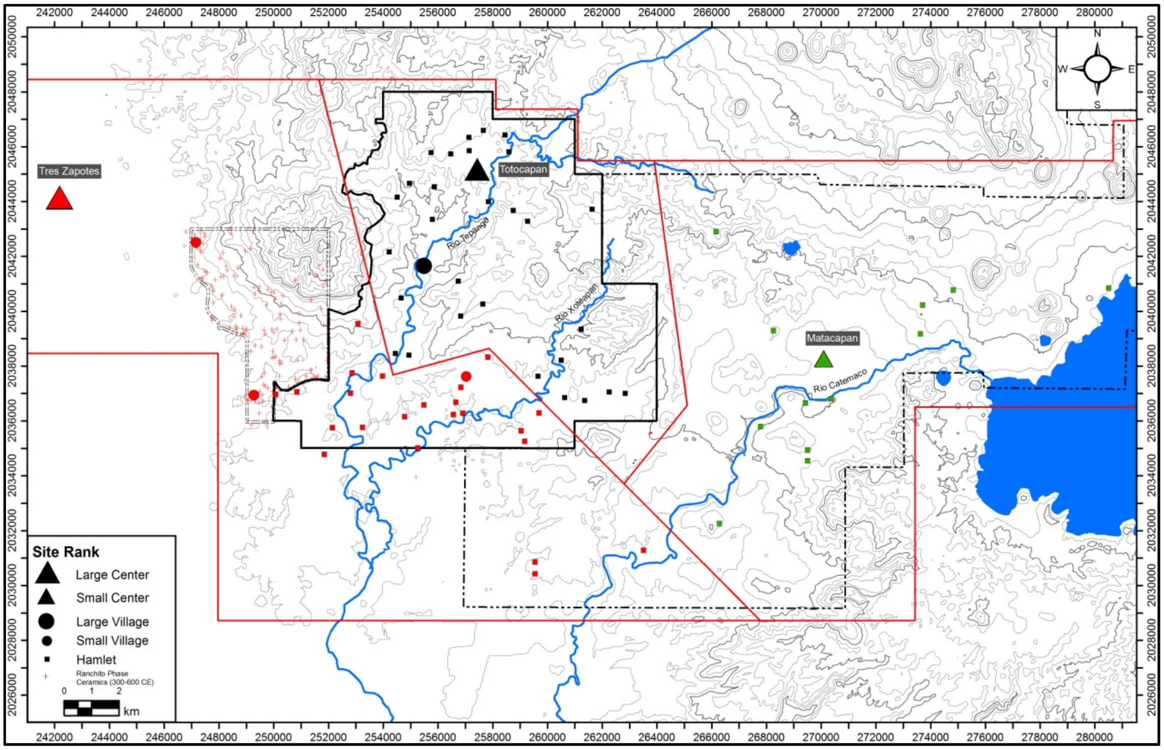

Figure 7.18. Xtent model EC2 results with *a*=0.6 and *k*=0.5.

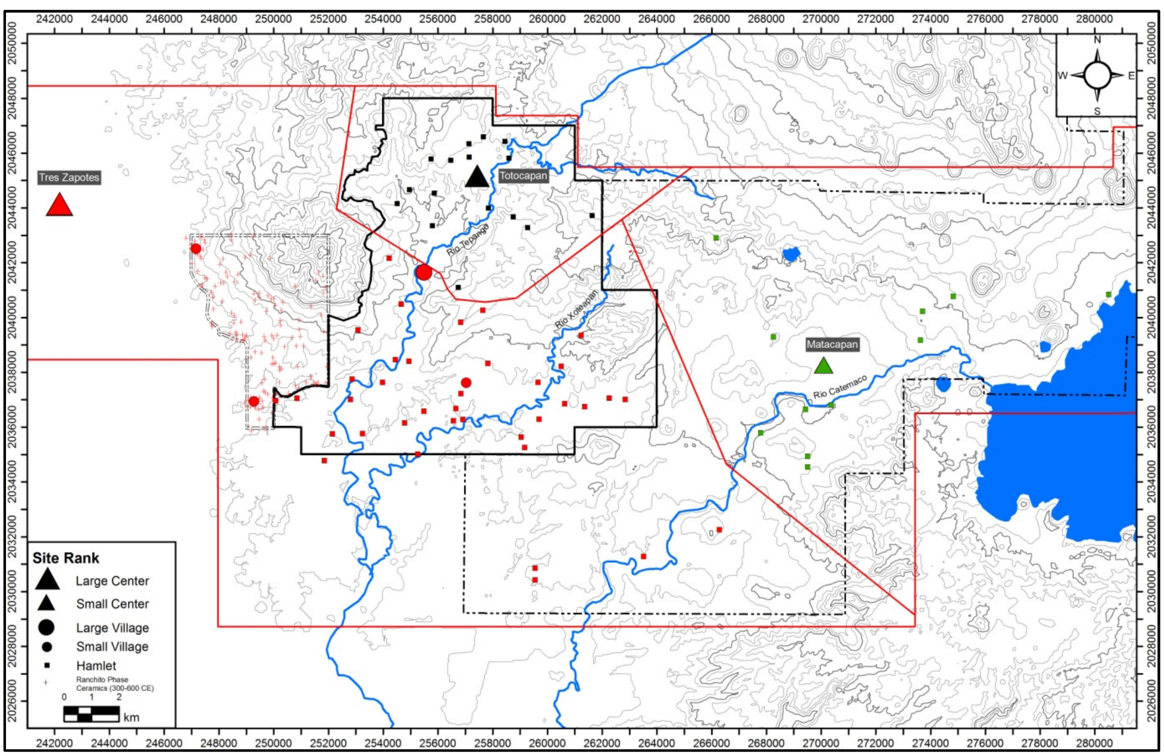

Figure 7.19. Xtent model EC3 results with *a*=0.65 and *k*=0.5.

the abandonment of the area around where Matacapan was to be founded, which would have created a vacancy for settlement in the Early Classic (Pool and Britt 2000, Santley et al. 2000). The projected boundary between Matacapan and Totocapan in Figure 7.16 falls over the small village of Tilzapote. This location becomes very important for the remainder of the Classic period because it sits in the most easily traveled pass that links the two emerging powers. The path to the north of Cerro Amarillo (which is the current route of Highway 80) is a more direct route connecting the two centers, but it is also much more difficult terrain to cross by foot than the relatively flat trajectory to the south.

The next two Xtent solutions depict an encroaching Tres Zapotes influence that follows a similar pattern as the preceding periods. The major difference is the rapidity of the "expansion". In the Late Formative and Protoclassic, Tres Zapotes was predicted to have controlled the entire study area calculated with an "*a*" value of 0.65. In the Early Classic, that same value depicts Tres Zapotes as encroaching upon, but not controlling, the Totocapan and Matacapan polities. In this progression of Xtent models, I suggest that model EC1 is the most appropriate (Figure 7.16). In EC2 and EC3 (Figures 7.18 and 7.19), Tres Zapotes would have had difficulty controlling such a large area without the use of secondary centers. This is particularly true in the context of the center's decreasing size, and, in turn, power. In none of the Xtent models does Tres Zapotes control a secondary center in the study area. This does not mean that Tres Zapotes failed to control secondary centers during the Early Classic. The area considered here is only a fraction of the potential area over which Tres Zapotes could have projected political influence. To the south of Tres Zapotes, a number of mound centers have recently been identified by an archaeological survey funded by PeMex (Alfredo Delgado personal communication, 2010), though these data are at an initial stage of interpretation.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE SANTIAGO B PHASE

The Santiago B phase was the time of maximum population at Totocapan (Ortiz 1975) and in the Tepango Valley. A total of 125 sites were occupied covering 13 percent of the survey area (Table 7.5). Included in this tally are three large centers (Totocapan,

Table 7.5. Santiago B phase sites sorted by area.

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
1 (Totocapan)	585.76	Large Center	20.68	12115.59
82/112/113 (Francisco Madero)	122.59	Small Center	25.55	3131.74
139/134/138/145 (Tilzapote)	102.84	Large Center	15.30	1573.11
2 (Oteapan)	89.08	Small Center	13.74	1223.85
5 (Xiguipilincan)	85.50	Large Center	7.89	674.48
50/54/56/58 (Texcochapan)	60.50	Large Nucleated Village	9.95	601.78
182 (El Nopal)	16.10	Small Nucleated Village	20.14	324.30
62 (La Cuesta)	12.00	Small Dispersed Village	26.00	312.00
16/17 (Sehualaca)	43.80	Large Nucleated Village	6.57	287.83
89 (Maxyapan)	9.62	Small Nucleated Village	25.71	247.37
108	8.29	Hamlet	29.80	247.16
35 (Tepetapan)	20.80	Small Dispersed Village	11.33	235.73
63/77 (Tetax)	13.42	Small Dispersed Village	17.17	230.38
51 (Zezecapan)	14.27	Small Dispersed Village	16.00	228.26
65 (Coyoltepec)	8.42	Small Nucleated Village	25.33	213.36
124 (Totogal)	12.00	Small Dispersed Village	16.67	200.00
20	28.41	Small Dispersed Village	6.82	193.74
38/8/34 (Cruz de Vidaña)	48.13	Small Center	4.00	192.54
3/4/96/100 (Pizapan)	11.31	Small Dispersed Village	16.92	191.29
24 (Chilchutiuca)	24.54	Small Nucleated Village	6.43	157.78
103	2.00	Hamlet	70.00	140.00
179 (Nancinapan)	8.09	Small Dispersed Village	15.40	124.55
23	10.20	Small Dispersed Village	12.17	124.10
87	7.09	Hamlet	16.00	113.40
170 (Bustamante)	13.82	Small Dispersed Village	7.67	105.95
141	2.65	Hamlet	39.50	104.61
104	3.46	Hamlet	27.67	95.59
81	6.29	Small Dispersed Village	14.50	91.13
75	6.85	Hamlet	13.00	88.99
25 (Vista Hermosa)	20.66	Small Dispersed Village	4.13	85.41
6	20.80	Small Dispersed Village	3.88	80.60
102	2.79	Hamlet	28.67	80.07
97	1.85	Hamlet	40.50	74.77
29	7.36	Hamlet	9.33	68.72
132/133	5.65	Hamlet	12.00	67.83
111	4.17	Hamlet	16.00	66.79
135	6.68	Hamlet	10.00	66.79
147	2.61	Hamlet	25.50	66.43
9	5.88	Hamlet	11.00	64.63
98	2.50	Hamlet	25.00	62.50
42	3.74	Hamlet	15.50	58.01
31	2.48	Hamlet	21.60	53.52
49	6.93	Hamlet	7.00	48.49
114	4.12	Hamlet	11.50	47.41
19	11.30	Hamlet	3.67	41.43
156	2.12	Hamlet	19.00	40.29
117	1.80	Hamlet	21.00	37.90
26	2.76	Hamlet	12.71	35.14
100	3.81	Hamlet	9.20	35.02
150	1.49	Hamlet	22.50	33.50
83	1.50	Hamlet	21.50	32.18
167	5.10	Hamlet	6.20	31.62
80	5.54	Hamlet	5.50	30.49
35	9.00	Hamlet	3.25	29.25
73	8.09	Hamlet	3.50	28.33
72	2.24	Hamlet	11.00	24.62
143	0.67	Hamlet	35.50	23.69
33	2.05	Hamlet	11.50	23.53
121	1.30	Hamlet	17.50	22.67
46	2.95	Hamlet	7.60	22.45
12	2.93	Hamlet	7.25	21.25

Table 7.5 (continued).

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
115	3.22	Hamlet	6.33	20.41
11	2.54	Hamlet	7.33	18.62
161	2.14	Hamlet	8.67	18.58
34	2.35	Hamlet	7.67	18.04
164	0.93	Hamlet	19.00	17.75
78	4.21	Hamlet	4.00	16.86
122	1.33	Hamlet	12.50	16.57
152	1.40	Hamlet	11.50	16.10
162	1.01	Hamlet	15.00	15.15
165	1.23	Hamlet	12.00	14.82
109	1.07	Hamlet	13.00	13.97
44	1.71	Hamlet	7.67	13.11
70	3.05	Hamlet	4.20	12.83
178	3.31	Hamlet	3.50	11.59
32	1.62	Hamlet	7.00	11.35
183	0.77	Hamlet	14.75	11.29
7	2.60	Hamlet	4.33	11.27
27	2.16	Hamlet	5.00	10.78
177	1.11	Hamlet	8.67	9.61
69	0.54	Hamlet	17.67	9.57
171	0.47	Hamlet	18.50	8.71
68	1.97	Hamlet	4.00	7.87
130	1.65	Hamlet	4.50	7.41
137	0.73	Hamlet	9.50	6.98
92	0.28	Hamlet	24.00	6.78
39	1.07	Hamlet	6.25	6.67
159	0.74	Hamlet	9.00	6.62
18	1.10	Hamlet	6.00	6.60
184	0.85	Hamlet	7.50	6.39
43	0.57	Hamlet	10.00	5.75
90	0.35	Hamlet	16.00	5.65
94	0.76	Hamlet	7.00	5.32
53	1.44	Hamlet	3.33	4.81
181	0.36	Hamlet	13.00	4.66
180	0.77	Hamlet	6.00	4.64
185	0.34	Hamlet	13.00	4.42
93	0.60	Hamlet	7.00	4.23
166	0.77	Hamlet	5.50	4.22
15	1.58	Hamlet	2.50	3.94
28	0.78	Hamlet	5.00	3.88
136	1.03	Hamlet	3.50	3.61
76	2.83	Hamlet	1.25	3.54
173	0.59	Hamlet	6.00	3.54
186	0.25	Hamlet	14.00	3.50
86	1.14	Hamlet	2.88	3.28
119	0.92	Hamlet	3.50	3.20
61	1.16	Hamlet	2.67	3.10
148	0.38	Hamlet	8.00	3.02
158	0.53	Hamlet	5.67	3.01
106	0.25	Hamlet	12.00	3.00
95	1.00	Hamlet	3.00	2.99
144	0.70	Hamlet	4.00	2.79
176	0.25	Hamlet	8.50	2.13
40	1.39	Hamlet	1.50	2.09
172	0.41	Hamlet	5.00	2.05
22	0.41	Hamlet	5.00	2.04
123	0.25	Hamlet	7.00	1.78
175	0.35	Hamlet	5.00	1.77
101	0.34	Hamlet	5.00	1.69
155	0.82	Hamlet	2.00	1.64

Table 7.5 (continued).

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
149	0.25	Hamlet	6.00	1.50
88	0.73	Hamlet	1.50	1.10
174	0.43	Hamlet	2.33	1.00
120	0.53	Hamlet	1.67	0.88
Total Occupied Area	**1613 ha**		**Percent of Survey Area Occupied**	**13%**

Xiguipilincan, and Tilzapote), three small centers (Oteapan, Cruz de Vidaña, and Francisco Madero), two large nucleated villages (Sehualaca and Texcochapan), four small nucleated villages (Chilchutiuca, Maxyapan, Coyoltepec, El Nopal), 13 small dispersed villages (Vista Hermosa, Zezecapan, Bustamante, Nancinapan, Tetax, Tepetapan, Totogal, La Cuesta, and Sites 6, 20, 23, 45, and 81) and 100 hamlets (Figure 6.13). Mean site size rose to 12.9 ha, with a median size of 2.12 ha. The divergence of the mean and median from the previous phase suggests a great concentration of population in the larger sites within the region. The majority of the TVAS area occupation is skewed to the north of the survey area, due primarily to the immense size of the now-unified Totocapan center.

Totocapan grows to cover about 585 ha during the Santiago B phase. All of the individual districts within Totocapan were connected by a continuous distribution of material and mounds (Figure 7.20). The Totocapan regional center is about 4.5 times larger than the site during the Santiago A phase. A total of 127 individual mounds were constructed within the site, and a high proportion of these were arranged into formal plaza groups.

Totocapan was generally divided into five districts: Totocapan Core, Chaneque, El Picayo, Nancinapan, and Palo Blanco. The principal civic-ceremonial center of the site remains within the Totocapan Core district, with a continuous distribution of mounds extending into the Chaneque district (separated only by Highway 180), the Nancinapan district, the southern extreme of the site, and up to 300 m north of the Acropolis. Beyond that range, mounds are more sparsely distributed, with additional architectural concentrations within the El Picayo, and Palo Blanco districts. Each district possessed local political authorities as evidenced by the presence of at least one massive platform. These platforms are thought to be the residences, or palaces, of regime officials, which

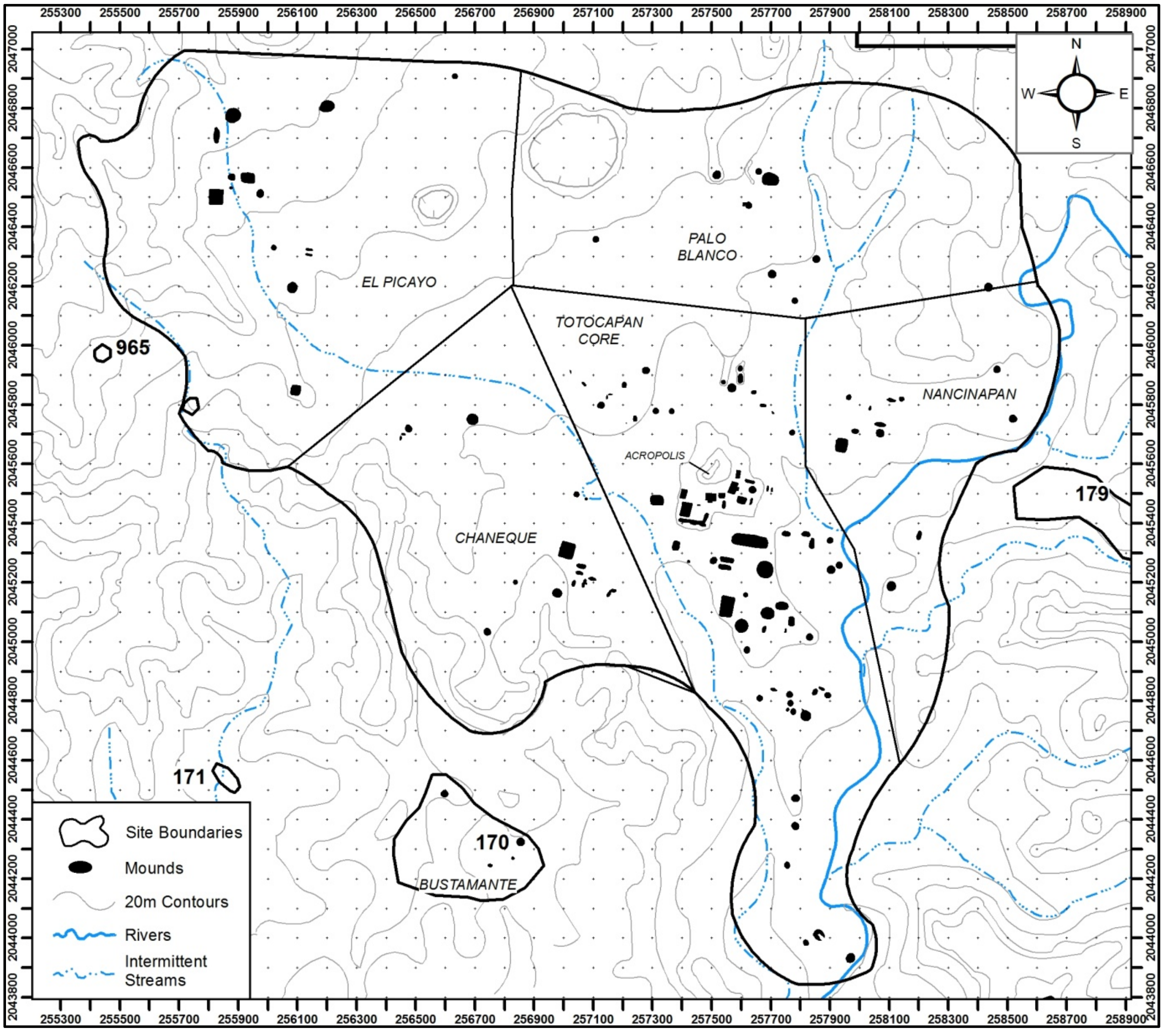

Figure 7.20. Plan view of Totocapan showing the distribution of mounds.

may be similar to the concept of the Aztec *altepetl* (Gutiérrez 2002). The paramount leader of the polity resided upon the Acropolis within the Totocapan Core district. Each massive platform was associated with a plaza group. Chaneque, El Picayo, and the Totocapan Core districts all built ball courts into their main civic-ceremonial architecture. While this raises the possibility of factional competition for Totocapan, the size and power of all districts and district heads together was dwarfed by that of the regime residing in the Totocapan Core. The Acropolis alone is an amazing feat of engineering considering the technologies at hand (Figures 7.20 and 7.21). This is assumed to have begun as a natural hill, but it has been sculpted into a 35 m high palace complex. Even the base of the Acropolis has been shaped to conform to the Plaza Group 1 to the south.

Figure 7.21. Photograph of the Acropolis from the top of Mound 32 (facing north).

Figure 7.22. Google Earth image of the Acropolis and Plaza Group 1.

The site's only stone paved architecture is found on three structures on the Acropolis. Stone wall foundations can be seen on top of Mounds 43, 45 and 50 in the satellite image depicted in Figure 7.22. The spatial layout of Totocapan will the subject of extensive discussion in the following chapter, so I will not belabor the point here. Suffice it to say that the architectural core of Totocapan displays the highest known level of monumentality within the Tuxtla Massif, surpassing even Matacapan.

Oteapan was a small center located about 2 km south of Totocapan, separated only by the modern Town of Santiago Tuxtla. This site covered 89 ha with areas of very high material density. Unfortunately, this site has been severely disturbed by modern occupation and the construction of the hospital, road, and many houses (Figure 7.23). If not for this destruction, the site would be much larger and probably have evidence for much more mound building. However, the remnants of mounds that can be seen today support the presence of important elites during the Classic period. Three mounds behind the hospital at the north end of the site form a plaza group, though it is difficult to discern its exact form due to modern construction. Three isolated mounds were also mapped at the south end of the site. One of these (Mound 5) was a rectangular stone platform with a small pyramid on the eastern end. The perimeter of this stone plaza was demarcated about every ten meters by a basalt column marker planted vertically into the ground (some of these columns were toppled over). To the west of this mound on a terrace overlooking the Tepango River a stone retaining wall was built in the same manner. Every few meters along the retaining wall was marked with a vertically planted basalt column, suggesting the construction of the retaining wall and stone structure date to the same time. Much of this impressive architecture has been destroyed.

Tilzapote became a large center by the Santiago B phase, covering 103 ha. A moderate concentration of material covers the entire site area, but the elites lived in two discreet plaza groups at the center of the site (Figure 7.24). Each plaza group is completely enclosed by mounds. The Western Plaza Group is generally smaller in scale than the Eastern Plaza Group, except for Mound 6. At 11 m height, Mound 6 rivals the largest individual mound at Totocapan. Low long mounds enclose the remainder of the plaza, and a small altar (Mound 7) is situated within the plaza. The Eastern Plaza Group is, on average, of larger scale and better construction than the Western Plaza Group.

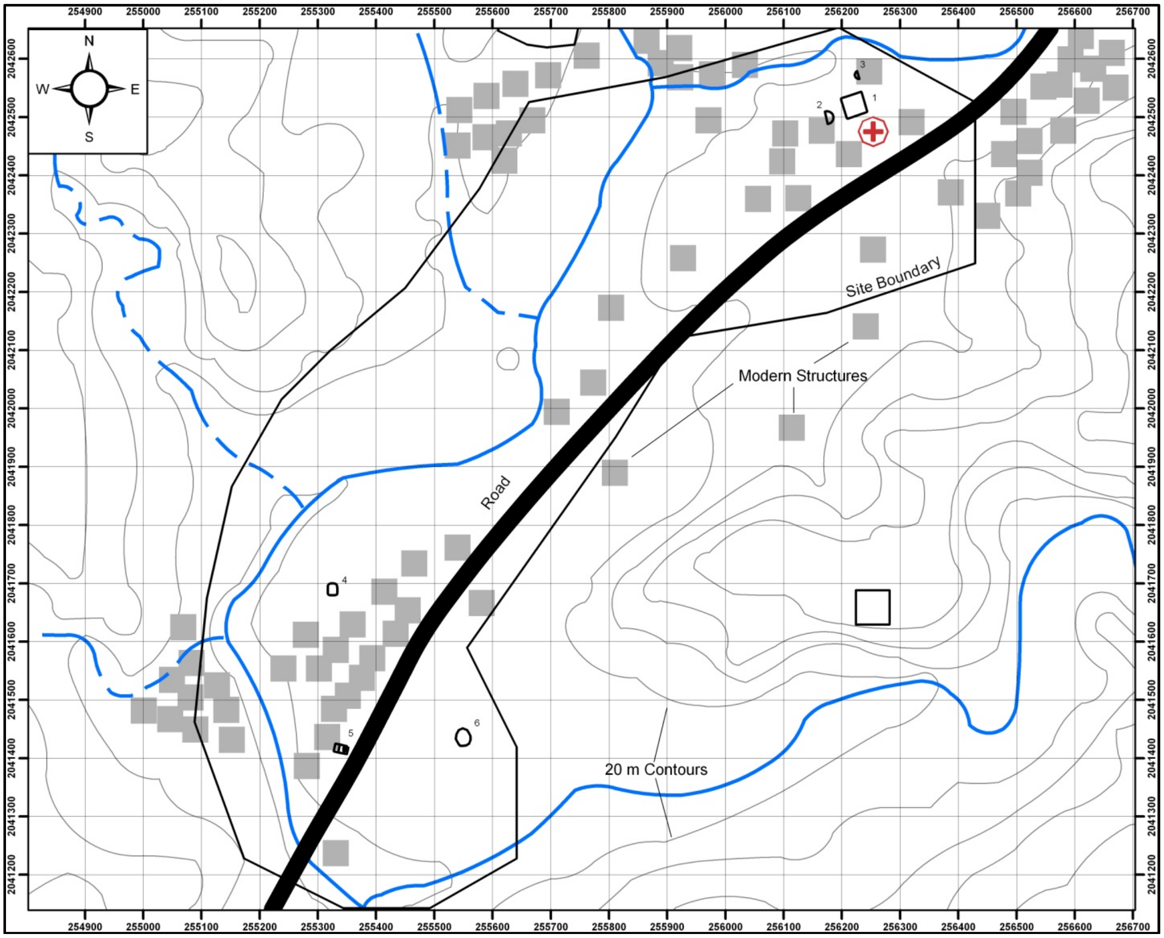

Figure 7.23. Plan view of Site 19 showing the distribution of mounds and modern habitation.

The plaza is enclosed on the north, south and east edges by elongated mounds. The western edge is enclosed by a ball court. Oddly, the large conical Mound 13 is situated in the corner of the plaza. They do not appear joined today, but Mounds 13 and 14 may have been once formed a keyhole shaped structure that was relatively common in the neighboring Catemaco Valley (Santley 1991) and at Cruz de Vidaña. Another possible keyhole structure at this site is Mound 1 south of the Western Mound Group. At least one marker stone was found *in situ* a few meters south of Mound 10 (marked by a triangle in Figure 7.26). In a broader regional context, Tilzapote appears to have had a special function. It may have been important to monitor and control the flow of goods, people, and information between the Tepango and Catemaco valleys. As mentioned for previous phases, it occupies the easiest traveled path between the Tepango and Catemaco Valleys.

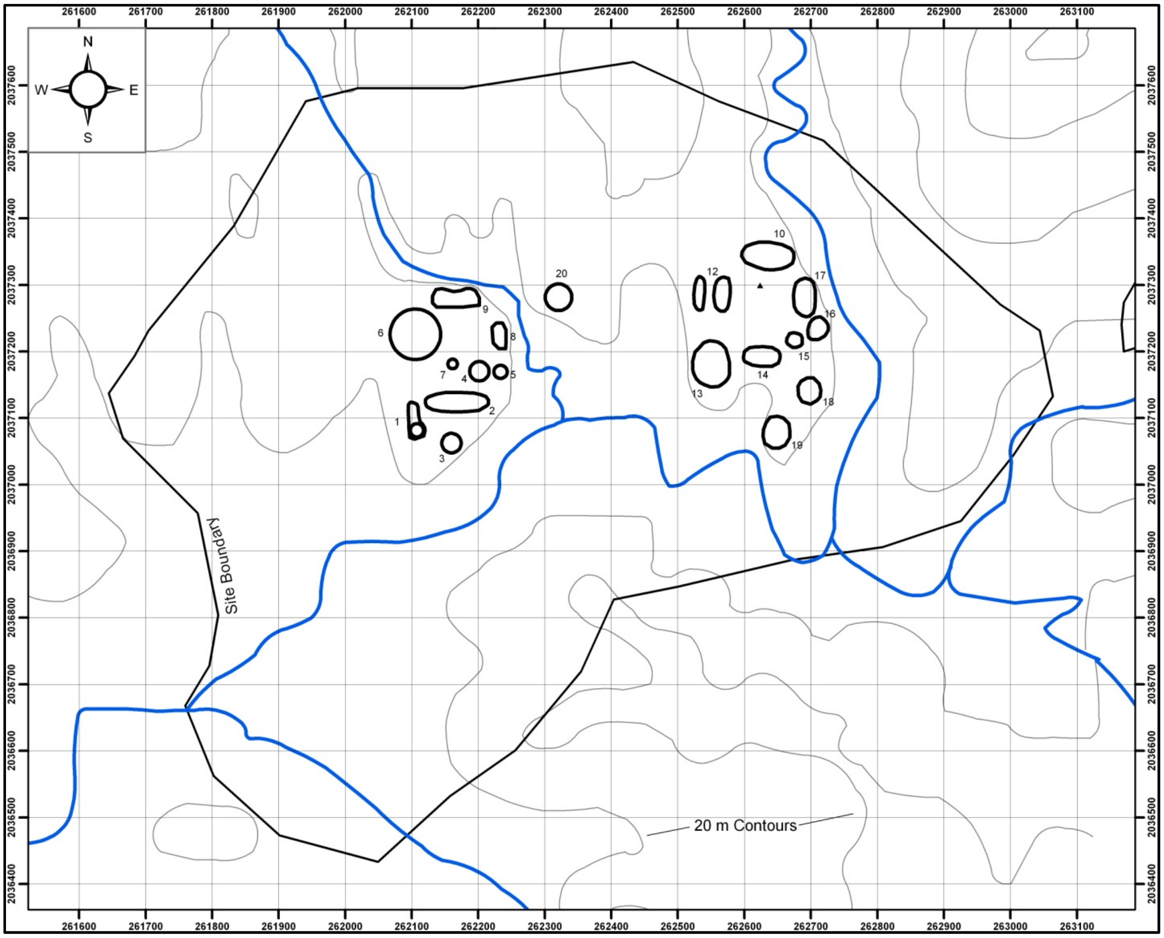

Figure 7.24. Plan view of Tilzapote showing the distribution of mounds.

Situated about one kilometer to the northwest of Tilzapote, Francisco Madero emerged as a small center. Francisco Madero was actually larger in areal extent than Tilzapote, but only one small formal mound group was built there accompanied by a few isolated mounds (Figure 7.25). While Francisco Madero was an important center of population, Tilzapote was more important from an administrative standpoint. The mound group at Francisco Madero consisted of a large platform to the north of the plaza (Mound 4), a conical mound enclosed the western end (Mound 3), and small elongated mounds enclosed the east and south edges (Mounds 1 and 2). Mound 2 is very low, to the point that the field crew debated whether it was a mound or not. The plaza in the center is sunken unusually deep below the level of the terrace. With heavy rain, this plaza would likely fill with water, which may have been the intent of those who built it. Mound 6 is a human-modified platform sculpted from a natural rise. A footpath has cut into the southern end of this platform, revealing an extremely high density of material: ceramics

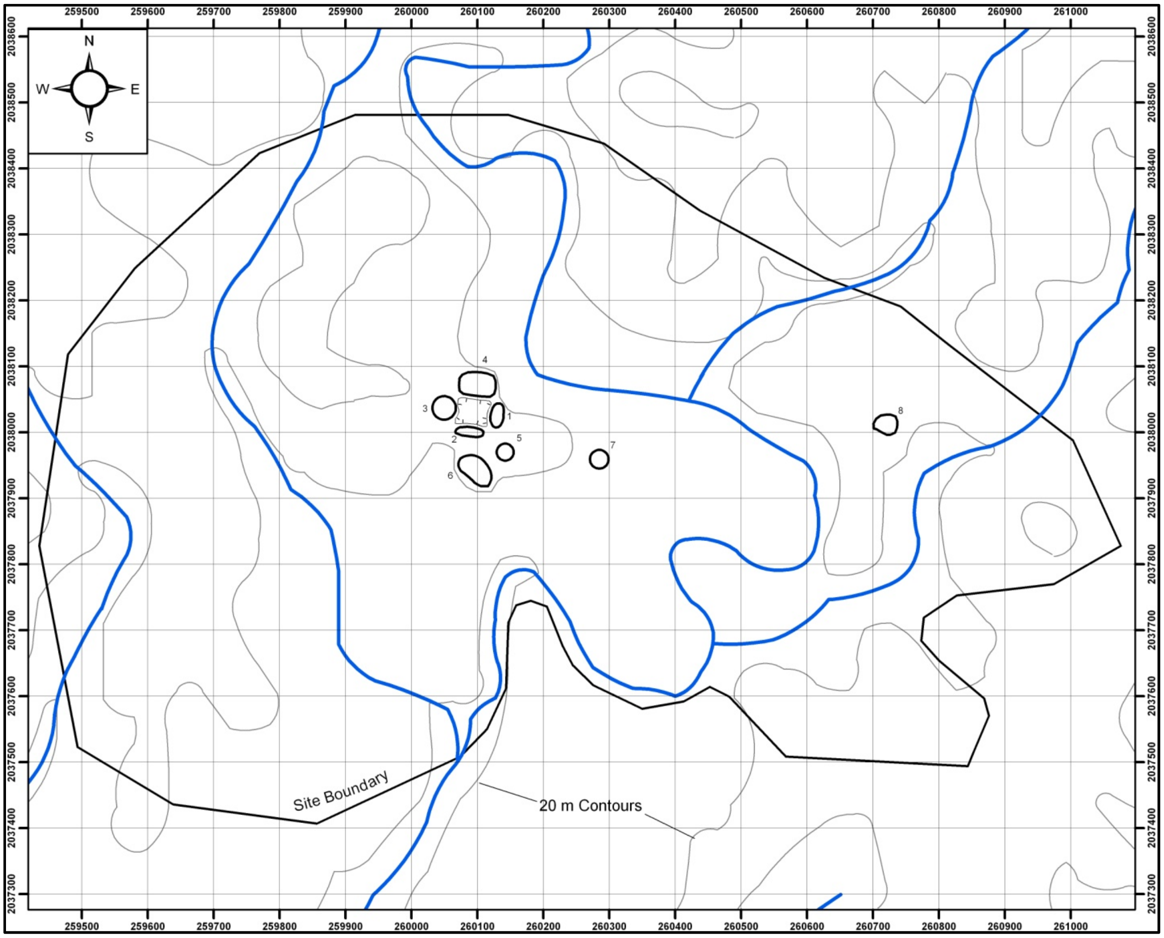

Figure 7.25. Plan view of Francisco Madero showing the locations of mounds.

and obsidian. Most of the material recovered consists of decorated serving wares, suggesting this platform did not have an everyday utilitarian function. Francisco Madero and Tilzapote together represent a moderate density population spread over a huge area; it is the segment of the survey with the greatest population density outside Totocapan.

Xiguipilincan was a large center just south of the survey boundary. Unfortunately, few collections were made here due to the objection of the local *comisariado*. Archaeologists walked through much of the site with landowners and noted the presence of at least a dozen mounds and more than one plaza group. One ball court configuration also was identified. We were able to estimate the site's boundaries through a combination of shovel probes prior to our meeting with the *comisariado* and through our walking tour with local landowners. Based on this brief reconnaissance, the site limits presented here are thought to be conservative. The site may actually incorporate the village of Site 6 to the north. Furthermore, I have reason to believe that Xiguipilincan is part of, or closely situated to, the site Valenzuela (1945b) identified as “La Mechuda”. He describes La Mechuda as situated two kilometers west of Tilapan, which would place it within two kilometers of the southern limit of Xiguipilincan. La Mechuda and Xiguipilincan could therefore be part of one large center, or two closely situated centers, much like Tilzapote and Francisco Madero. Cruz de Vidaña had a resurgence as a small center in the Santiago B phase, but it was smaller (48 ha) than its maximum Formative period size and had a much lower material density. That said, there is no reason to think that the mound groups ceased to be used in the Middle Classic. This site potentially has the oldest ball court built in the region, and it is possible that it introduced the ball game into the Tepango Valley. Maintenance of this long-standing site may have been an important strategy employed by regime officials drawing upon the ritual memory of past groups (discussed below).

Two other sites worthy of mention were Sehualaca and Texcochapan. Both of these sites displayed dense occupations over a large area. Sehualaca possessed seven mounds in total which were organized into three discreet clusters. In the southeastern portion of the site, three mounds form a small plaza group. Two of these were probably small house mounds, but the third was a one-meter-tall long mound oriented at about 170 degrees. Two more house mounds were located along the Tepango River in the center of the site. At the north end of Sehualaca, a conical mound and a long mound were positioned next to each other, but it cannot be determined if they were intended to form a plaza. Two mounds were mapped at Texcochapan, both were likely house mounds. The more impressive characteristic of Texcochapan is the broad expanse of continuous moderate density material concentrations.

TVAS POLITICAL CENTRALIZATION DURING THE SANTIAGO B PHASE

During the Santiago B phase, the Totocapan Center appears to have politically controlled most, if not all, of the survey area. Both rank-size plots place Totocapan as the sole center in the uppermost tier based on comparative settlement size (Figures 7.26 and 7.27). Totocapan was therefore a primate center within the TVAS. Mehta ratios for the

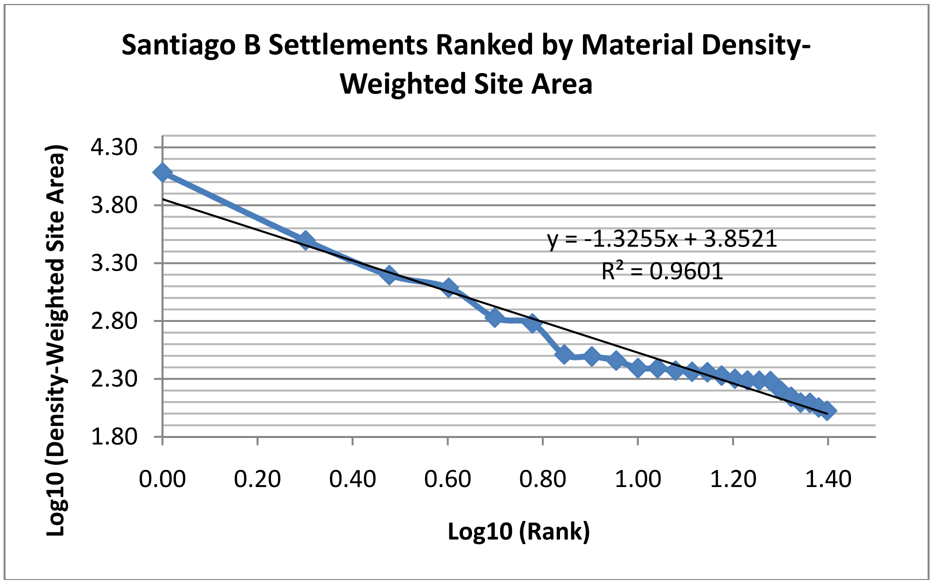

Figure 7.26. Rank-size plot of Santiago B phase sites using density-weighted site area.

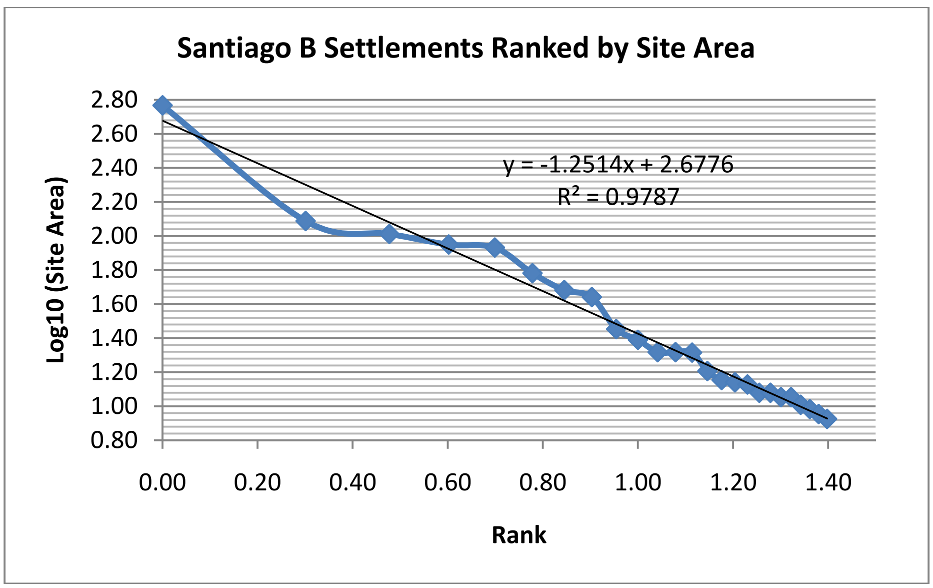

Figure 7.27. Rank-size plot of Santiago B phase sites using site area.

density-weighted and simple site area data both prove to be concave (0.67 and 0.65 respectively). However, the lower portion of the simple site area plot approaches log normality. The Mehta ratio of 0.67 is the highest value for the entire TVAS settlement history. This suggests that, based on site area, the political economy of the TVAS reached its highest level of centralization during the Middle Classic. This may also suggest that Totocapan was a parasitic center which gathered up resources from the hinterland and contributed little to its development. However, Mehta (1964) suggests that this is not always the case with primate centers that are internally focused on their own polities. He suggests that post-colonial primate cities following their independence turn toward internal development and cannot therefore be considered parasitic based solely on their disproportionate population (i.e., site area). It is true, however, that externally focused primate centers within a dendritic system under-develop their hinterlands (see Santley 1994). There is little to no evidence at this point that Totocapan controlled an externally focused political economy.

The distribution of mounds in the TVAS area displays a similar picture that is more appropriate to make inferences about political centralization (see Figure 7.28). Totocapan possessed 127 individual mounds (123 if one does not count both mounds of its four potential ball courts), while the next highest mound count is 21 at Tilzapote. It must be noted that the total number of mounds constructed at Xiguipilincan is not known, but that number is thought to be somewhat less than that found at Tilzapote. The tallest mound at Totocapan was 11 meters. This equals the height of the largest mound at Tilzapote. Together these two mounds are the tallest in the region. This is not very impressive given the size and importance of Totocapan within the region. As Urcid and Killion (2008:270) calculate, the uppermost echelon centers of the southern Gulf Coast "macroregion" typically have principal mounds that range between 17 and 23 meters tall. Using height of the principal mound, Totocapan and Tilzapote would fit into the second echelon of centers on the regional landscape. As Urcid and Killion themselves note, however, height of the principal mound is not in itself a very good indicator of political rank. Indeed, this simple measure does not take into consideration other types of monumental constructions, like the Acropolis at Totocapan.

Many other elements of Totocapan's architecture support this statement. There is really no way to quantify with the data available the labor investment that went into the modification and mound construction on top of the Acropolis, but it was a massive undertaking. Furthermore, Totocapan boasted a total of six massive rectangular platforms that measured between 8 and 10 meters in height. The monumentality of mound construction at Totocapan dwarfs any other site in the Middle Classic Tuxtlas or

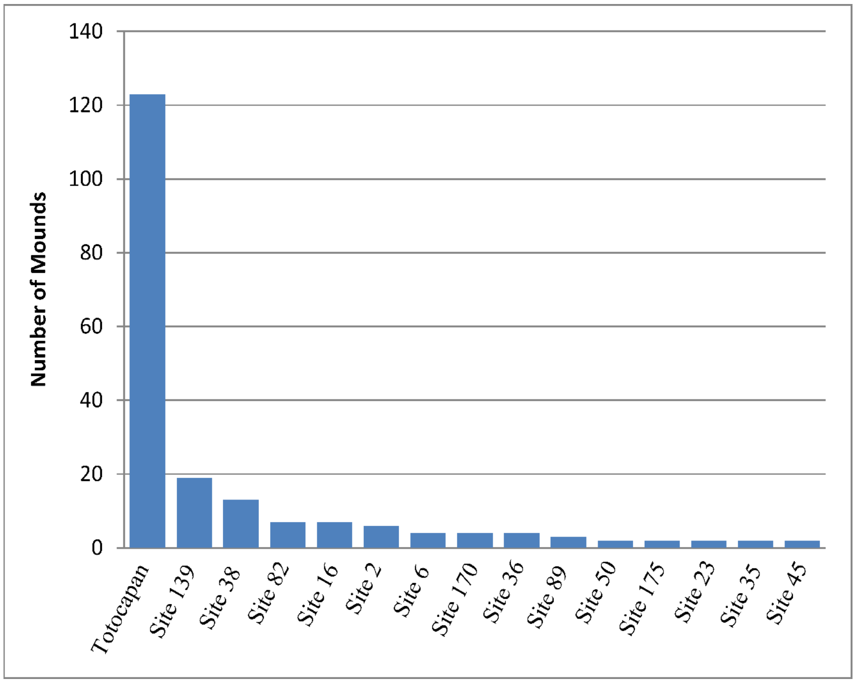

Figure 7.28. Histogram of the number of mounds at sites with two or more mounds during the Santiago B phase.

the southern foothills with the exceptions of Matacapan, Laguna de los Cerros, and Teotepec. Additionally, the quality of mound construction of the Acropolis is potentially among the best in the region. The stone façades on at least three mounds have preserved their original shapes well over the centuries. These data paint a picture of political centralization within the Tepango Valley during the Santiago B phase.

At the TVAS scale, Totocapan is one of two or three primary centers. Totocapan and Matacapan are of roughly equal size, population, and monumentality. They both additionally display similar levels of political centralization. The rank size plots that Santley (2007) constructs for the early and late Middle Classic trend toward log normality. Since I did not use population to calculate my rank-size plots, I calculated the Mehta ratio for the Catemaco Valley using the area values entered into the Xtent model below. The result is 0.73, a more centralized trend than is seen in the Tepango Valley. However, calculating the same ratios for total number of mounds at the top four centers in each valley produced a different picture. The Tepango Valley produced a Mehta ratio of 0.75 while the Catemaco Valley was 0.45. Using mounds to calculate Mehta's ratio, therefore, paints a picture of greater political centralization in the Tepango Valley. The key site is Teotepec, which was about as monumentally invested as Matacapan. Removing Teotepec from the figure produces a picture of equivalence between valleys. It is not a certainty that Teotepec was subordinate to Matacapan, as I discuss in the following chapter. After presentation of Xtent models below, I consider a measure of political centralization based on Daneels (2008a) observations in the lower Cotaxtla Basin that paints a very different picture between valleys.

REGIONAL POLITY BOUNDARIES DURING THE MIDDLE CLASSIC (450-650 CE)

A number of large and small centers emerged on the Middle Classic Tuxtlas political landscape. Matacapan grew into a massive settlement which Santley suggests covers 18.2 square kilometers when considering satellite communities (2007:51). He argues that the main archaeological occupation of the site covers 10.37 square kilometers, but that the area of higher density refuse covers only 3.6 square kilometers. Given this range of sizes, it was difficult to arrive at a figure to use for Matacapan's area in the Xtent model. I decided to use the area of the polygon that is drawn on the Catemaco Valley settlement maps (Santley and Arnold 1996, Santley 2007:49), which is roughly 600 hectares.

Ranchoapan grew to cover a maximum area of 101.6 hectares, but Santley notes that during any one time period the maximum size was about 64 hectares (during the late Late Classic). He notes that Ranchoapan may be twice that size if suburban occupation is included in the area, which apparently he did when drawing the site's polygon on the settlement maps. The Ranchoapan polygon covers 358 hectares, which is 5.6 times the size reported for the maximum size of Ranchoapan during any one time period. This is a larger figure than Santley speculates Ranchoapan would encompass even if suburban occupation is included, so I had to compromise. I used the figure of 102 hectares (or 1,020,000 square meters) to calculate the Xtent model. This number pertains to the maximum extent of Ranchoapan for all phases combined, which overestimates its size for any single phase, but underestimates its size if suburban areas are considered. Only 5 mounds were documented at Ranchoapan, but Santley suggests that the construction of an airstrip may have destroyed others.

Teotepec, on the other hand, boasted over 100 mounds and was undoubtedly an important politico-ritual center. The land surrounding Teotepec lay in pasture, which inhibited surveyors' ability to identify the maximal extent of this large center. Santley lists Teotepec at 79.7 hectares, but I use the area of the polygon on his settlement map (107 ha), given the strong likelihood that habitation at the site was larger than could be identified by surface remains without use of shovel probes.

The sizes of the remaining centers in the Catemaco Valley centers was taken at face value as reported by Santley (2007). To the west, Tres Zapotes persisted as a center of 80 hectares size (Pool personal communication). La Mechuda contained a plaza group as reported by Valenzuela (1945b). It was given the size equal to Cruz de Vidaña for the Middle Classic. My inclusion of La Mechuda is rather inconsequential for the results of the Xtent model because settlement around this potential center is unknown. Mata Canela on the southern shores of Lake Catemaco contained a ball court. Valenzuela's (1945b) description of this ball court sounds very similar to the configuration described for Totocapan and Teotepec, that is, the ball court is capped at one end by a conical/pyramidal mound. It is not known if the ball court is situated in line with the principal mound group or off to the side, the latter of which is common for the Plaza Groups seen in the Hueyapan Survey area to the south (Killion and Urcid 2001) and farther to the south east (Borstein 2001).

There are a number of centers – namely Calpulalpan, Berenjenal, Calabozo, and Guayabal – in the Hueyapan Survey area in the southwestern Tuxtlas foothills and the San Juan river floodplain that are not calculated within the Xtent model. I leave these centers out because the data that has been published does not permit a full consideration of the potential political territories each center controlled. Additionally, these settlements occur about midway between Matacapan and Laguna de los Cerros. It is likely that they were important centers because of this central location. As Urcid and Killion (2008) reconstruct the regional political landscape, their survey area is likely composed of a number of secondary centers, but none of them were built on the scale of Matacapan or Laguna de los Cerros. While the architectural data generated by the Hueyapan Survey are extremely important for my consideration of sociopolitical interaction in the next chapter, I do not attempt to quantify their role in the region here.

To the north of the TVAS area, and to the west of Highway 180 as it snakes through the northern mountain pass out of the Tuxtlas, another mound center was identified near the town of Tapalapan. Aurelio Poxtant, who worked on the TVAS project, reported that his former employment took him to work at this site. He had counted 23 mounds there, several of which can be seen from the highway. Like La Mechuda, Tapalapan is inconsequential for the current quantification, but I include it on the map as a potential secondary center to Totocapan. It is the only mound center known along the route between Totocapan and the settlements identified around El Tropico, north near the modern town of La Florida, and farther west near the town of Angel R. Cabada.

I ran several instances of the Xtent model for the Middle Classic, three of which will be detailed here (Figures 7.29, 7.30, and 7.31). In the MC1 Xtent solution with "*a*" and "*k*" both set at 0.5, each center (large and small) possessed some territory that corresponds to its immediate hinterland (Figure 7.29). The larger centers, like Totocapan and Matacapan, possessed a slightly larger hinterland than the small centers. The settlement around Teotepec is not well known because of the relatively heavy vegetation that inhibits surface visibility. Its geographic position, though, suggests that it controlled passage to what Santley (1991) referred to as the Monte Pio transect of their survey. It is unknown how the island centers of Agaltepec and Tenagre functioned within their respective territories, or if they even controlled a territory. They may have been important ritual destinations. Alternatively, they were likely secondary centers within Teotepec's administration.

In the Tepango Valley, Francisco Madero and Totocapan were attributed the largest potential hinterlands. These were the two largest centers based on site area, after all. Also, Francisco Madero was well positioned within the surveyed area to have some administrative role for many of the settlements along the Xoteapan River and in the central uplands between the Xoteapan and Tepango Rivers. Tilzapote was allocated settlements directly surrounding the site and those that fell within the southwestern

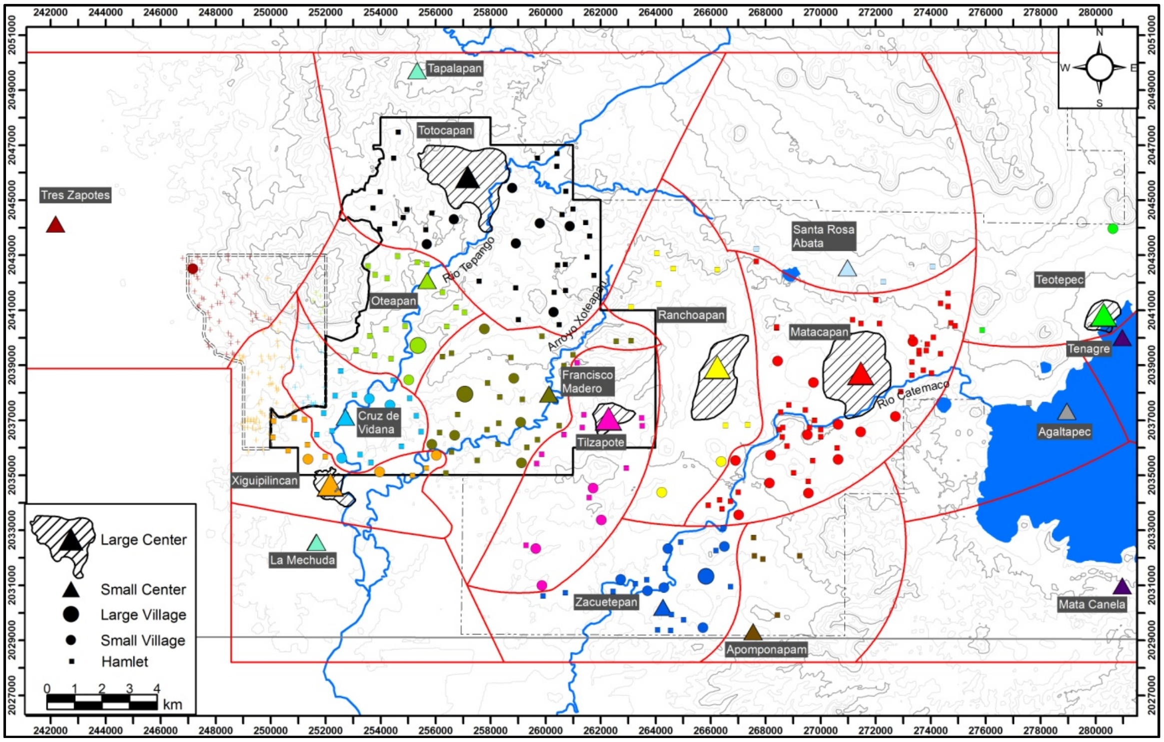

Figure 7.29. Xtent model MC1 results with *a*=0.5 and *k*=0.5.

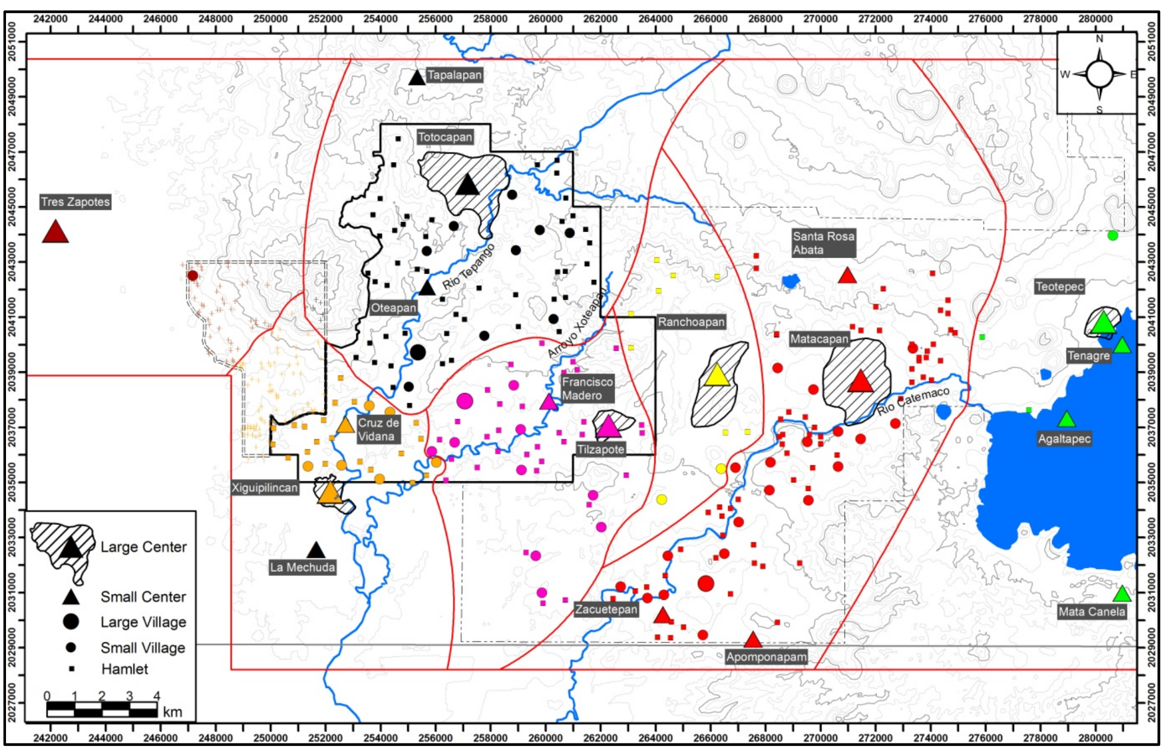

Figure 7.30. Xtent model MC2 results with *a*=0.5 and *k*=0.5. Calculated with large centers only.

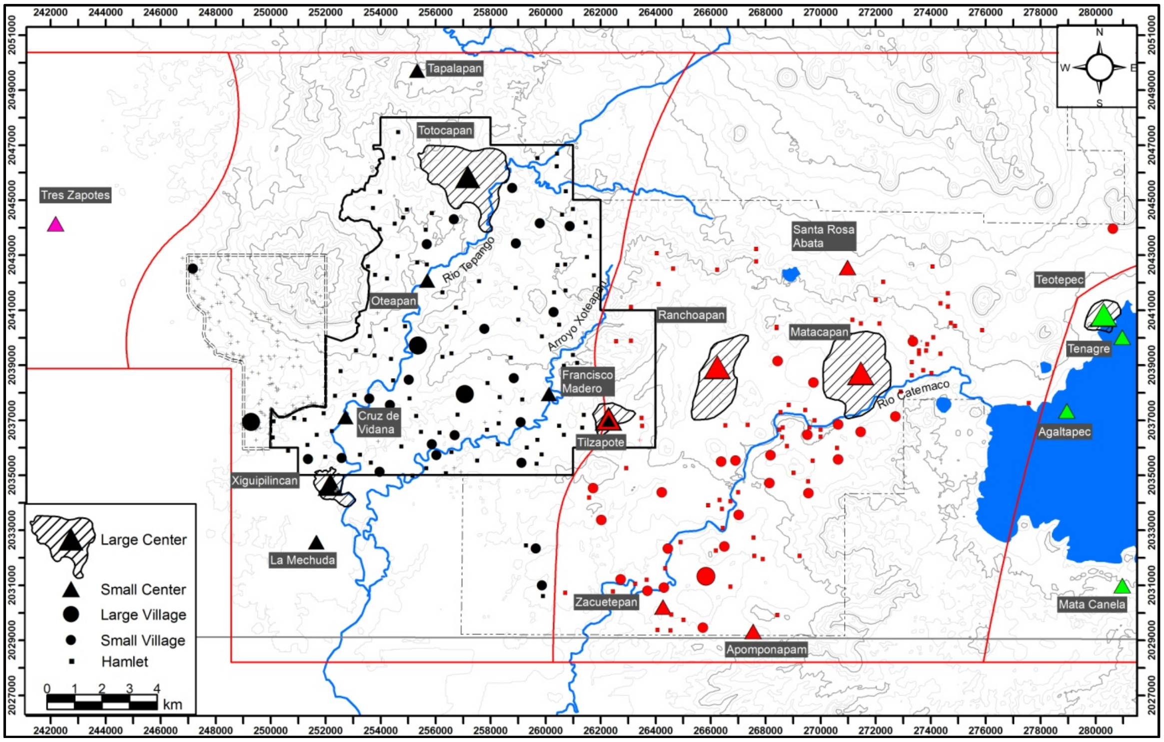

Figure 7.31. Xtent model MC3 results with *a*=0.6 and *k*=0.5.

extremes of the Catemaco Valley survey. Tres Zapotes continued to be the likely administrative center for the western half of Cerro el Vigía.

This initial reconstruction somewhat distorts the reality of the Middle Classic political landscape. If one were to conduct a Theissen polygon analysis in the region, polygons would be layered on top of each other according to settlement rank. That is, secondary centers (i.e., large centers) would occupy an administrative tier above the tertiary centers (i.e. small centers), and so on with primary centers (Matacapan and Totocapan) over secondary centers. The same effect is calculated using the Xtent model by allocating settlement only to large centers and using the same *a* and *k* values (Figure 7.30). This has the effect of allocating tertiary centers to secondary centers. It is unnecessary to layer primary centers over secondary centers, as will become apparent below.

In MC2 (Figure 7.30), Matacapan is hypothesized to control a swath of settlements from Santa Rosa Abata all the way through Apomponapam. Given the disparity in site size and monumentality between these centers, I believe that this is an accurate portrayal of how the tertiary centers related to their larger counterparts. Ranchoapan is the only large center that is not predicted to have had a tertiary center under its administration. This is a fair assessment considering the proximity of Ranchoapan and Matacapan. Although Ranchoapan is slightly closer to Zacuetepan, for example, Matacapan is situated on the Catemaco River and was many times larger and more monumental. The result is that Matacapan "wins" in determining which of the small centers pertain to the larger centers in every case along what Santley (1991) referred to as the Catemaco Valley transect.

Ranchoapan may have had a different purpose within the Middle Classic political and economic landscapes. Its role as a specialized obsidian tool producer is discussed in Chapter 9, but it is also interesting to note its position relative to Tilzapote. Despite the depiction of Ranchoapan as covering over 350 hectares on published settlement maps, Tilzapote and Ranchoapan were probably similar in size. Tilzapote possessed more mounds, but, as Santley argues, mound destruction may have taken place at Ranchoapan. Based on visual inspection of the geographic pattern of primary, secondary, and tertiary centers, it seems likely that Tilzapote served Totocapan in much the same way that Ranchoapan served Matacapan. That is to say that these two large centers may have functioned to maintain the political boundaries of both polities. This would place a hypothetical boundary between the two centers just east of Cerro Amarillo. I will return to this possibility after presentation of the next map.

The MC3 Xtent solution valued "*a*" at 0.6 and "*k*" was held constant at 0.5 (Figure 7.31). This model depicts Totocapan and Matacapan as controlling the entire settlement within the southwestern Tuxtlas. The only center that remains "beyond reach" is Tres Zapotes. It is unknown how Tres Zapotes may have functioned under the administration Totocapan, or if it remained independent. However, settlement over the entire Cerro el Vigía area likely was subordinate to Totocapan. Matacapan subjugated every settlement in the Catemaco valley except Teotepec, Mata Canela, and the island centers of Lake Catemaco. How far south the authority of Totocapan and Matacapan regimes may have penetrated in this hypothesis is unknown. However, it is likely that somewhere near the center to northern areas within the large survey block delineated by

Killion and Urcid (2001) both Tuxtlas polities would have collided with the authority of Laguna de los Cerros (Borstein 2005).

Turning attention back to the Cerro Amarillo area, Tilzapote is "too close to call" with regard to allocating it to either polity. Hamlets on either side of this center fall into different polities. As opposed to my above suggestion that a boundary occurred between Ranchoapan and Tilzapote, this model predicts that Tilzapote *was* the boundary. It is just a model, after all, but this is an intriguing possibility. As detailed in sections above, Tilzapote contained two discreet mound groups, each surrounding a plaza. Tilzapote may have been ruled by dual leaders each representing either Matacapan or Totocapan. The pass extending northeast from Tilzapote is the most easily traveled path connecting the two polities. This corridor is bound to the west by a 200 meter nearly vertical ascent to the summit of Cerro Amarillo. The pass north of Cerro Amarillo, where Highway 180 currently runs, would have been a more direct route to communicate/travel between Matacapan and Totocapan, but it is rather rugged terrain. A less rugged route would pass through Tilzapote, Francisco Madero, and then either over the central uplands of the TVAS area or west to the Tepango River. Either way, the corridor northeast of Tilzapote was interestingly devoid of settlement. If this can be seen as a buffer zone between the Totocapan and Matacapan polities then perhaps the boundary between polities does lie between Tilzapote and Ranchoapan.

Looking at the broader picture, within their respective river valleys Totocapan and Matacapan were by far the most potent political forces. However, the two primary centers were equals on the broader regional political landscape. The sum of all evidence suggests that neither Matacapan nor Totocapan were able to subjugate the other during the Middle Classic period. Teotepec may have formed a third sovereign polity, as will be discussed in Chapter 8.

REGIONAL DISTRIBUTION OF CENTERS

There is one more pattern considered here for the Middle Classic period that is relevant for comparing the relative political centralization of the Tepango and Catemaco valleys. Following Daneels (2008a), relative political centralization can be indicated by inferred patterns of interaction based on positioning of regional centers within a polity. Within the TVAS, small centers are situated closely to large centers. In other words, small centers are situated on the interior of the polity within primary hinterlands of large centers. This implies that patterns of interaction go up the hierarchy from small centers to large centers then to Totocapan. While this indicates some autonomy for Tilzapote and Xiguipilincan, the political boundary at the edge of the Totocapan polity may go through Tilzapote. This would resemble Daneels (2008a) centralized pattern of placing potential politico-ritual competitors with ball courts at the edge of the polity. In reality, there was probably a mixture of the two patterns, but resolving the issue will likely involve incorporation of data to the south to better delineate political boundaries. I suspect that Totocapan's territory ended at Tilzapote, but continued further south past Xiguipilincan and La Mechuda. The southern boundary was probably about the midpoint between Xiguipilincan and a cluster of Plaza Groups identified at Dagamal Santa Rosa and Chacalalpan (Urcid and Killion 2008:Figure 8).

Within the Matacapan polity, the rank order of centers extending out from Matacapan is size sequential, with some exceptions. In other words, there are no tertiary centers located between Matacapan and its secondary centers. Santley initially interpreted this to be indicative of a dendritic central-place settlement (1994), where interaction among centers flows in rank order from smallest to largest[3]. The spatial distribution of centers in the Catemaco Valley, however, show that the shortest path of travel between Matacapan and all subordinate centers within the Valley (except the lake centers of Agaltepec and Tenagre) is direct to Matacapan. For tertiary centers to interact with Matacapan through Ranchoapan, for example, would be rather circuitous. This implies a direct pattern of interaction between all subordinate centers and Matacapan. This centralized pattern of interaction grants less autonomy to secondary and tertiary centers than may have been experienced in the Totocapan polity.

If the Totocapan polity was relatively segmented and the Matacapan polity was centralized, these findings would differ from Daneels's (2008a) argument that older

[3] Santley later change this interpretation to suggest that the Catemaco Valley settlement more resembles a solar central-place system (2007).

centers tend to be more centralized in the lower Cotaxtla Basin. However, one major difference exists between the two regions. The lower Cotaxtla Basin is characterized by highly standardized architectural complexes and a relatively homogenous application of political authority through ball game rituals. Political authority in the Classic Tuxtlas does not seem so homogenously based. Application of Daneels's (2008a) model reveals very different patterns of interaction among centers in each Tuxtlas polity. I argue that this indicates differences in the structure of political institutions between the two valleys, a position developed throughout the remainder of this dissertation.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE CHANEQUE PHASE

The overall settlement pattern remains intact during the Chaneque phase, but the largest centers in general begin to deteriorate and lose population and probably political power. This situation likely continues past the 800 CE end date for the phase, as seen with the late Late Classic period in the Catemaco Valley. A total of 7.8 percent of the total survey area, distributed over 89 sites, displays occupation at this time (Table 7.6). The majority of this settlement decrease comes from large centers as Totocapan, Oteapan, Tilzapote, and Francisco Madero begin to fragment. Sites in the valley were broken down into two large centers (Totocapan and Tilzapote), three small centers (Xiguipilincan, Francisco Madero, and Maxyapan), one large nucleated village (Oteapan), two large dispersed villages (Cruz de Vidaña and Texcochapan), one small nucleated village (El Nopal), seven small dispersed villages (Ocelota, Pizapan, Sehualaca, Vista Hermosa, Tetax, Totogal, and Site 6) and 73 hamlets (Figure 6.15). Mean site size for the Late Classic drops to 8.2 ha, while the median was 1.8 ha. Compared to the Middle Classic, depopulation was happening more rapidly in the north, a pattern that continued in the Postclassic.

Totocapan remains the largest site in the region, covering 317 ha. Density of phase-sensitive materials is very low compared to other sites, though. Only 80 of the mounds constructed in the Santiago B phase are associated with Chaneque phase

Table 7.6. Sites with collections dating to the Chaneque phase sorted by material density-weighted site area.

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
1 (Totocapan)	316.61	Large Center	4.585714	1451.873
82 (Francisco Madero)	93.58	Small Center	12.83333	1200.932
13/134/138/145 (Tilzapote)	75.86	Large Center	8.777778	665.8478
2s (Oteapan)	33.94	Large Nucleated Village	8.545455	290.0125
182 (El Nopal)	7.55	Small Nucleated Village	36.71429	277.1968
89 (Maxyapan)	34.50	Small Center	7.571429	261.2312
5 (Xiguipilincan)	44.87	Small Center	5.6	251.2644
50/54/56/58 (Texcochapan)	17.78	Large Dispersed Village	12.6	223.9906
63/70 (Tetax)	17.39	Small Dispersed Village	9.5	165.2167
51 (Zezecapan)	12.00	Small Dispersed Village	11.875	142.5
3/4/96/100 (Pizapan)	9.43	Small Dispersed Village	12.5	117.9201
17 (Sehualaca)	16.36	Small Dispersed Village	6.25	102.2498
6	23.40	Small Dispersed Village	4	93.59091
124 (Totogal)	11.19	Small Dispersed Village	8.333333	93.27411
102	5.00	Hamlet	17.33333	86.66667
155	2.00	Hamlet	42.5	85
179 (Nancinapan)	10.25	Hamlet	7.333333	75.20266
25	15.41	Small Dispersed Village	4.857143	74.87164
108	6.87	Hamlet	10.66667	73.23552
38/8/34 (Cruz de Vidaña)	31.03	Large Dispersed Village	2	62.05526
111	4.17	Hamlet	14	58.44379
10	3.23	Hamlet	18	58.18511
144	1.51	Hamlet	36	54.52756
65	2.02	Hamlet	23	46.56778
117	1.80	Hamlet	23	41.51005
85	5.15	Hamlet	8	41.21009
23	5.60	Hamlet	7.333333	41.06667
99	2.21	Hamlet	18.25	40.37981
141	2.51	Hamlet	15	37.68985
75	3.55	Hamlet	10	35.53257
98	3.59	Hamlet	9	32.28801
62	2.67	Hamlet	12	31.99755
29	1.95	Hamlet	15.5	30.24592
100	4.90	Hamlet	5.75	28.19643
58	2.09	Hamlet	13	27.17297
36	4.89	Hamlet	5	24.43906
19	10.84	Hamlet	2.25	24.37921
56	1.68	Hamlet	14	23.47228
31	2.52	Hamlet	8.8	22.21817
83	1.50	Hamlet	13.5	20.20587
49	4.15	Hamlet	4.75	19.69208
81	5.70	Hamlet	3.333333	18.99455
64	1.55	Hamlet	12	18.631
12	11.15	Hamlet	1.666667	18.58323
114	4.12	Hamlet	4.5	18.54992
170	5.27	Hamlet	3.5	18.45408
26	2.76	Hamlet	5.666667	15.65971
2n	6.17	Hamlet	2.333333	14.39252
33	2.05	Hamlet	6.666667	13.63841
135	2.43	Hamlet	5.333333	12.97451
115	3.22	Hamlet	3.666667	11.81727
121	1.30	Hamlet	9	11.6564
167	2.57	Hamlet	4.5	11.58029
147	1.20	Hamlet	9.5	11.4
122	1.33	Hamlet	8	10.60554
71	2.50	Hamlet	4	10.01319
87	2.20	Hamlet	4.5	9.920016
46	2.95	Hamlet	3.333333	9.846542
76	3.66	Hamlet	2.666667	9.764572
132	2.89	Hamlet	3.333333	9.643386

Table 7.6 (continued).

Site	Area (ha)	Settlement Rank	Ceramics/Collection	DWSA
143	0.53	Hamlet	17	8.973613
109	1.07	Hamlet	8	8.594148
73	2.44	Hamlet	3.5	8.526651
171	0.47	Hamlet	17	8.001127
166	2.00	Hamlet	4	8
16	2.35	Hamlet	3	7.039536
34	1.50	Hamlet	4.666667	6.98922
61	1.16	Hamlet	6	6.968821
164	0.93	Hamlet	7	6.539152
54	0.97	Hamlet	6	5.824769
161	1.61	Hamlet	3.333333	5.350808
24	2.00	Hamlet	2.5	5
42	0.98	Hamlet	5	4.923478
86	1.14	Hamlet	4	4.567589
125	3.00	Hamlet	1.5	4.5
27	1.08	Hamlet	4	4.318429
22	0.75	Hamlet	3.23	3.47
39	1.07	Hamlet	3.25	3.467477
9	1.66	Hamlet	2	3.327399
173	0.59	Hamlet	5	2.947445
44	1.07	Hamlet	2.6	2.785006
183	1.11	Hamlet	2.5	2.77231
11	1.07	Hamlet	2.333333	2.501434
137	0.73	Hamlet	3	2.204514
106	0.24	Hamlet	8	1.900514
120	0.53	Hamlet	3	1.583283
43	0.57	Hamlet	2	1.149464
41	0.27	Hamlet	3	0.800695
148	0.38	Hamlet	1.75	0.661644
Total Occupied Area	**956 ha**		**Percent of Survey Area Occupied**	**7.77%**

diagnostics. This does not necessarily mean that the remainder of the mounds was abandoned because not all attempted collections on mounds produced diagnostic materials. In those cases, mounds were dated to the dominant phase represented within ceramic collections of the nearest associated collection unit. This is not an ideal procedure, but only more intensive, mound-focused research will be able to determine the use of mounds for the Chaneque phase.

Most of the other regional centers identified for the Middle Classic also begin to fragment and lose some population, including Tilzapote (76 ha), Francisco Madero (93 ha), Xiguipilincan (45 ha inferred from proportion of Chaneque diagnostics in relation to the maximum site size), Oteapan (33 ha). Cruz de Vidaña shrunk in areal extent and is characterized by meager concentrations of Chaneque phase diagnostics, so it was classified as a large dispersed village. The only one of the largest sites that displayed growth during the Late Classic was Maxyapan.

Maxyapan, located along the Xoteapan River near the southern survey boundary, grew to cover 34 ha during the Chaneque phase (Figure 7.32). One small mound group was in use . This mound group was constructed atop a modified ridge spur overlooking the Xoteapan River. The form of the mounds was very different from the architectural styles visible at other sites, perhaps indicating that they were a late addition to the site. Maxyapan continues to flourish as the only administrative center in the TVAS into the Vigía phase. It is also possible that this mound group dates to the Early Postclassic. Mound 1 is a conical mound flanked on either side by access ramps. A large amount of basalt rock was observed on the surface of Mound 1, which was either part of the mound

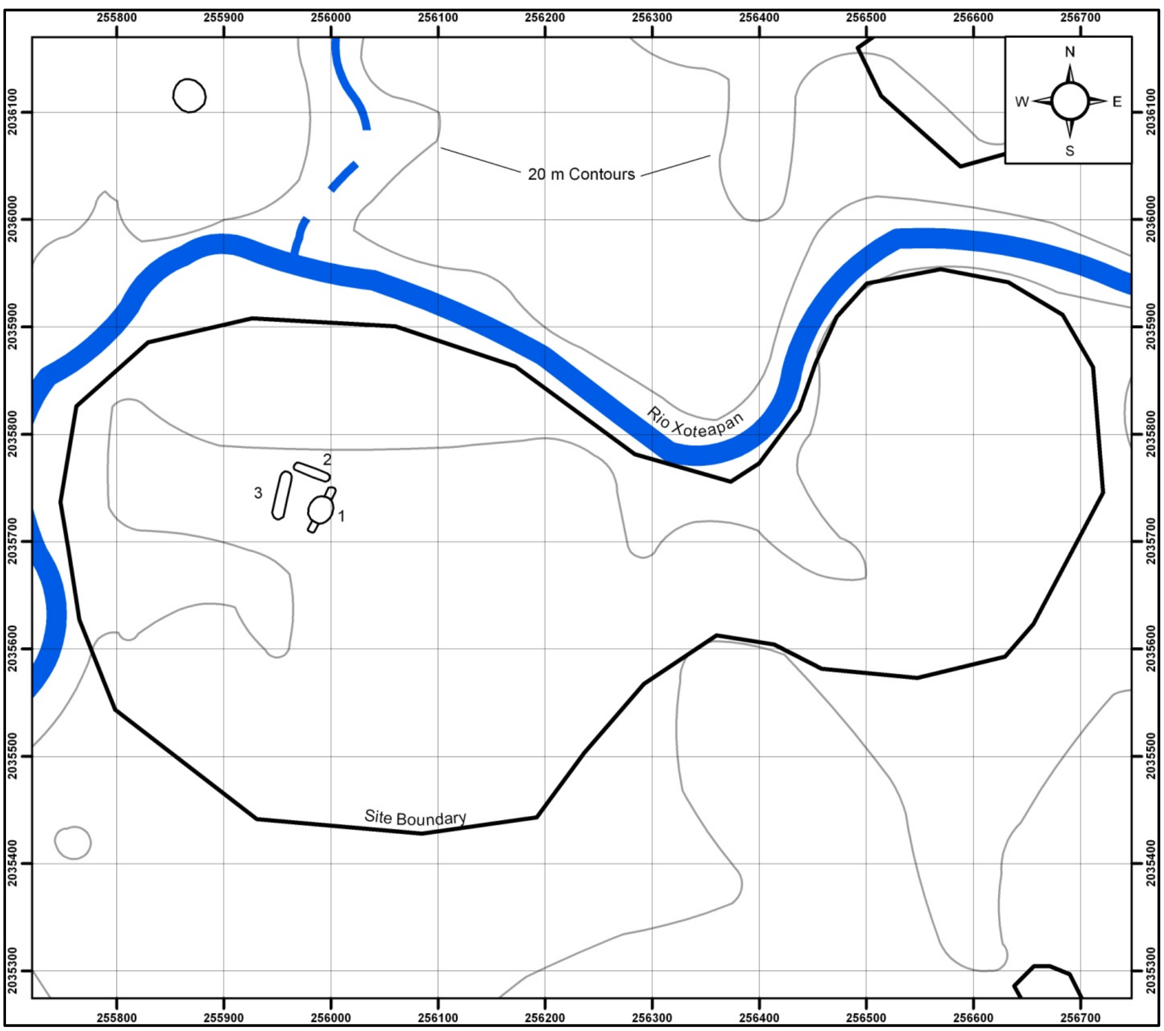

Figure 7.32. Plan view of Maxyapan showing the distribution of mounds.

fill or the mound was paved with basalt. Mounds 2 and 3 are long mounds that form the northern and western edges of the plaza. Together, these three mounds form a roughly triangular plaza. To the east of this mound group, material densities are among the highest for the region. The ridge spur on which this mound group sits appears unnaturally flat, so landscape modification for this plaza group is likely. Alternatively, the bedrock underlying the site may be sandstone, which typically produces flatter ridge tops than the basalt flows or tephra that compose ridges farther north. The site is probably bigger than depicted in Figure 7.32, but conditions for surface collection of material were not ideal.

TVAS POLITICAL CENTRALIZATION DURING THE CHANEQUE PHASE

Despite the fragmentation seen at Totocapan, it remains the primate center of the TVAS area (Figures 7.33 and 7.34). Mehta's ratio for the top four sites using simple site area is 0.60, somewhat lower than the 0.65 calculation for the Santiago B phase. However, using the material density-weighted site area presents a strongly convex curve with a Mehta's ratio of 0.40 (Figure 7.33). Totocapan still covered a broad expanse of land, but its population must have plunged during the Chaneque phase. This conclusion is supported by Ortiz's (1975) excavation pit. While most centers declined in size, the basic configuration of political centralization remained roughly similar and focused on Totocapan. However, Totocapan still utilized at least 60 more mound structures than any other center in the survey area. The question of the degree of political centralization receives ambiguous answers from use of these quantitative tools. Based on the Chaneque phase ceramics discussion in Chapter 6, I suggest that Totocapan started the phase as the supreme political power in the TVAS, but declined at a faster rate than any other center. The subsequent Vigía phase experienced a dramatic decline in population throughout the TVAS, and it is assumed that this decline began during the Chaneque phase. Therefore both rank-size plots may be partially accurate. Factional competition among opposing regimes may help to explain this pattern (Brumfiel 1994, Pool 2008).

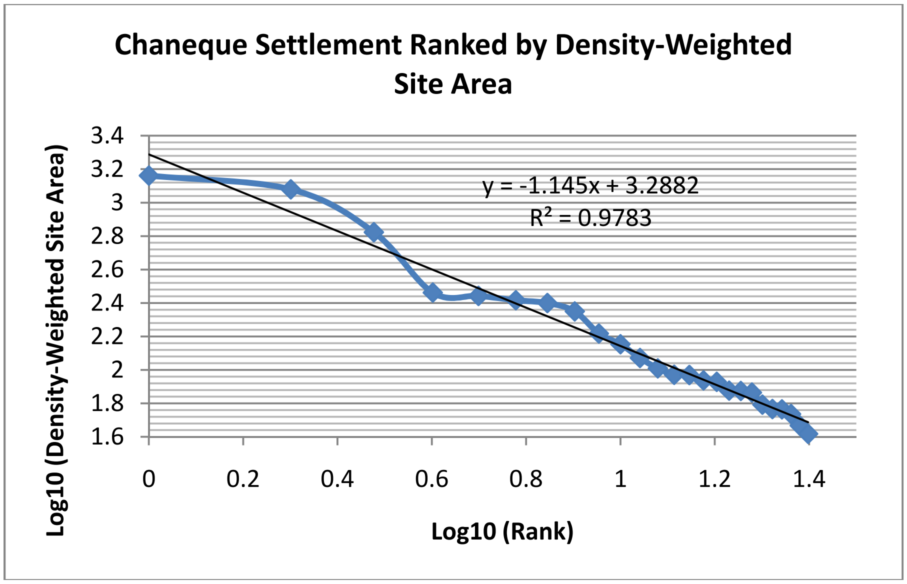

Figure 7.33. Rank-size plot of Chaneque phase sites using density-weighted site area.

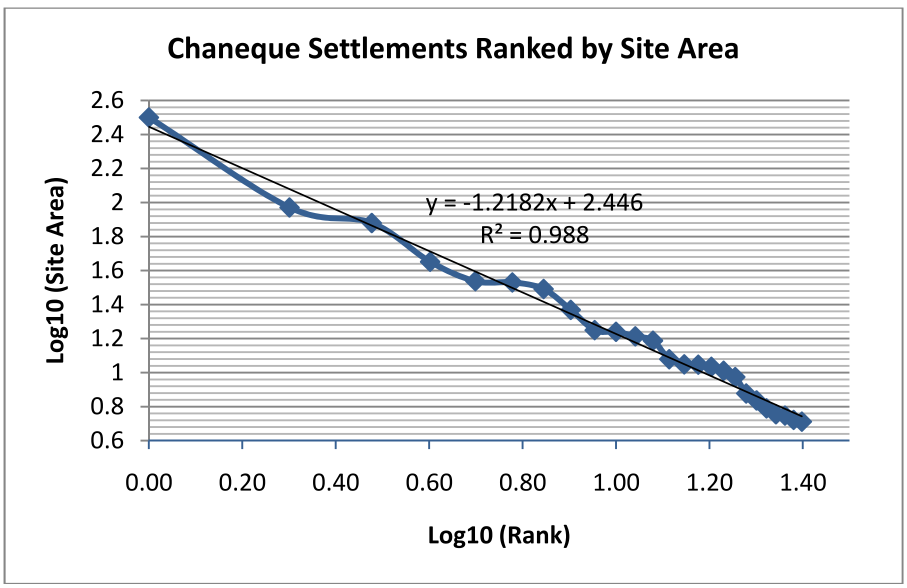

Figure 7.34. Rank-size plot of Late Classic sites using site area.

In the Catemaco Valley, Santley's rank-size plot trends more toward log normality. His logged Mehta ratio is 0.299, which is almost log normal (0.300). By comparison, Matacapan was in a similar situation as Totocapan. While Matacapan declines in power Ranchoapan and Teotepec both increase in size. The patterns of interaction among centers remain very different between the valleys. Ranchoapan and Teotepec may have gained more subjects that bypassed Matacapan to interact with them, but the pattern of interaction is still centralized (i.e., from tertiary and secondary to primary centers). The pattern of interaction among centers in the Tepango Valley is still indirect (i.e., from tertiary to secondary to primary centers). Furthermore, the introduction of a new center at Maxyapan likely further diverts interaction from Totocapan.

REGIONAL POLITY BOUNDARIES DURING THE LATE CLASSIC (650-800? CE)

The Chaneque phase corresponds to the Late Classic period in the broader Tuxtla region. Recent research by Venter (2008) places the Chaneque phase between about 650-800 CE at Totogal. Compared to the Catemaco Valley, this corresponds to the early Late Classic (Santley and Arnold 1996, Santley 2007). However, in the Catemaco Valley, a late Late Classic period is also identified that lasts from 800-1000 CE. Both the early and late Late Classic periods are contained within Phase F defined by the Matacapan Project (Ortiz and Santley 1988). No equivalent to the late Late Classic currently exists in the Tepango Valley. It is possible that with future research in the Tepango Valley, researchers will be able to split the long Vigía phase (800-1250 CE) into two phases that might arrive at a more comparable situation to the Catemaco Valley. The late Late Classic period demonstrates a continuation of the trend of population decline at Matacapan that might also apply to Totocapan. The timing of decline between the two centers is an important question that should be addressed in the future. It cannot currently be determined how the early and late Late Classic periods are separated in the Catemaco Valley using surface collections, so any comparison of population trends is speculative at this point. At Matacapan, both of these periods are encompassed within Phase F, so no *types* of ceramics can be used to separate them. Philip J. Arnold III (personal communication) suggests that Santley may have used high relative *proportions* of Tuxtlas Polychrome to indicate the late Late Classic phase on surface collections. If this is indeed what was done, then the Tepango Valley may have been abandoned for a short time between the Chaneque and Vigía phases. However, such a hypothesis would rely on low frequencies of a generally rare ceramic type that can be identified only by decoration that is highly susceptible to erosion. Radiocarbon dates from excavations at Totogal display a 130 year gap between the upper limit of the 2-sigma range for the earlier date to the lower 2-sigma limit of the later date. With these 2-sigma error ranges considered, the occupational hiatus at Totogal ranged between 890-1020 CE, and may have been longer. The degree to which these dates can be generalized to the region is unknown. Totogal certainly represents a special site in the region, so it may not be typical.

The early Late Classic period in the Catemaco Valley saw a decline in population similar to that seen in the TVAS. Populations there dropped 33 percent (Santley 2007:66). Santley suggests that most of this decline occurred at Matacapan, which shrunk to a core size of 210 ha and an estimated population of 23,000. While Matacapan was declining, Ranchoapan and Teotepec are suggested to have reached their maximum sizes. Ranchoapan was 62.4 ha, but, as Santley notes for the preceding period, the site was much larger if suburban population is considered. Teotepec was likely over 100 ha in size, but estimates are clouded by low surface visibility surrounding the architectural core. All of the other centers identified for the Middle Classic, continue as centers into the early Late Classic. In addition, Chuniapan de Abajo had a brief recurrence as a small center and Site 143 also develops into a small center. To the west of the TVAS, Tres Zapotes was still likely a small center, though the Quemado phase spans the end of the Middle Classic and early Late Classic in the Catemaco valley. This makes it difficult to compare phases directly, so the same figure of 80 ha is used for Tres Zapotes in the models below.

The Xtent model LC1 calculation where both "*a*" and "*k*" were valued at 0.5 depicts a similar political landscape to the Middle Classic (Figure 7.35). This makes sense as the administrative hierarchy did not change significantly. Totocapan, now the largest center in the study region, likely controlled the largest territory. Matacapan also persisted as the largest center in the Catemaco Valley, but the power dynamic shifted somewhat. Where all centers in the Tepango Valley declined to a similar degree (except Maxyapan which actually grew), Ranchoapan and Teotepec closed the power gap with Matacapan considerably. This likely contributed to a fragmented political landscape in the Catemaco Valley, The upper Tepango Valley may have become more centralized due

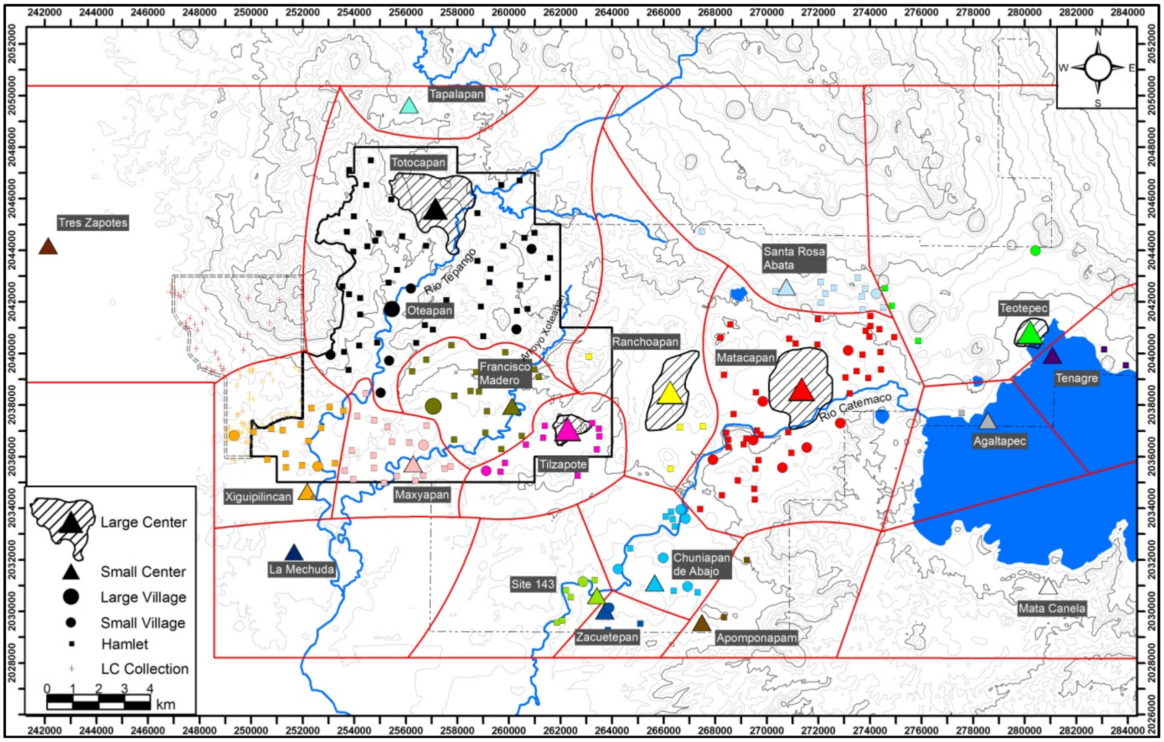

Figure 7.35. Xtent model LC1 with *a*=0.5 and *k*=0.5.

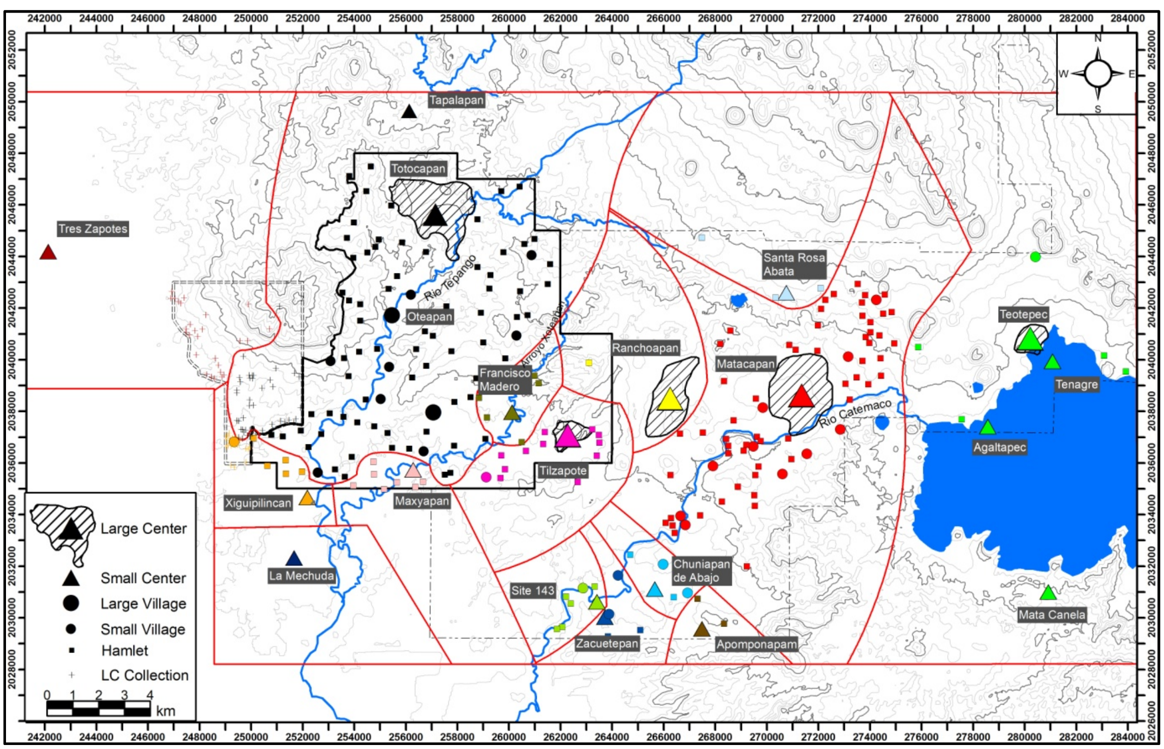

Figure 7.36. Xtent model LC2 results with *a*=0.6 and *k*=0.5.

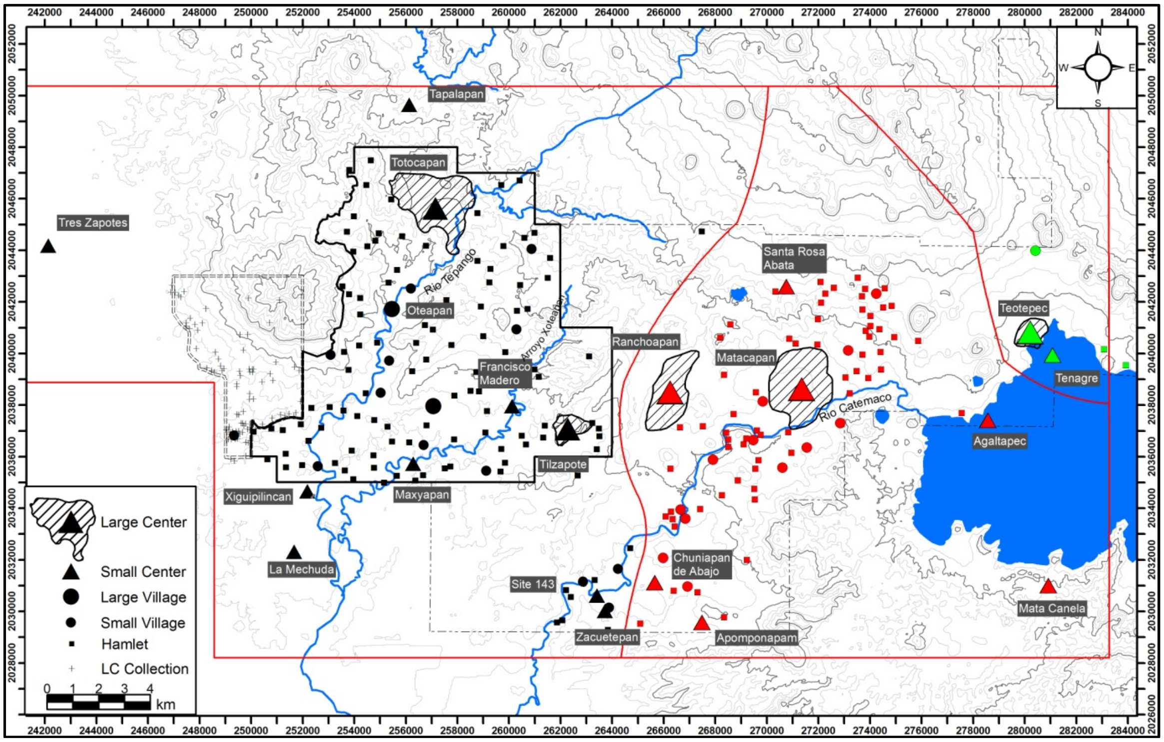

Figure 7.37. Xtent model LC3 results with *a*=0.65 and *k*=0.5.

to the elimination of Oteapan and Cruz de Vidaña as political competitors. However, the relationships among Totocapan, Xiguipilincan, and Tilzapote may have become more complicated (discussed in Chapter 8).

The difference in the political landscape between the two valleys becomes more apparent when the progression of Xtent models is viewed. In the LC2 model, at the "*a*"=0.6 level, Totocapan, Teotepec, and Matacapan all gain more territory, but none of them encompasses a secondary center (Figure 7.36). In the Middle Classic, at this same level the entire study region was divided into Totocapan and Matacapan polities. In model LC3, at the "*a*"=0.65 level, Totocapan overtakes the entire western half of the study area and penetrates into the southern Catemaco Valley (Figure 7.37). Matacapan again fails to incorporate Teotepec. Teotepec retains its autonomy and likely controls the entire "Monte Pio" survey transect to the coast and the areas south of Lake Catemaco. Recently, Alfred Siemens (2004:61) supplied a photograph of a mound center on the north coast of the Tuxtla Mountains that displays a very similar architectural configuration to Teotepec. This supports the role of Teotepec as the principal authority over the route to the north and probably much of the coast. Additional support for this hypothesis is provided in Chapter 8.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE VIGÍA PHASE (EARLY POSTCLASSIC) (800-1250 CE)

Settlement in the survey area declines greatly into the Postclassic, though sites from this period may be underrepresented because ceramic and other diagnostics are poorly understood. Recent studies by Arnold (2007) and Venter (2008) have helped to better define the Postclassic in the Tuxtlas, and their work is reflected in the identification of Postclassic sites in this research. Only 1.3 percent of the survey area was occupied during the Postclassic, spread over 43 sites. Among these sites were one small center (Maxyapan), two large dispersed villages (Francisco Madero and Totogal), one small dispersed village (Tilzapote), and 39 hamlets. Mean site size drops to 3.7 ha, but the median rises slightly to 1.5. These changes indicate a dramatic decrease in size of the largest sites in the region as well as a drop in the number of hamlets. Settlement and population was concentrated greatly in the southern half of the survey region (see Figure 6.17). This is the first time in the TVAS history that the southern half of the area was the major focus of population, though the process began in the Chaneque phase.

The only occupation remaining at Totocapan was within the El Picayo district and a small mound group about 200 m north of the Acropolis. Francisco Madero took over as the largest site in the region, which includes Bella Vista, but Maxyapan is about the same size and probably had greater political significance. Population densities at Maxyapan were greater, and it was likely that more people resided at this small center. Furthermore, the mound group at this center is unlike any other mound group found in the region, suggesting that its construction may postdate the major epoch of mound construction (i.e., the Classic period) in the Tuxtlas. Tilzapote was less than half the size of either Francisco Madero or Maxyapan.

I do not calculate the rank-size plot or the Xtent model for either of the Postclassic phases because there is too much uncertainty regarding site size. However, some general observations can be made regarding settlement distribution during the Vigía phase. Compared to the subsequent Totogal phase, the Vigía phase settlement is rather dispersed. Settlement was spread throughout the survey area, with only a few areas of concentration in the south. The central uplands were largely abandoned.

TVAS SETTLEMENT DISTRIBUTION AND SITE RANK DURING THE TOTOGAL PHASE (LATE POSTCLASSIC) (1250-1521 CE)

The Totogal phase corresponds to the Late Postclassic period in the Tepango Valley. This was a time when the Aztec Triple Alliance had influence in the region (Carrasco 1999, Gerhard 1993, Venter 2008). Venter has identified what was likely the Aztec's tribute collection post in the Tuxtlas at Totogal on the southeast flanks of Cerro el Vigía. Totogal grew, likely as a result of foreign influence, to cover about 61 ha. It was the only clear political center in the region at the time (see Figure 6.18). Elsewhere, Tilzapote also seems to grow somewhat. While Tilzapote covers a broad area the density of materials that can be attributed to the Totogal Phase is rather sparse. It is unknown if this is an artifact of the paucity of diagnostics that mark the phase or actual low population density. Francisco Madero shrinks to a small village as only a couple of collections indicate a Totogal phase occupation. Maxyapan also shrinks considerably, but the density of materials at the core of the former center was still quite dense. The remaining settlement in the valley was distributed among many hamlets that cluster around Tilzapote and Totogal. This strong shift in settlement to the southern foothills of the Tuxtlas is a process also seen in the Catemaco Valley (Arnold 2007). Arnold's (2007) presentation based on ground platforms on clear obsidian likely reflects a settlement shift pertaining to the Early Postclassic.

Indication of imperial involvement comes in the form of Texcoco Molded censers, found in low quantities at specific areas within the survey area and at Agaltepec (Arnold 2007b), and high percentages of green obsidian. Totogal and Site 130 in the western settlement cluster yielded Texcoco molded ceramics. At Totogal, a mold was recovered (Venter 2008) to produce Texcoco Molded censers. This raises the possibility that Totogal was producing the ceramics locally and trading them to other sites in the region, but it does not rule out production at other sites as well. Texcoco Molded censers were also found at Tilzapote, Site 112, and Site 176 in the TVAS, and they are relatively common in Kruszczynski's (2001) survey area on the southwestern flanks of Cerro el Vigía.

It is too early to tell what the relation between the Tepango and Xoteapan settlement clusters was during the Totogal phase, but included in the possibilities is competing political factions or subordination of the entire area by Totogal.

THE RISE AND FALL OF TWO CLASSIC PERIOD POLITIES IN THE TUXTLAS

The experience of the Tuxtlas political landscape has been characterized above based on several quantitative techniques. Principal among the concerns for this reconstruction were to characterize the structure of authority in the region on a continuum between centralized and dispersed. The first step to this process was to categorize settlement within the TVAS into a settlement hierarchy. Simple quantitative techniques were then used to examine the relations among sites at different settlement ranks. A second objective was to estimate political boundaries and relationships among discreet center/hinterland units using a geospatial model. The model delineated basic center/hinterland units for each center and hypothesized relationships among them. As detailed in Chapter 2, though, the experience of the political landscape cannot be fully understood unless one also considers the perception and imagination of authority and polity. To understand these other two dimensions of the political landscape, I turn to an architectural and stylistic analysis in the following chapter. But first I summarize some major points and trends here.

The Middle Classic is the period of greatest population in both the Catemaco and Tepango River valleys, and at Matacapan and Totocapan respectively. It is also the time when Teotihuacan symbol use reached its height at Matacapan and in its hinterland. To understand these developments, I recapitulate a brief history of the two valleys leading up to the Middle Classic.

The area around Matacapan was settled as early as the Early Formative (Santley 2007:26, Santley and Arnold 1996; see also Arnold and McCormack 2003 for evidence of Initial period occupation). Except for the outlying community of Bezuapan (Pool and Britt 2000), the lands that would become Matacapan lay uninhabited until the Early Classic. Any institutional memory that began during the Early Formative at Matacapan may have been lost. However, those settlements may have moved to the lower Catemaco Valley where they stayed between the Middle and Late Formative (Arnold 2002, McCormack 2002, Santley 2007:33-34, VanDerwarker 2003). The Protoclassic brought dramatic population loss (Santley 2007:43-44), caused in part from a volcanic eruption (Santley et al. 2000). Matacapan was settled in the Early Classic. Settlement shifted dramatically to focus on the upper Catemaco Valley and Matacapan specifically. The Early Classic in the Catemaco Valley was a very primate-looking settlement pattern. Matacapan was a small regional center that developed around what became the "Teotihuacan Barrio". All other sites in the valley were hamlets.

The Formative history of the Tepango Valley was quite different. Totocapan provided a deep, relatively unbroken cultural history reaching back to the Middle Formative. The site was occupied over a period of 1700 years. There were subtle population shifts, but a substantial population resided there until it was largely abandoned at the end of the Late Classic. Elsewhere in the Tepango Valley, Cruz de Vidaña provides a second node of cultural continuity over a large temporal span. Though it largely collapsed during the Early Classic, Cruz de Vidaña resurged as a small center in the Middle Classic. More importantly, the architecture of Cruz de Vidaña was potentially built during the Late Formative and Protoclassic periods. This is an important piece of evidence because it does not seem that Totocapan had constructed a ball court until the Middle Classic. The ball game was, therefore, a local development at Cruz de Vidaña but not Totocapan. Cruz de Vidaña was equally important for preserving institutional memory within the Tepango Valley as Totocapan.

During the Early Classic, settlement within the Tepango Valley, like the Catemaco Valley, was a centralized political system. The form of settlement surrounding Totocapan looked very similar to the situation around Matacapan. The two regional centers began the Classic period in political parity as the power and influence of Tres Zapotes waned to the west (Pool 2007). One significant difference between these centers is the Teotihuacan connection seen at Matacapan (Arnold and Santley 2008, Ortiz and

Santley 1998, Santley et al. 1987). Although several potential Teotihuacan related finds were identified by Ortiz (1975) and by this study for the Santiago A phase, there is a clear division on the Tuxtlas symbolic landscape between the identity portrayed by the first Matacapeños and continuing settlement at Totocapan (discussed in Chapter 8).

In summary, Matacapan emerged on a dynamic landscape characterized by dramatic population shifts every few hundred years. Very few sites, like Chuniapan de Abajo and possibly Teotepec, preserved the institutional memory of Formative period culture in the Catemaco Valley. Chuniapan de Abajo did so through mounded architecture which was a stable reminder of cultures past. On the other hand, Totocapan displays cultural continuity from the Middle Formative through the Late Classic.

During the Middle Classic, Matacapan and Totocapan both dominated their hinterlands. The two centers were equally sized and monumentally invested. However, distinct patterns of interaction among centers potentially appear. Locational patterns of centers in the Tepango Valley suggest that interaction between tertiary centers and Totocapan was mediated by secondary centers. In the Catemaco Valley, locational patterns of centers imply that tertiary and secondary centers alike interacted directly with Matacapan. This difference suggests that Matacapan was more actively involved in determining the events that took place in its hinterland, while Totocapan permitted its secondary centers a degree of autonomy to administer their own core hinterlands. These patterns of interaction are partially supported by examination of the economic landscape in Chapter 9.

SUMMARY

In this chapter, I presented the reconstructed settlement hierarchies for each phase of occupation within the TVAS. I also identified how political authority fluctuated between centralized and dispersed through the occupational history of the TVAS. The one constant through all phases of occupation, prior to the Postclassic period, was that Totocapan was the largest and most influential settlement in the survey region.

Secondary and tertiary centers arose and fell in Totocapan's hinterland over the course of 1700 years, but Totocapan maintained its primary position in the Tepango Valley.

In comparison to settlement in the Catemaco Valley, the Tepango Valley settlement was much more stable through time. In the Catemaco Valley, Matacapan became a new political authority during the Early Classic following a volcanic disruption to settlement in the upper Valley. Once Matacapan began to assert its authority in the region, however, it quickly developed into a more centralized polity than that headed by Totocapan.

With respect to relationships between valleys, settlements in neither valley were able to conquer or politically dominate settlements in the other. This is inferred from the relative parity in settlement size and distribution between the Tepango and Catemaco valleys, despite the stability of the former relative to the instability of the later. The only political imbalance in the southwestern Tuxtlas occurred during the Formative period when Tres Zapotes likely dominated a large portion of the region. The political parity between the Tepango and Catemaco valleys likely resulted in the emergence of a "border center" at the point of interaction between polities. Tilzapote probably arose as an important facilitator and regulator of interactions between Matacapan and Totocapan. It is at this site that interpolity relationships should be investigated in the future (discussed further in the remaining chapters).

CHAPTER 8: IMAGINATION AND PERCEPTION OF TUXTLAS POLITIES, REGIMES, AND POLITICO-RITUAL INSTITUTIONS DURING THE MIDDLE CLASSIC

The reconstruction of the experience of the political landscape in the previous chapter has generated testable hypotheses that can be evaluated in a number of different ways. It is assumed here that politically allied settlements will display similar symbols. The display of a unified material set represents the imagination of polity put forth by regimes. Political alliance can take place among peers or through hierarchical integration; both situations should result in similar material expressions among interrelated nodes on the political landscape. Lower-ranked regime officials within a polity derive part of their legitimacy through association with higher ranked authorities. Authorities in secondary centers should therefore display regime symbols, with different degrees of reinterpretation possible, creating a perception that local political agents are tied to other influential regimes throughout the region. Politically charged symbols may include particular architectural forms or layouts, ritual paraphernalia, prestige objects, or designs executed on portable (e.g., ceramics) or stationary (e.g., monuments) media.

In this chapter, I synthesize the different architectural programs that have previously been recognized on the Gulf Coast. Much of the Gulf Coast extended region displays a number of architectural similarities. In particular, ball courts are integrated into the central architectural complexes at most primary and secondary centers throughout the Gulf Coast region. A notable departure to this pattern is the lack of ball courts at both Tres Zapotes and El Mesón in the eastern lower Papaloapan Basin. The ball game and associated rituals were incorporated into the political ideologies of most regimes to ritually bind their subjects to them. Ball courts, players, and equipment (*palma, hacha,* yoke) became symbols of politico-ritual authority, and their distribution is important to understand the political landscape. How these ideologies were implemented varied among polities.

The TVAS displays affinity to architectural programs identified in the lowlands surrounding the Tuxtla Mountains, including the use of ball courts. The architectural discussion that follows, in part, demonstrates some level of ritual cohesion among the

Tepango Valley and other Gulf Coast groups. Variation exists among the material culture employed specifically at Totocapan that can be used to draw contrasts as well.

I begin the discussion below with an overview of Classic period architectural programs common to central and southern Veracruz. Particular attention is paid to the configurations seen in the Catemaco Valley, which display a number of convergences and divergences with broader Gulf Coast patterns. I then compare the architectural plans of centers within the Tepango Valley Archaeological Survey (TVAS) to these data. Included in this architectural analysis are more intensive examinations of the perception and imagination of political and ritual space at Totocapan. I characterize these internal relationships along continua of centralized to dispersed political authority and collective to exclusionary political strategies. The results are compared to Matacapan and Teotepec in particular.

Architectural analysis is followed by a motif analysis of decorated ceramics within the TVAS. I discuss here only patterns that may indicate sociopolitical interaction within the survey area and beyond. At the end of this chapter, the political boundary models presented in the previous chapter are evaluated.

ARCHITECTURAL PLANS AS INSTITUTIONS OF POLITICO-RITUAL AUTHORITY IN CENTRAL AND SOUTHERN VERACRUZ

Architectural configurations have received a great amount of attention in Gulf Coast archaeology lately. Barbara Stark (1999) and Annick Daneels (2002a) made great leaps for architectural analysis on the Gulf Coast, and others have followed with similar analyses for their respective regions of study (e.g., Borstein 2005, Loughlin personal communication, Pool 2008, Urcid and Killion 2008). My review of architectural patterns in the central and southern Gulf Coast begins in central Veracruz and proceeds south to end in the region surrounding San Lorenzo (Figure 8.1).

STANDARD PLAN

The lower Cotaxtla Basin and the western lower Papaloapan Basin have produced some of the most detailed architectural analyses on the Gulf Coast (Daneels 2002a, 2008a; Stark 1999 2003, 2008). Both regions are characterized by a redundant architectural pattern that was the focus of political authority in almost all political centers. This architectural configuration was referred to as the "Standard Plan" (Figure 8.1). My use of the term "Standard Plan" refers specifically to the architectural layout defined by Daneels (2002) for the Cotaxtla Basin. A Standard Plan consists of a small roughly square-shaped plaza enclosed on one end by a large pyramidal/conical mound, on the opposite end by a ball court, and on the sides by long mounds. These four architectural elements form the nucleus of the Standard Plan. In the Cotaxtla Basin, the pyramidal mound is usually positioned on the north of the plaza. This orientation is also common in the Mixtequilla region, but the main pyramidal mounds also occur to the east with the ball court on the west. Less common, the ball court occurs on the side of the plaza instead of along the centerline across from the main pyramid. The Standard Plan nucleus is usually associated with three other architectural features: 1) a secondary plaza (or "plaza group"), almost always adjoining the Standard Plan nucleus; 2) at least one recessed reservoir; and 3) a massive or monumental platform within 100 m of the main pyramidal/conical mound.

The Standard Plan nucleus was a fixed site on the landscape where formal rituals were enacted by political and ritual specialists. The main pyramidal/conical mound likely supported a temple, and Daneels suggests a calendrical function for the long mounds (2008:202). Regardless of whether this hypothesis holds, the plaza itself most certainly had ritual functions. Perhaps most important element of this architectural plan was the ball court. The ball game in ancient Mesoamerica was a highly ritualized game that was used to legitimate political authority (discussed below). Daneels argues that the secondary plaza groups provided administrative or mercantile functions. Reservoirs may also have had ritual functions. Stark suggests they were reflecting pools, but they may have additionally been raised gardens (2003). Finally, monumental platforms are interpreted as palaces or elite residences.

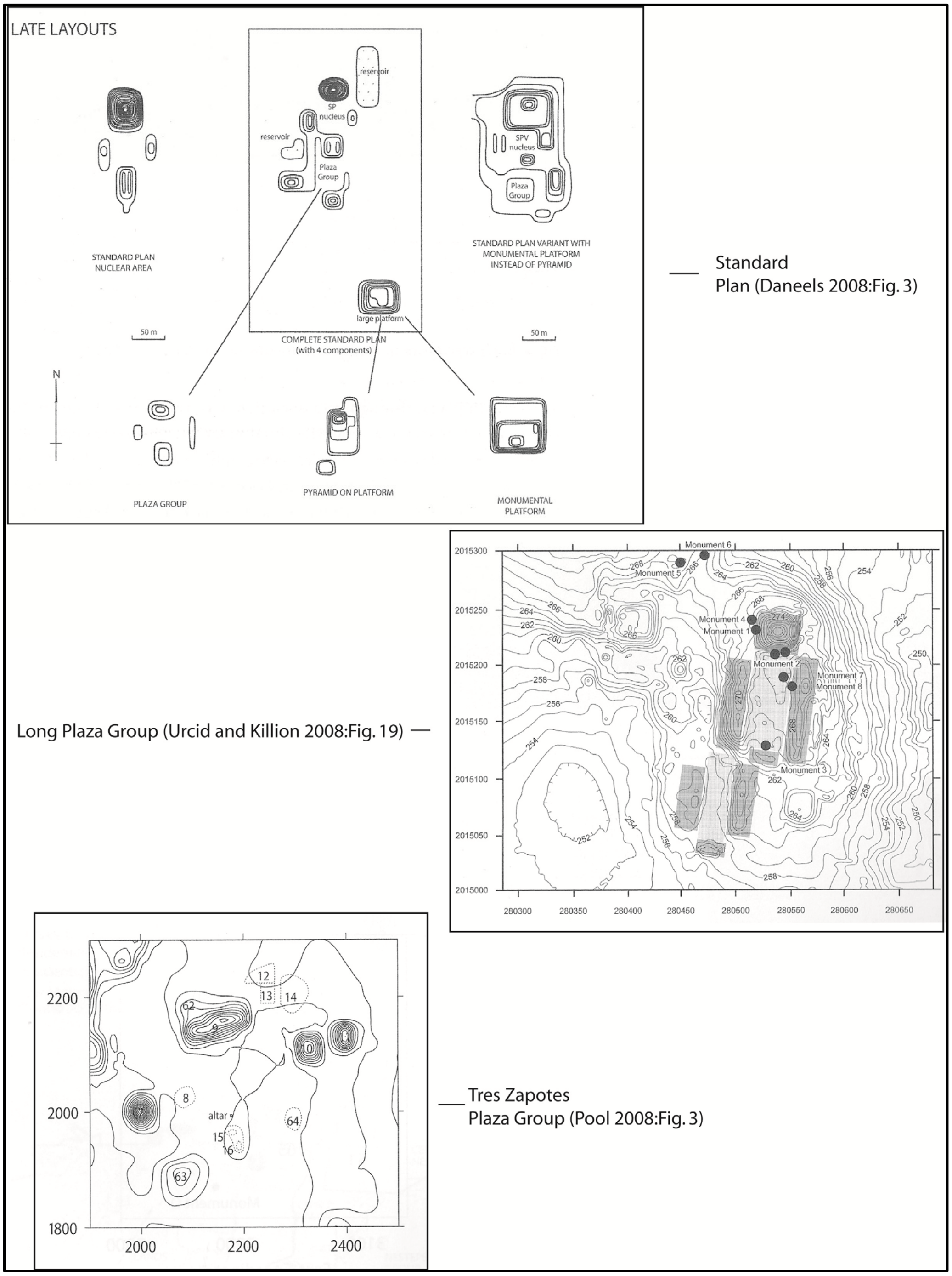

Figure 8.1. Architectural Plans from Central and Southern Veracruz.

Daneels (2008b) has recently excavated two monumental platforms at La Joya in the Cotaxtla Basin. She finds that they were constructed in stages going back at least to the Protoclassic period. Staged construction of these political seats suggests *in situ* development of authority over a long time period, which may indicate hereditary succession. Interestingly, the monumental platforms were constructed before the Standard Plan nucleus. Atop the platforms, several buildings were constructed that are inferred to have ritual, residential, and administrative functions. Perhaps most pertinent for interpreting architectural space at Totocapan, the two monumental platforms shared a single plaza. Daneels (2008b:18-19) interprets this as a situation of dual government where ritual and secular administrative aspects of La Joya were separated into distinct buildings. The interpretation was based on similar form and temporal occupations for the platforms, but employment of different symbols. One platform promoted state religion associated with the ball game, while the other promoted a folk cult that was found in common residential contexts throughout the region.

Daneels uses the distribution and size of Standard Plans to reconstruct polity territories throughout her survey area (2002a, 2008a). Two patterns appear. The first is a centralized model of political authority that consists of a primary center surrounded by tertiary centers (which lack Standard Plans). Secondary centers, which possess Standard-Plan architecture, surround this core territory in the centralized model. The second is a segmentary model where primary centers were surrounded by secondary centers which in turn held tertiary centers closely within their hinterlands. Centralized polities typically developed on lands that were settled during the preceding Formative period, while segmented polities were founded during the Classic on poorer lands that were previously uninhabited. The centralized polities drew upon their ancestral foundations as part of their political imaginations. Lacking such a foundation, polities founded in the Classic period could not develop centralized power structures. Daneels (2008:207-208) believes that these were settled by groups that fissioned off from the older polities some time during the Formative to Classic transition. They copied the architectures of power (the ball courts and Standard Plans) from their parent polities and incorporated them into their own political strategies. In centralized polities, a large ball court in the primary center likely serviced the entire polity, but in segmentary polities ball courts were rather numerous and widely distributed.

Standard Plan architecture is also present at Cerro de las Mesas, Nopiloa and surrounding settlements in the Mixtequilla region (Stark 1999, 2003, 2008). Many of these plans appear like direct copies of those described above. They contain all the nuclear elements as well as the adjoining monumental platforms, recessions, and secondary plazas. However, there are several variations that should be noted. First, later (Late Classic) Standard Plans plazas tend only to be flanked by one elongated mound, rather than enclosed on either side by parallel long mounds. This is interesting because Totocapan's version of the Standard Plan has only one flanking long mound. Stark sees the smaller Standard Plans found outside the principal architectural centers (e.g., Cerro de las Mesas), as "settlement segments". Settlement segments are corporate/administrative social units that may function like landed estates. More interesting is that these smaller versions of the Standard Plan lack ball courts. In fact, Stark notes that ball courts are restricted to the upper tiers of the settlement hierarchy, suggesting a very centralized political landscape legitimated by control over the ball game. The Late Classic period around Cerro de las Mesas, though, was marked by some political fragmentation (Stark 2003:415).

Ball Game Imagery and Associated Artifacts

The Gulf Coast version of the ball game is probably best known from the lower Cotaxtla Basin and areas north, such as at El Tajín. The style of ball game employed by regimes in Classic Veracruz is associated with a standard set of symbols. At the core of this symbology are three items: *palma*, *hacha*, and yoke (Ekholm 1949). *Palmas* are stone sculptures that range in size and shape, but all tend to be taller than wide and they widen as they extend upward in a gentle arc (Figure 8.4). These stones are depicted in ball court imagery engraved on the panels of Tajín's ball courts (Ekholm 1949, Koontz 2008). In these images, the palmas are shown to be worn at the belt so they extend upward curving away from the body. The *palmas* may have been affixed to yokes worn around the waist like belts. Yokes found today in Veracruz are thick stone objects formed in the shape of a "U" (Figure 8.2). The yokes and *palmas* worn by ritual actors in the Classic period may have been made of wood or some other material. Even wood would have been rather uncomfortable to wear, but imagery on the ritual panels at El Tajín shows the actors wearing very thick belts that do not always wrap around the back

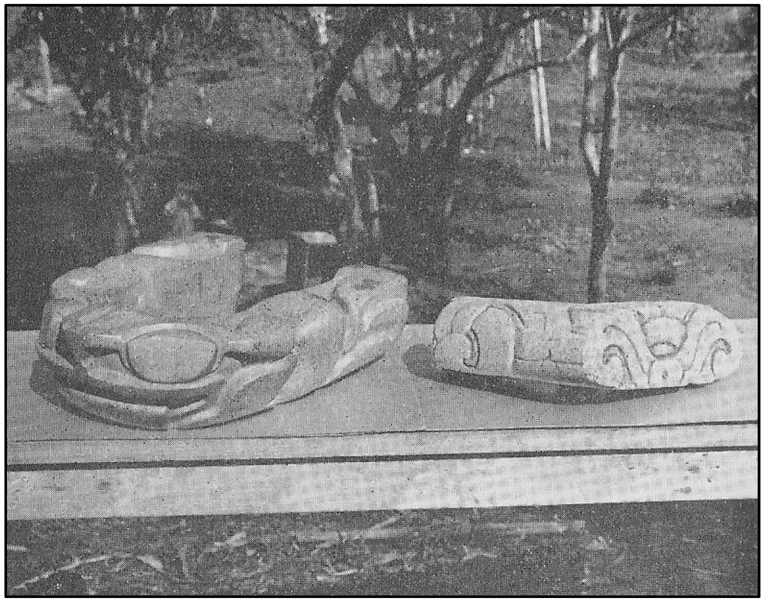

Figure 8.2. Yokes recovered at the Tres Zapotes Ranchito Group (Weiant 1943: Plate 67:1).

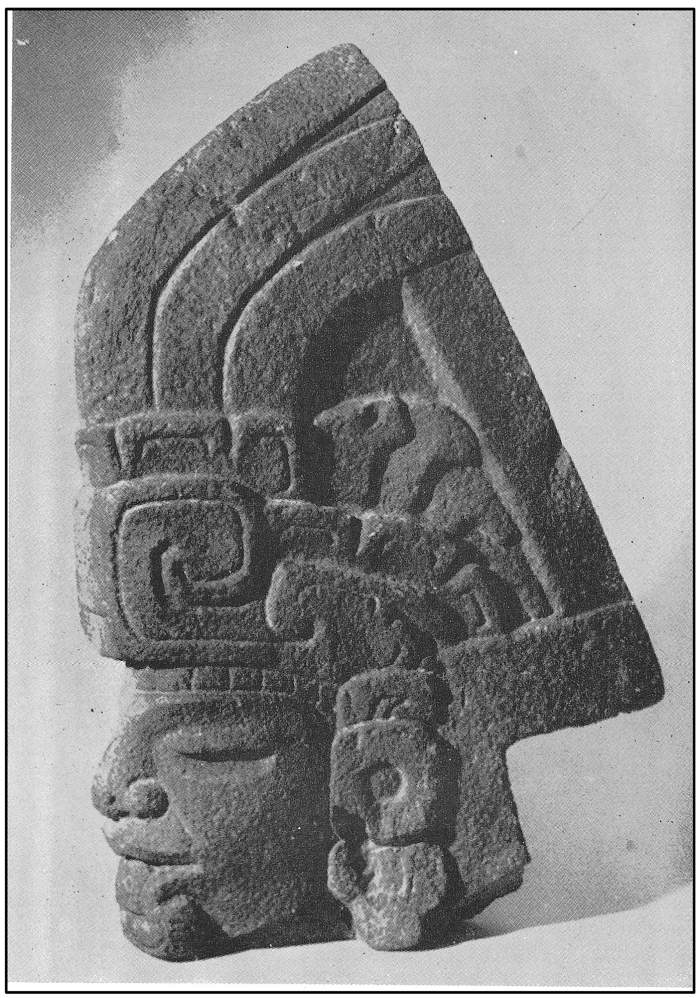

Figure 8.3. Votive axe (*hacha*) from Napatecuhtlan (Medellín 1960: Plate 66)

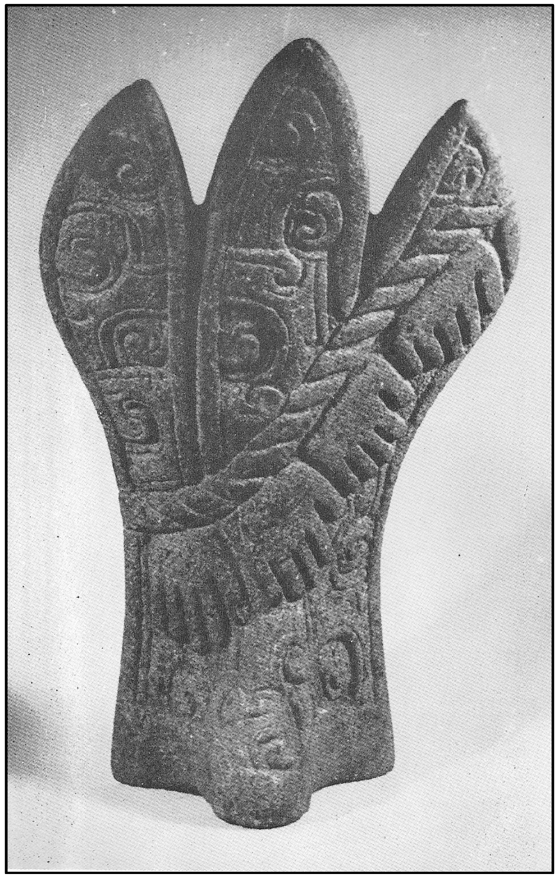

Figure 8.4. *Palma* recovered from Ranchito de las Animas (Medellín 1960).

side of the bodies with the *palmas* extending upward and outward from the center. Finally, the *hachas* resemble laterally compressed life-sized human heads carved in stone (Ekholm 1949:6) (Figure 8.3). It seems that the *hachas* were intended to attach to the front of the belt, as seen in a figurine recovered from the Tuxtlas (Ekholm 1949:6), but they were primarily attached to the back at Tajín.

These three symbols are usually highly decorated. The most common motif of decoration is the interlaced volute, or intersecting scrolls, common to the Veracruz stylistic canon (Stark 1998). All three of these objects are usually found in conjunction, and they are most commonly associated with images of ball game rituals and ball courts. At Cerro de las Mesas, for example, a yoke was found associated with two decapitated individuals and offertory caches that date to the Protoclassic (Stirling 1941), but the majority of these items are found in Classic contexts throughout the Gulf Coast. Imagery found primarily in central Veracruz and at El Tajín depict numerous decapitation rituals undertaken by individuals wearing *palmas* and yokes. It is inferred from this that decapitation rituals were associated with the ball game, and probably linked to the legitimation of political authority (Daneels 2008a). Where palmas, hachas, yokes, and decapitation rituals are identified in conjunction with ball courts, one can infer an important conjuncture between the ritual and political landscapes.

Another link between the ball game and the decapitation ritual appears in the Papaloapan Stela (Sanchez 1999) (Figure 8.5). Although this stela was not found in its original context, it is thought to come from Cerro de las Mesas (Sanchez 1999:21). It depicts the decapitation of what is probably a ball player. The main figure undertaking the decapitation and the figure to his right both appear to be dressed as ball players. The right-flanking individual is holding a yoke in his hand. Beneath these human figures, one complete and one partial crocodile lie as if waiting for their sacrificial offering. The position of the saurian figure below the human actors could commonly be inferred to represent their position in the underworld. It actually appears to be a human dressed as the cipactli. While there are many stylized differences between the cipactli images found in the TVAS and that depicted on the Papaloapan Stela, the similarities are numerous. Further below in this chapter, I discuss the connections between the cipactli and the ball game in more detail.

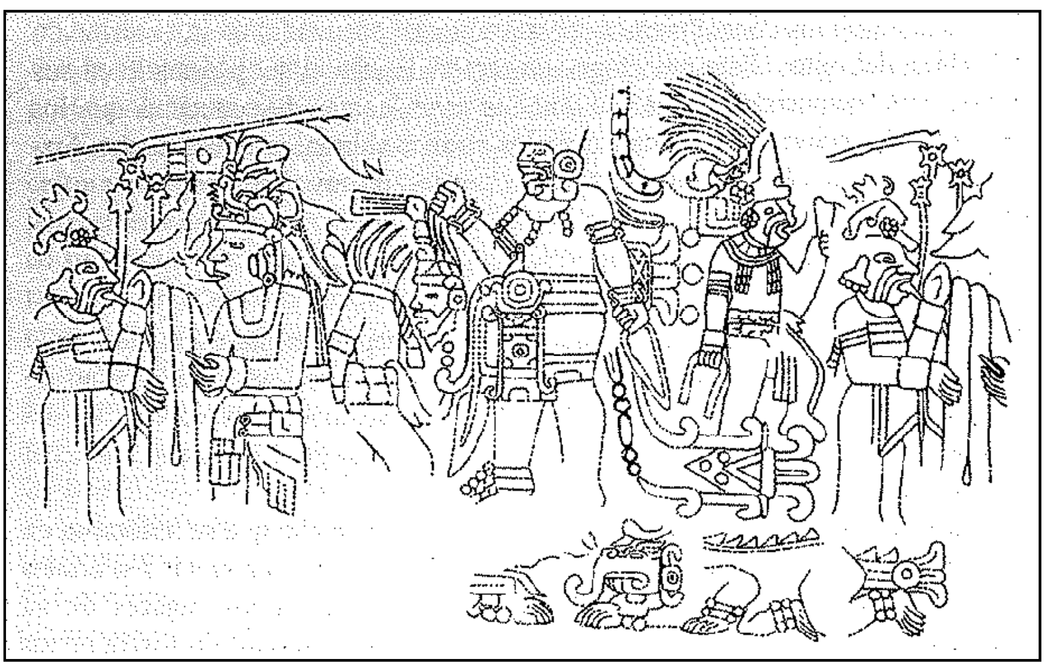

Figure 8.5. Drawing of the Papaloapan Stela (Sanchez 1999: Figure1).

THE LONG PLAZA GROUP AND VILLA ALTA QUADRIPARTITE ARRANGEMENT

The middle San Juan Drainage encompasses the southwestern Tuxtla foothills and the lowlands to the south. The archaeological study area delimited by Killion and Urcid (2001) borders both the Tepango Valley Archaeological Survey (current study) and the Catemaco Transect of the Tuxtlas Region Survey (Santley 1991). Borstein (2001) has also collected data in this area as part of his survey area connecting Laguna de los Cerros and San Lorenzo.

In their survey area, Urcid and Killion (2008) recognize a redundant architectural plan that bears some similarity to the Standard Plan. They name this architectural program the "Plaza Group", but I refer to it as the Long Plaza Group, after Dominguez (2001), because it is more descriptive (see Figure 8.1). Dominguez (2001) and Symonds (2002) report a number of architectural complexes that resemble this configuration in the hinterland of San Lorenzo. Borstein (2005) refers to the same pattern as the Villa Alta Quadripartite Arrangement (VAQA). Long Plaza Group architectural configurations are most commonly oriented on a roughly north-south axis with the main pyramidal/conical mound situated on the north end of the plaza. Like the Standard Plan, the long axis of the plaza is flanked to either side by elongated mounds. Long Plaza Groups tend to be more elongated and thus rectangular. When ball courts are present, they are attached to the side of one of the lateral long mounds as an "L" shaped mound appendage. Although it was not their focus in the published literature, monumental platforms (i.e., palaces) were also present at major centers.

Urcid and Killion (2008) undertook an architectural analysis of these Long Plaza Groups that incorporated previous archaeological research throughout most of southern Veracruz. Of the 15 localities with ball courts, 11 of them occur in the top two echelons of the regional administrative hierarchy (hierarchy reconstruction was based on the height of the main mound in the Long Plaza Group and number of Long Plaza Groups). This duplicates observations by Daneels (2008) described above for the lower Cotaxtla Basin. Based on a functional comparison to better-known excavated contexts (Monte Alban and La Venta) that display long-plaza architectural patterns, the authors argue that the Long Plaza Groups were seats of political authority. While they are most common during the

Middle and Late Classic, they may have been built in stages over time. Activities undertaken in these plazas likely included "administration, accounting, imparting of justice, calendrically prescribed public celebrations, ritual and secular playing of the ball game, immolation of sacrificial victims, and burial of heads of corporate groups and their embodiment as stone stelae (Urcid and Killion 2008:281)". Urcid and Killion suggest that the high number of standardized Long Plaza Groups may indicate a Balkanized political system. Furthermore, the presence of more than one Long Plaza Group in the primary centers may indicate group-oriented political strategies or rule by confederacy (2008:286).

Urcid and Killion (2008) use a nearest neighbor analysis to "predict" the locations of five known primary centers (and a sixth predicted one) in the extended region of southern Veracruz. Primary centers tend to be located in gateway (Hirth 1978) locations that connect major geographic regions. Their rise to prominence may have therefore been related to economic, as well as ritual, control. Matacapan and Teotepec together connect the Tuxtlas and their southern foothills to the narrow, rugged corridor leading to the coast. The location of Totocapan, which is easily as large as Matacapan, would not have nicely fit into their predictive model, but it did sit at the gateway to a natural transportation corridor leading west from the Tuxtlas to other major Classic period settlements.

Borstein (2001, 2005) identified a similar architectural pattern during his survey. Over this survey area, six district capitals were identified spaced at roughly regular intervals (13.5 km) (Borstein 2005:14). Within each district capital were VAQAs, which are nearly identical to the Long Plaza Group configurations described above. They exhibit the same rectangular plaza bordered on the long axis by elongated mounds and enclosed on one end by the main pyramidal/conical mound and the other end by a low platform of other structure. Like the Long Plaza Group, this is the core architectural cell of the VAQA. These cells are connected end to end to form double and triple structures in some cases. Each district capital also contained a ball court, which were positioned alongside one of the long mounds. Finally, five of the six district capitals within Borstein's survey area contain at least one monumental platform.

Borstein surmises that the sharing of architectural canons across his survey area suggests political cohesion, but subtle variations indicate a degree of autonomy (2005:17). The regional settlement mostly supports a segmentary political model, but elements of a unitary, or centralized, political system is apparent. Laguna de los Cerros was larger and more architecturally complex than other district capitals. Borstein draws upon de Montmollin's (1989) model to suggest that Laguna de los Cerros may have been a "microcosm" of its hinterland.

TRES ZAPOTES PLAZA GROUP

Architectural plans in eastern lower Papaloapan Basin are best known from Tres Zapotes and El Mesón. This is one of the only segments of the central or southern Gulf Coast region that does not display Standard Plan or Long Plaza Group architectural configurations. Architectural groupings at these centers are rather different, which may be partially explained by their earlier florescence. Both Tres Zapotes and El Mesón reached their maximum size and power in the Late Formative or Protoclassic periods (Loughlin n.d., Pool 2007). In the western lower Papaloapan and lower Cotaxtla Basins, architectural plans were somewhat less standardized during the Formative periods. The same may be true for the eastern lower Papaloapan Basin, but patterns do appear. In particular, Tres Zapotes pioneered a plaza group which Pool refers to as the Tres Zapotes Plaza Group (TZPG) (2008). The TZPG is oriented on an east-west axis with the main pyramidal/conical mound positioned on the west of the plaza. An elongated mound encloses the plaza on the north end, but the southern end was either left open or smaller, dome-shaped mounds were situated there. The eastern end of the plaza was enclosed by one or two conical/pyramidal mounds, which may have originally been temple platforms, situated in line with the long axis. A low altar is situated along the center line of the plazas of Group 1, Group 2, and Plaza A of Group 3. Additionally, carved monuments were identified within two of the three main plaza groups. While there is variation among the three TZPGs, certain guidelines were obviously in place for constructing monumental architecture. One instance of the TZPG is found at El Mesón, which

Loughlin (2005) interprets as influence from Tres Zapotes. Pool (2008:149, Table 3) demonstrates a decreasing frequency for the TZPG with distance to the west, but no proven examples have been noted to the east of Tres Zapotes.

Pool was able to demonstrate based on excavations near or within the plazas of each of the TZPGs that construction began during the Late Formative, in most cases. Early construction followed the core TZPG plan described above, but during the Protoclassic several additions were made that add variation. Pool interprets this process as the imposition of a corporate political ideology during the Late Formative to ease factional tensions that previously arose. During the Protoclassic, however, factions began to differentiate themselves again by modifying the core TZPG.

CATEMACO VALLEY

Because Matacapan and other centers in the Catemaco Valley are so critical for the current comparison, a more detailed discussion of its architecture is undertaken here. In general, architectural expressions of political authority in the Catemaco Valley are less standardized than the lowland groups discussed above. Architectural variation among regional centers may indicate small spheres of autonomous political control, but a more holistic view of Catemaco Valley settlement suggests a higher degree of political centralization than seen in the surrounding lowlands (Santley 1994, Santley and Arnold 1996). Matacapan presented an architectural program that lacks strong affinities with other Gulf Coast centers (Figures 8.6 and 8.7). I present the architectural data here and return to the issues of political centralization below.

Matacapan

Matacapan boasted a total of 107 earthen mounds. The majority of these were situated around a large plaza that was kept relatively clear of debris, judging from the low artifact densities recorded there (Figure 8.6). Among the functions proposed for the Main Plaza are marketplace, ritual procession, and other civic-ceremonial activities. The Main Plaza was large enough to accommodate a large segment of population of Matacapan and

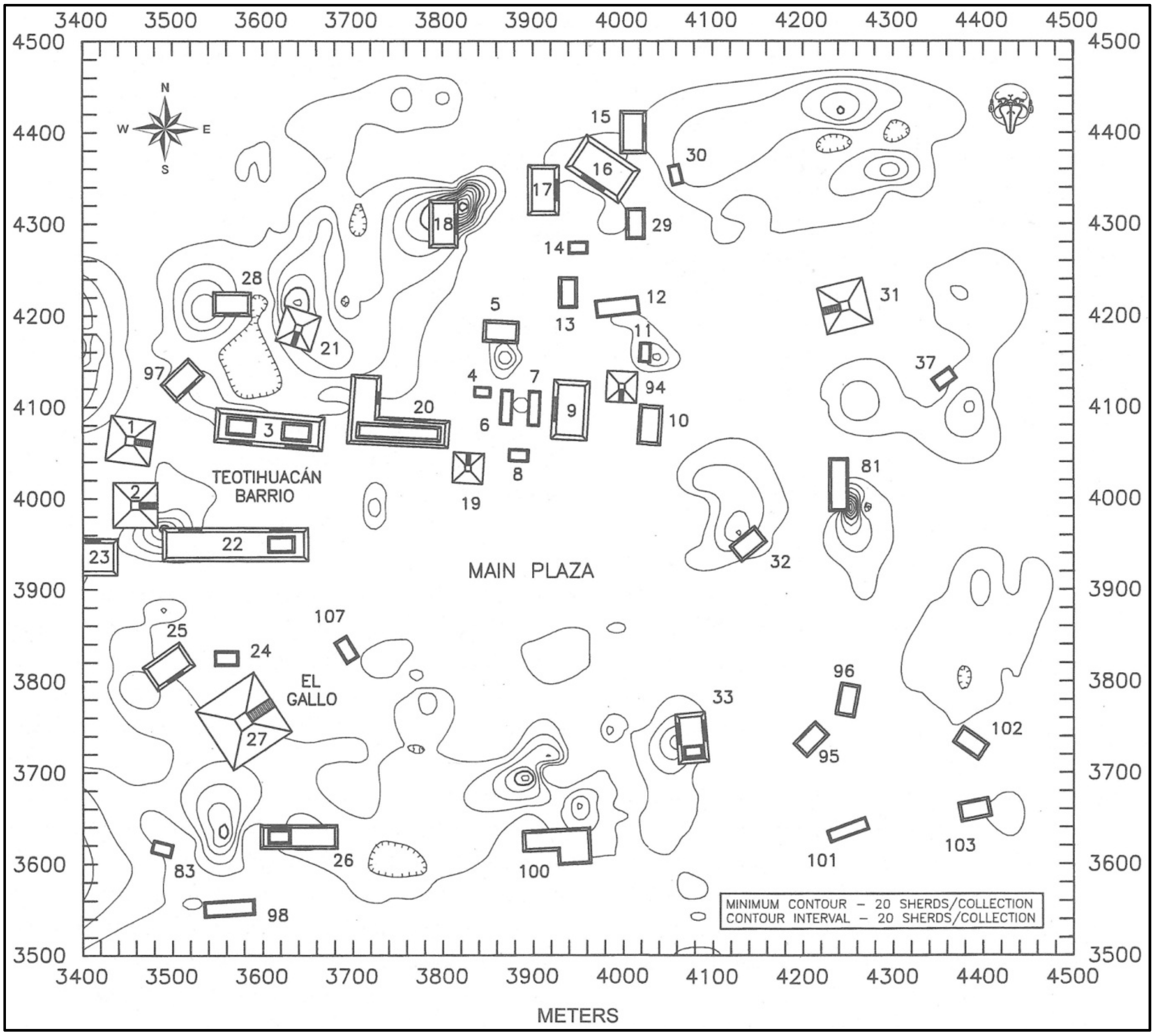

Figure 8.6. Architectural reconstruction of central Matacapan (from Santley 2007: Figure 3.18).

surrounding communities. Matacapan's political regime must have lived in the northwest corner of the Main Plaza. Mounds 1, 2, 3, and 22 formed a plaza opening into the Main Plaza. These were among the earliest constructions at the site. This plaza group has been called the "Teotihuacan Barrio" due to the high percentages of Teotihuacan-like materials found behind the plaza mounds and the identification of *talud tablero* architecture on Mound 2 (Valenzuela 1945a). Since Mounds 1 and 2 were paired temple mounds, it is assumed that Mound 1 also was constructed in the *talud tablero* style. The name "Teotihuacan Barrio" is now known to be a misnomer because Teotihuacan-style materials are found over most of the site. One of the long mounds in this group likely served as an administration building. Mound 20, in particular, is a long mound with a

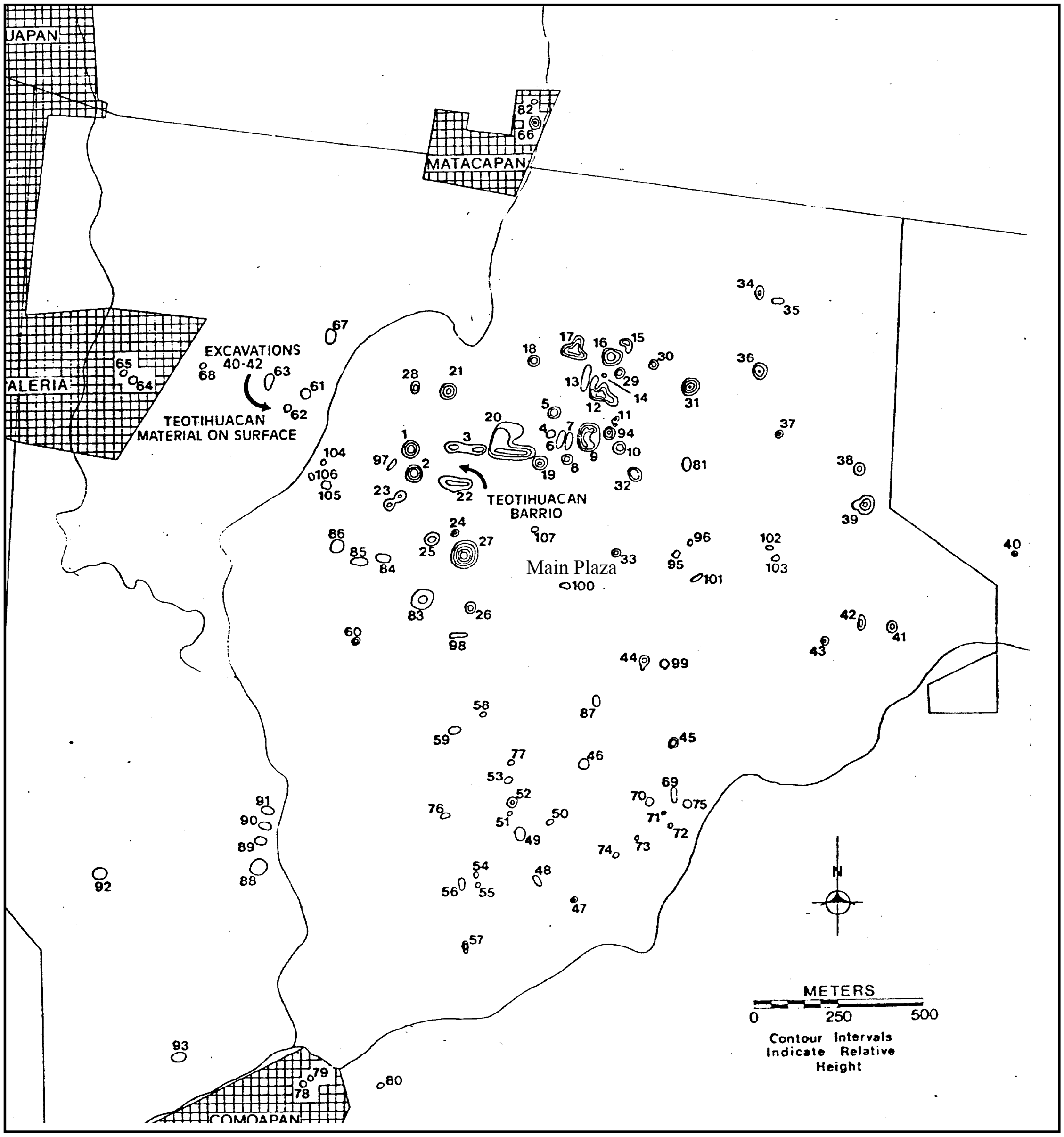

Figure 8.7. Matacapan showing mound distribution and relative size (Santley et al 1984).

low broad platform extending to the north situated between the "Teotihuacan Barrio" and a small ball court to the east. Several monumental platforms also are present. Mound 9 is one such platform that adjoins the ball court. This mound may have housed ritual specialists and raises the possibility of the separation of secular administrative and ritual activities, like Daneels has proposed for La Joya in the Cotaxtla Basin (2008b). The ritual focus of the Main Plaza is El Gallo, a large conical temple mound at the western edge of the plaza.

The ball court is interesting in its own right. First, it is very small. Most of Mound 6 is less than 1 m tall, though its height may have been reduced due to agricultural plowing and erosion. Secondly, the ball court is located along the northern margin of the Main Plaza, removed from the most important ritual architecture at the site, El Gallo. While the ball game may have been an important politico-ritual activity at Matacapan, the diminished size of the ball court architecture and its displacement from the largest temple mound at the site do not portray an image of primary importance. Matacapan is one of the only known primary Classic period centers that does not possess an example of Standard Plan or Long Plaza Group architecture. The "Teotihuacan Barrio" does possess two parallel long mounds, but the similarities end there. Matacapan therefore demonstrates architectural anomalies compared to almost all other primary centers in central and southern Veracruz, Totocapan included.

Another anomaly is the apparent focus of architectural construction. If one feature at Matacapan dictated the placement of buildings at this regional center it was the Main Plaza itself. Among all the different types of buildings and formal configurations constructed at Matacapan the central rule appears to have been to maintain open space at the heart of the site. The "Teotihuacan Barrio" plaza and another plaza formed by Mounds 9, 10, and 94 open into the Main Plaza. Likewise, the site's largest temple mound encloses the southwest corner of the Main Plaza. This communal space could be the key to identifying the political strategies of Matacapan's regime. At first glance, it appears that political elites may have employed a group-oriented, or collective, political strategy. While there were certainly wealth differences dividing the population, all architectural and spatial data emphasize the principle of inclusivity over exclusivity with regard to major ritual and civic functions. Ritual processions may have begun in the "Teotihuacan Barrio" and opened into the Main Plaza to be witnessed by all, or *vice versa*. In either case, state sponsored rituals likely had both public and private components. No portraits of individual leaders have been found at the site, but it is difficult to build inferences on negative data. Here it is interesting to note a recent donation of a ceramic statue to the San Andres Tuxtla Museum. This statue clearly bears Teotihuacan-style garb and imagery. It is a warrior wearing a "net jaguar" shield executed in style very similar to that seen at Teotihuacan. Additionally, elites that potentially occupied the monumental platforms north of the Main Plaza were closely integrated into the main civic-ceremonial center. This suggests that elites were interconnected to a central authority rather than isolated into different districts of the site. Grouping of the city's most influential elites in a central location is a political strategy that is replicated throughout the Catemaco Valley writ large as the most powerful secondary centers are positioned closely to Matacapan (see Chapter 7).

I argue that the Matacapan regime employed a collective political strategy designed to underemphasize difference among different authorities and with its subjects. The enormous Main Plaza was a wide-open space maintained to incorporate large groups of people. It was certainly not a spatial domain used exclusively by political elites. The two largest plaza groups ("Teotihuacan Barrio" and Mounds 9, 94, and 10) open directly into the Main Plaza so that its inhabitants could look out over the daily activities that took place there; the common Matacapeño could likewise see in. The concentration of elite architecture in "downtown" Matacapan points to a cooperative alliance among elites. The large size of Mound 20 could have acted as a palace where the ruling elites of Matacapan resided. This potential palace delineates the edge of the public space in the northwest corner of the Main Plaza, as opposed to removing the regime leaders from common activities of Matacapan residents. No efforts were made to spatially isolate one faction from another, such as at Tres Zapotes (Pool 2008) or Totocapan (see below). Furthermore, it appears that each plaza group may have been functionally differentiated. With each group of elites dedicated to a different aspect of Matacapan society, they would have avoided direct competition. The possibility that the Matacapan regime employed a collective political strategy may be tied to its association with Teotihuacan. I do not suggest that such a political strategy was imposed upon them, but the idea of corporate governance may have come over from central Mexico with the immigrants who colonized the area. Pool argues, however, that collective governance may have already surfaced at Tres Zapotes during the Late Formative (2008), so this political strategy was not new to the region.

Governance and society at Matacapan appears to have been a blend of local Gulf Coast traditions and foreign inspired ideologies. Regional Tuxtlas influences at Matacapan include material cultural styles used in political, ritual, and mundane contexts;

the construction techniques for at least some of the individual mounds, but not the overarching arrangement of mounds and use of space; the construction of a ball court; and use of the *hacha* and yoke ball game paraphernalia (excepting *palmas* which have not yet been recovered at Matacapan). However, disruptions to the broader Gulf Coast traditions include the overarching configuration of space at Matacapan, the use of Teotihuacan-inspired architecture, intrusive Teotihuacan-related material culture and behaviors, and their economic organization (discussed in Chapter 9 Finally, Matacapan displays no Standard Plan, Long Plaza Group, or VAQA architectural configurations that are ubiquitous to all other major centers in central and southern Veracruz.

The timing, context, and spread of Teotihuacan-style materials at Matacapan and the upper Catemaco River valley supports an interpretation that the regime at Matacapan was actively promoting Teotihuacan ideas and rituals to the populace. Pool (1992a) argues that the recovery of household ritual items formed in the Teotihuacan style (*candeleros* and figurines) within common households provides evidence that the Matacapan regime wanted its subjects to adopt these ideals. Part of this argument stems from the spread of these materials from the "Teotihuacan Barrio" in the Early Classic to the general populace of the upper Catemaco Valley in the Middle Classic. The promotion of this collective belief system would have been important for Matacapan elites to legitimize their central-Mexican-based political authority. As mentioned in Chapter 3, Teotihuacan leaders employed a similar tactic by encouraging domestic rituals to reflect state-run public rituals.

The sum of all data indicates that the upper Catemaco Valley experienced a Teotihuacan-related sociopolitical and ritual disruption during the Early Classic. Political authority was, in part, based on Teotihuacan ideals, but a certain amount of syncretism was employed with traditional Gulf Coast/Tuxtlas culture. The small ball court may have been part of the strategy of Matacapeños to indigenize themselves within the region's main architectural canons, though research at La Ventilla at Teotihuacan yielded a ball court marker (Uriarte 2006) and Teotihuacan could have employed an open-style ball game without the use of parallel mounds (Gómez et al. 2004). It should also be noted that ballgame paraphernalia has been recovered from Tres Zapotes (Weiant 1943: Plates 66-69) in the absence of known ball court architecture. The variable inputs into the

Tuxtlas cultural landscape resulted in disjunctures among the political, economic, symbolic, and ritual landscapes throughout the region, which will be discussed throughout the remainder of this chapter and in Chapter 10.

Teotepec

Teotepec conforms more closely to Gulf Coast architectural traditions discussed in previous sections, but there are variations (Figures 8.8 and 8.9). The central architectural focus of Teotepec holds elements in common with both the Standard Plan common west of the Tuxtlas and the Long Plaza Group found to the south and east. Like the Standard Plan, a pyramidal/conical mound (Mound 1) encloses one end of the main plaza on the long axis while the other end opens into an "I" shaped ball court (Mound 5 or Juego de Pelota 1) (Figure 8.3. [duplicated from Arnold 2007]; also see Mounds 38-41 in Figure 8.x [duplicated from Santley 2007:Figure 3.23]). Long Mounds 4 and 5 flank the plaza on its short axis. The main plaza itself is more like the VAQAs seen along the middle San Juan drainage due to its elongated, rectilinear shape. Standard Plans usually have a more square appearance. Common, but not ubiquitous, among Standard Plans is a second but smaller pyramidal/conical mound enclosing the end of the ball court opposite the main plaza. Also present are secondary plazas and a monumental platform extending south of the central Standard Plan complex at Teotepec. The monumental platform was likely a palatial estate.

The blending of elements of both Long Plaza Group and Standard Plan architectural styles at Teotepec is interesting. Until I conducted the Tepango Valley Archaeological survey, it was the only site with either of these redundant architectural plans identified in the Tuxtlas. Within the broader distribution of Standard Plan and Long Plaza Group configurations, Teotepec seems to be a cultural watershed. To the west, Long Plaza Groups/VAQAs, such as those identified by Urcid and Killion (2008), Borstein (2001), Symonds (2002), and Dominguez (2001), have not been documented. To the south and east, nothing that closely replicates the Standard Plan has been identified. Emphasizing the differences between these two architectural plans may be

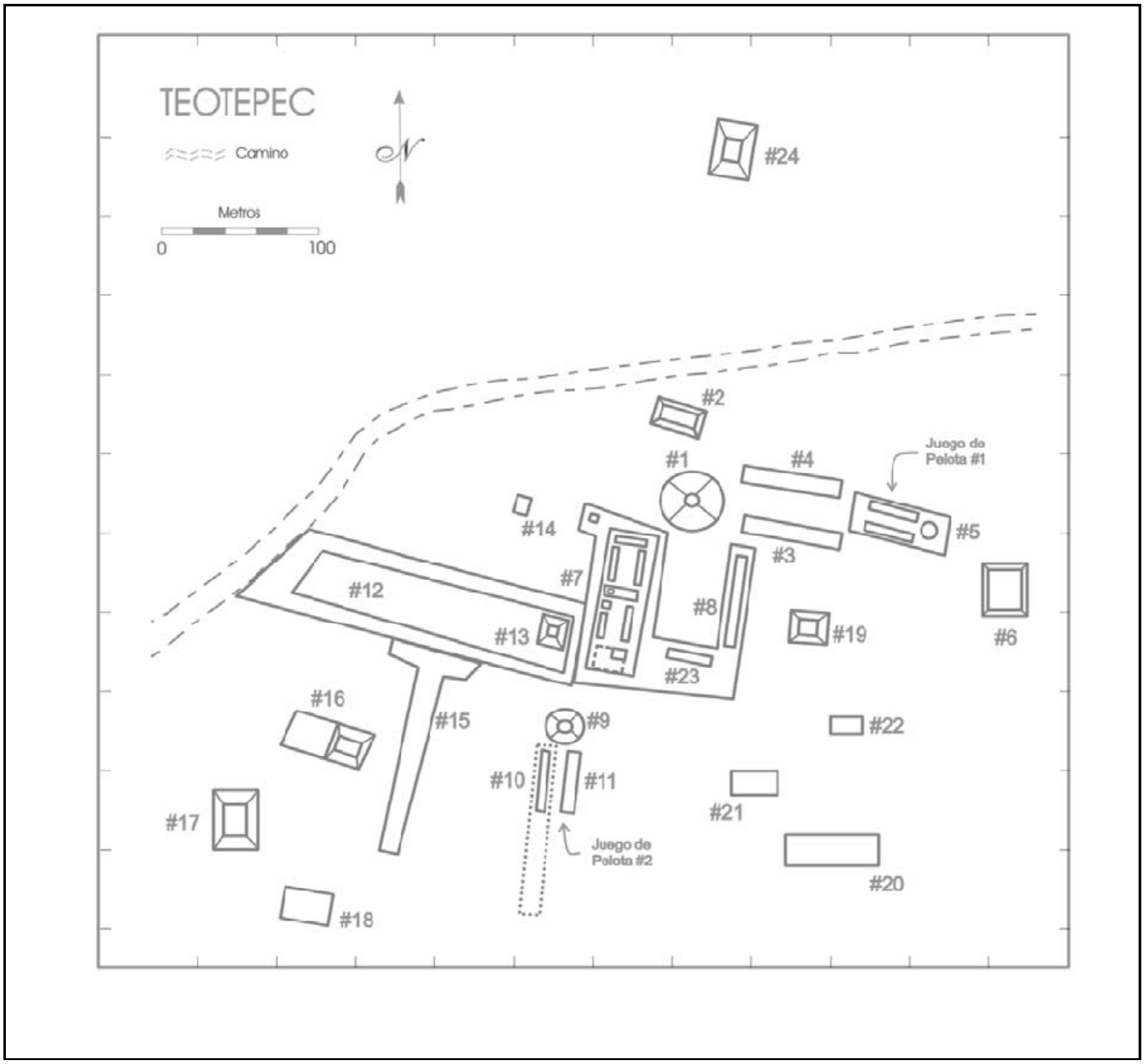

Figure 8.8. Plan map of the architectural core of Teotepec (after Arnold 2007).

splitting hairs, but there are significant and consistent differences that correspond to the different geographic areas. Standard Plans most frequently place the ball court in line with the long axis of the group rather than on the side of one long mound as with the Long Plaza Groups. In this regard, Teotepec follows the Standard Plan more closely. On the other hand, the elongated and narrow rectangular shape of the plaza at Teotepec is more similar to the Long Plaza Group. So it appears that Teotepec blends elements of the predominant Classic architectural programs to the south, east, and west of the Tuxtla Mountains (excepting the Tres Zapotes Plaza Group).

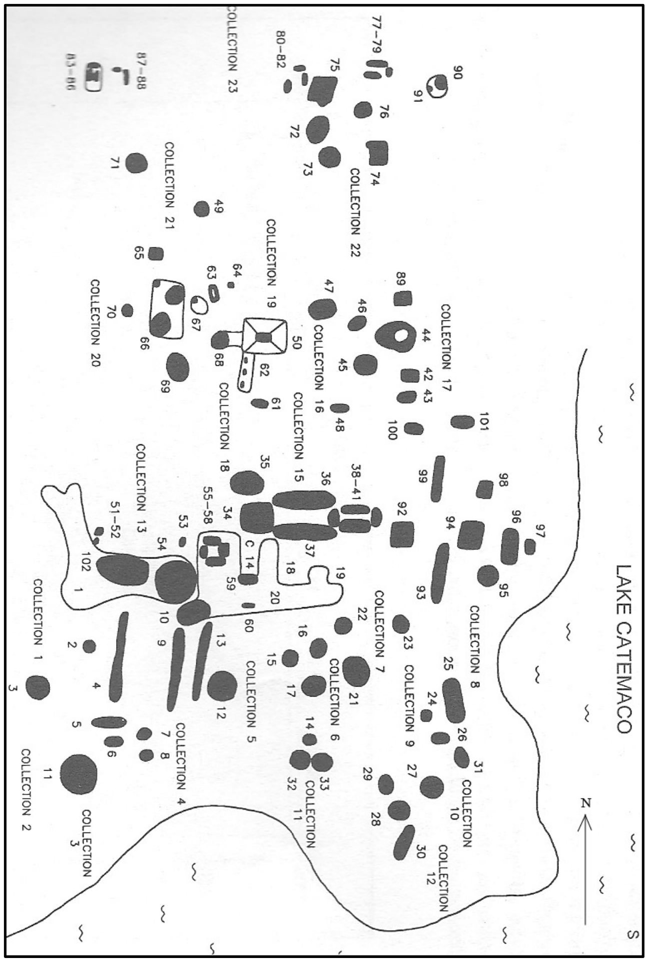

Figure 8.9. Urban core of Teotepec (Modified after Santley 2007: Figure 3.23)

Teotepec has four possible ball courts (Santley 2007: Figure 3.23). Electrical conductivity was employed over much of the central architectural district by Victor Thompson (Thompson et al. 2009). This geophysical technique revealed a prepared surface on the Ball Court #1 in the shape of an "I". I-shaped ball courts are common throughout Classic Mesoamerica and best known from sites such as Monte Albán, El Tajín, and Cantona. Geophysical techniques were not employed over the other three potential ball courts, but it is reasonable to assume similar findings for them. A ball court was also constructed atop Isla Tenagre. This island is situated a short paddle from Teotepec on Lake Catemaco, so the two sites are undoubtedly connected in some way. The ball court on Tenagre is enclosed on the southern end by a pyramidal/conical mound in a manner that was common to all four ball courts at Teotepec, Mata Canela (Valenzuela 1945b), and Totocapan.

Other Architectural Configurations in the Catemaco Valley

Outside Matacapan and Teotepec, very few maps of formal architectural complexes exist in the Catemaco Valley. Santa Rosa Abata contains the third highest mound count (n=15), but many of those appear to be a cluster of residential house-mounds. One plaza group is formed by Mounds 3, 4, and 5 (Santley 1991: Figure 18). Judging from the sketch map, the plaza is oriented northwest-southeast. The long axis of the plaza is enclosed by circular mounds and an elongated mound encloses the northeast edge. The southwest edge of the plaza was left open.

Chuniapan de Abajo and Chuniapan de Arriba both have formal mound groups oriented around plazas. At Chuniapan de Abajo, a ball court is situated about 100 m west of a key-hole shaped structure. The intervening plaza is enclosed to the south by an elongated mound, but the north edge remained open. This site achieved its apogee during the Late Formative, though. Mound construction at Chuniapan de Abajo could therefore date prior to the Classic period. At Chuniapan de Arriba, two adjacent plaza groups are delineated by Mounds 1, 2, and 3 and Mounds 10, 11, 12, and 13. Neither of these plaza groups conforms to standardized architectural plans seen at other sites in the region or elsewhere on the Gulf Coast. Chuniapan de Arriba reached its apogee during the Protoclassic, when it was the only center in the Catemaco Valley. It never regained its status as a regional center afterwards.

The keyhole shaped structure identified at Chuniapan de Abajo was fairly common in the region during the Classic. It consists of a dome- or conical-shaped mound, which likely supported a superstructure, with a low platform extending out in one direction. These structures were also identified at Apomponapam and within the Tepango Valley at Cruz de Vidaña and Tilzapote. The significance of this architectural replication is not known, but it does represent communication of architectural information among sites in the region. At Apomponapam, keyhole-shaped structures are not combined with other mounds to form plaza groups. It is interesting to note that this structure type occurs primarily within the southernmost areas within both the TVAS and the Catemaco Valley transect of the TRS.

A plaza group (the Valenzuela Complex) was identified on Isla Agaltepec (Arnold and Venter 2004: Figure 3). The plaza itself was recessed slightly and surrounded on the north, west, and south sides by elongated mounds. A pyramidal mound was situated in the northeast corner of the plaza. A low platform extended west from the pyramid. This plaza group may have been a Postclassic construction.

Mound construction at the remaining Catemaco Valley sites is sparse. Where mounds do exist, they tend to be informal constructions that do not conform to a discernable plan. However, Valenzuela (1945b) describes a ball court at Mata Canela, south of Lake Catemaco that is similar to the architecture seen at Teotepec.

Summary

I return now to the issue of degree of political centralization and unification of the Classic period in the Catemaco Valley. Clearly, settlement along this river valley breaks with conventions seen elsewhere on the Gulf Coast. In every regional setting throughout Classic central and southern Veracruz, Classic centers share a common architectural theme with their neighbors, with some variation. Borstein (2005) argues for the lands between the Middle San Juan and the Lower Coatzacoalcos drainages that this indicates regional coherence but subtle architectural variations point to a degree of political autonomy. He also sees support for a politically centralized system in that Laguna de los Cerros is much larger and complex than other district capitals. The size and monumentality of Laguna de los Cerros compares to its surrounding region much like Matacapan compares to its respective hinterland. Both likely held political authority over smaller district capitals. So what significance can be attributed to the lack of architectural cohesion in the Catemaco Valley versus the highly coherent architectural program surrounding Laguna de los Cerros? I suggest that the foreign disruption from Teotihuacan caused a disjuncture within the political landscape in the Catemaco Valley that affected how Matacapan related to its hinterland. While the Matacapan regime participated in the Gulf Coast ball game tradition, it was not the central focus of its political administration. Instead, it used their association with Teotihuacan to legitimate political authority. The types of ritual enacted at Matacapan had a central Mexican flavor which the Matacapan regime controlled (Pool 1992a).

The disruption seen at Matacapan was partially offset by Teotepec, which displays a more traditional Gulf Coast architectural pattern and placed great importance on the ball game. It is hard to imagine a scenario where Matacapan did not, at least for a short time span, politically control Teotepec. The Matacapan regime may have employed a dual legitimizing theme that drew upon both central Mexican ideals and tied into local ideologies through Teotepec. Together, Matacapan and Teotepec could have unified the Catemaco Valley into a very centralized polity.

Statistically, Matacapan and Teotepec are much larger and more architecturally invested than any other center in the Valley. Mound construction at both centers exceeded any other center in the Valley by a multiple of 6.7. In fact, relatively few sites in the Catemaco Valley displayed mound construction that served administrative or ceremonial functions, though there may be more mound centers that have not been mapped. Matacapan is many times larger than any other site, but the size of Teotepec recorded through survey may be reduced by poor ground surface visibility (see Chapter 7). These data all point to a very centralized political landscape. There is no reason to doubt that Matacapan held political power over a large segment of the Catemaco Valley settlement, and perhaps beyond. Prestige and household ritual items inspired by Teotihuacan were found at settlements surrounding Matacapan, but this primate center was the only known node in the regional network that displayed Teotihuacan-related architectural-styles and mortuary practices. The size and openness of the Main Plaza at Matacapan suggests that they flaunted this connection to as large a population as possible.

TEPANGO VALLEY ARCHITECTURAL COMPARISON

Maps for centers in the Tepango Valley were presented in the previous chapter, but simplified plans are presented here for ease of comparison (Figure 8.10). In general, settlement in the Tepango Valley shares more in common with the surrounding Gulf Coast and with Teotepec than anything identified at Matacapan.

The Totocapan Core

Plaza Group 1 on the Principal Terrace within Totocapan's architectural core is configured like a Standard Plan. Mound 32, which encloses the eastern end of the plaza, is the tallest pyramidal/conical mound. The principal ball court (Mound 35) is situated on the western end of the plaza. One long mound (Mound 34) encloses the north edge of the plaza, but the southern edge opens into a secondary plaza composed of Mounds 1, 6, and 85. With one edge of the plaza left open, this configuration is more like the later versions of the Standard Plan seen in La Mixtequilla (Stark 2008). Mound 31 is situated in the center of the two plaza groups. It may have been a rather large altar (standing at about 3 m tall) near the center of the two plazas, forming one large ceremonial space. The west end of the ball court is capped by a 5 m tall platform mound (Mound 38), as is common for ball courts throughout central and southern Veracruz. Given the similarity of form between Mound 35 at Totocapan and the principal ball court at Teotepec, I have little doubt that the former functioned as a ball court. If the results of geophysical work conducted at Teotepec can be generalized to Totocapan, it is likely that this was an I-shaped ball court. As a whole, the westward orientation of Plaza Group 1 is abnormal for Standard Plans. The trend is for the principal pyramidal/conical mound to be positioned on the north or west end of the plaza. As with other Standard Plans identified by Stark (2008) and Daneels (2002a, 2008a) several reservoirs, which were probably reflecting pools, are positioned to the east and south. Furthermore, the Acropolis serves as the monumental platform that is typically associated with both the Standard Plan and Long Plaza Group configurations. Like the monumental platforms, the Acropolis likely acted as a palace complex. As a whole, Plaza Group 1 on the Principal Terrace is a replication of the Standard Plan with some variations.

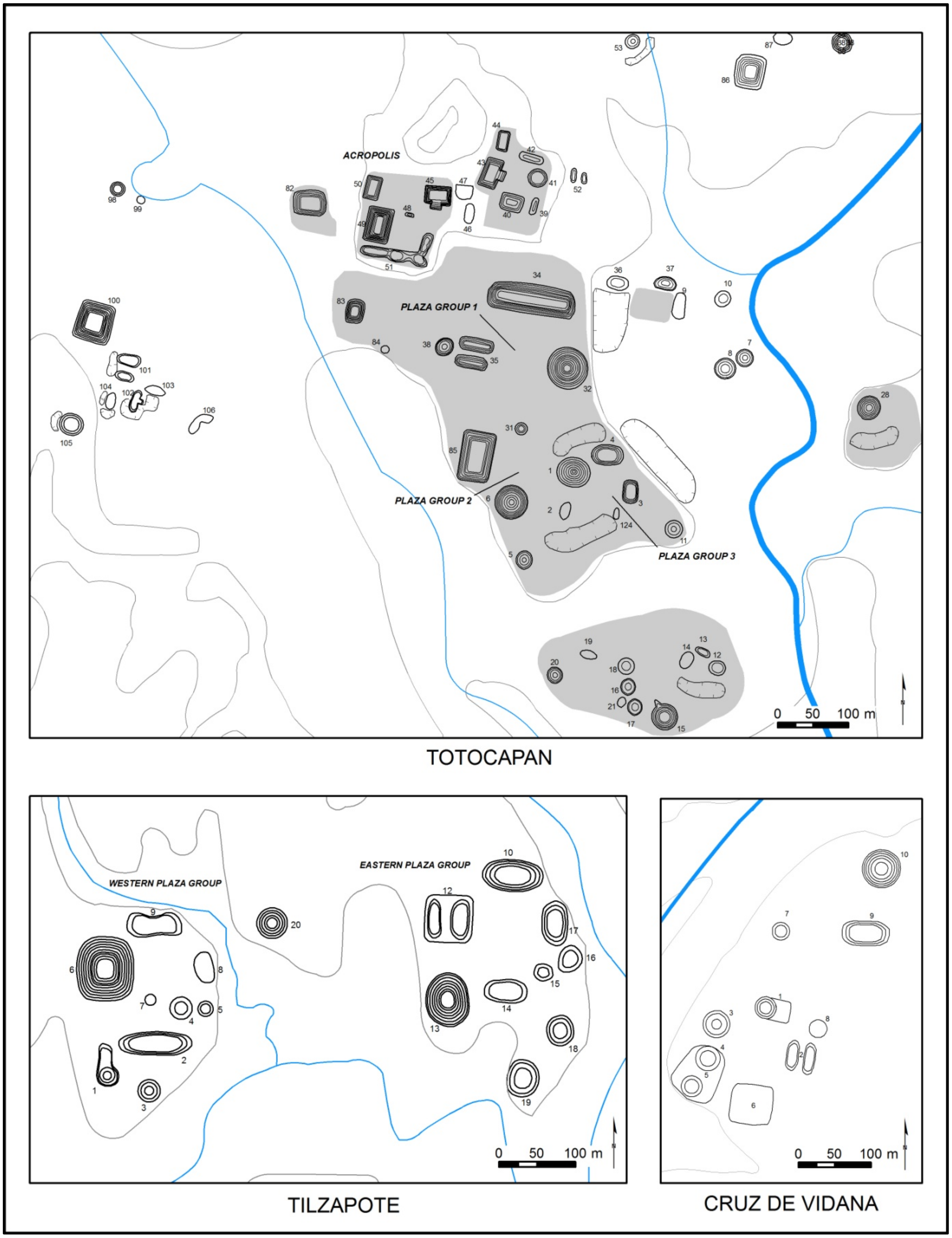

Figure 8.10. Sample of architectural plans identified in the TVAS area.

The significance of leaving one lateral edge of the plaza group open may be to open up space to public view. Compared to Matacapan, the use of space in the civic-ceremonial district at Totocapan is relatively closed and restricting. However, it is more open than other Standard Plans that display parallel lateral long mounds. The other potential function of leaving the south side of the plaza group open is to provide a line of site between Plaza Group 1 and Plaza Group 2. The Acropolis (discussed below) was, without a doubt, where the ruling regime of Totocapan resided, but Mound 85 is a massive platform that also likely housed important elites.

The Acropolis is the highest point in the immediate area. From the top of this hill, which stands about 35 m above the main civic-ceremonial plaza, the whole site and much of the northern valley can be seen. About midway down the southern exposure of the Acropolis, but still elevated above the Principal Terrace by about 10-12 m, the entire hillside has been reformed and leveled. Mounds constructed atop this immense platform enclose two distinct plaza groups. These plazas are delimited by the highest quality structures documented at the site. Mound 45 in the northeast corner of the Southwest Plaza, was constructed of both soil and rock. The surface may have been paved with basalt rock and plaster, though no plaster was detected. This structure was formed in the shape of a low truncated pyramidal platform with an access ramp extending to the south. Basalt wall foundations are visible on top of this mound.

Mound 43 of the southeast plaza is the twin of Mound 45. It was constructed in the same manner with the same materials, but the access ramp extends to the east. Mounds 49 and 50 of the Southwest Acropolis Plaza are also constructed of both soil and basalt rock, with stone wall foundations visible on the superior surface. These two mounds along with Mound 51 serve to restrict access to the Southwest Plaza. The organization of mounds around the Southeast Acropolis Plaza acts in much the same way, though the scale is somewhat smaller. Considering that both plazas are elevated about 10-12 m above the surrounding ground surface, one arrives at the conclusion that the Acropolis was constructed to restrict public access. The single intended entrance to this palace complex consists of an earthen ramp that emerges onto a low flat platform located directly between Mounds 43 and 45. The base of the Acropolis also was sculpted to conform to the orientation of Plaza Group 1 of the Principal Terrace, which was at an azimuth of about 98 degrees. The southern base of the Acropolis was sculpted to match the orientation of the long mound (Mound 34), forming a broad corridor. The function of this corridor cannot be determined without excavation or geophysical investigation, but it may have been part of ritual processional or a staging area for the public displays that took place within the plaza or the ball court (Mound 35).

As seen from the principal conical/pyramidal mound (Mound 32) of Plaza Group 1, the two Acropolis plaza groups, and Mound 45 and Mound 43 in particular, establish an architectural symmetry among uppermost ranks of the Totocapan polity. While the Southwest Acropolis Plaza tends to be a little larger scale and better constructed, the two plazas together were constructed according to the same general plan and were oriented on axes roughly perpendicular to each other. This suggests that the Totocapan polity may have been ruled by a diarchy (see next section).

In general, the entire Totocapan Core district was sculpted to establish a vertically ranked series of terraces extending southward from the Acropolis. Compared to the probable social restrictions applied to the Acropolis, the mound groups situated on top of the Principal Terrace appeared more accessible to the public. In fact, the activities undertaken within Plaza Group 1 of the Principal Terrace were probably intended to be viewed by a fairly large group of people. Religious ceremonies, the ball game, and other civic activities would have been the main avenue of political legitimation for the Totocapan regime elites.

The labor expended to construct Plaza Group 2 of the Principal Terrace was considerably less than either the Acropolis or Plaza Group 1. Plaza Group 2 shares Mound 1 with Plaza Group 3. As discussed above Plaza Group 2 was left open to the north to join with Plaza Group 1. Plaza Group 3, on the other hand, is opened to the south. The two small mounds located south of Mounds 1 and 3 were probably altars.

To the south of the Principal Terrace, the Secondary Terrace also appears to be a human modified platform that supports a number of mounds, but these mound groups continue the trend of decreasing size and formality seen from north to south within the Totocapan district. Most of the mounds on the Secondary Terrace were residential house mounds, but Mound 15 is a conical temple mound with a ramp extending to the northwest.

Throughout much of the core Totocapan District, borrow pits, or depressions, were frequently encountered. These were probably the depressions left after construction of the mounds, but as Stark (2003) suggests, they may have also served as reflecting pools. These same depressed areas occur adjacent to Standard Plan groups in the Mixtequilla and the Cotaxtla Basin (Daneels 2002a, Stark 2003).

Dualism within the Totocapan Core

A government of dual rulers is not unusual for the ancient world. Diarchies have been proposed for Postclassic *altepetl*, the Aztec word for town, in the Valley of Mexico. *Altepetl* functioned as a unit of sociopolitical organization. Central Mexican *altepetl* were ruled by a male *tlahtoani* ("he who speaks") and a female *cihuacoatl* ("woman-serpent"), but over time the *tlahtoani* became more powerful and acted as king. These earthly roles mirror the deity of duality, Ometeotl, who has male, Ometecuhtli, and female, Omecíhuatl, counterparts (Leon-Portilla 1963:80-103). A similar duality guides all of Aztec and Maya life and world view, and explains not only the difference between male and female but also heaven and the underworld, day and night, light and dark (Taube 1993). The division of political authority into male and female counter parts therefore reflects the overarching worldview.

Two elements of dualism are evidenced by the architectural layout of the Totocapan Core. The first is seen on the Acropolis. While the Acropolis as a whole is the single most monumental construction in the Tepango Valley, the internal structure of this massive structure is bifuricated. The Southwest and Southeast Plazas display similarities in construction and elements of symmetry, particularly with the form and orientations of Mound 43 and Mound 45. These two mounds were obviously constructed to be twins, and each forms the corner of a discreet plaza group. If monumentality and quality of construction can be used to rank the plazas, the Southwest Plaza was more important, though the overarching design seems to present two equal parts. If the dualism seen at Totocapan was based on a moiety system, political authority was likely based largely on complementary kin groups. Alternatively, Mounds 43 and 45 could have housed male and female counterparts of the polity, which would result in a style of rulership more similar to Postclassic cities in the Valley of Mexico.

The second element of dualism is seen with the monumental platform in Plaza Group 2. As mentioned before, the opening of the southern edge of Plaza Group 1 appears to have been intended to link the Plaza Group 1 to Plaza Group 2. Daneels's (2008b) excavations at La Joya in the Cotaxtla Basin again serve as an interpretive tool. While the Acropolis held Totocapan's regime heads, elite residing on Mound 85 had more direct access to Plaza Group 1 and the ball court. The Acropolis and Mound 85 are too closely situated and architecturally linked to suggest that these represent competing factions. The more powerful regime leaders occupying the Acropolis would not tolerate a direct political competitor to reside so close to the site's main ritual architecture. An alternative proposal is that the occupants of Mound 85 could have been ritual authorities under the control of the secular leadership residing on the acropolis. Functional differentiation of these two authoritative roles would have permitted both to exist in closely situated spaces without competing directly.

More work needs to be done to address questions of duality before any empirically based hypotheses are drawn about these examples of dualism, but it seems that Totocapan was not ruled by a single individual with supreme power. This assumes that there was not a structure on the summit of the Acropolis, as it does appear unnaturally level at the top (see Figure 7.22).

Political Districts: Competing Factions or Loyal Public Servants?

Unlike at Matacapan, the Totocapan Core does not concentrate all expressions of elite architecture within a contiguous block at the center of the site. Based on the distribution of mounds, monumental platforms, plaza groups, ball courts, and temple mounds, I divided Totocapan into five segments (Figure 8.11). Each of these districts likely possessed its own district level elites. This is inferred by the presence of a plaza group and a massive platform in each district. It must be observed that these platforms are not all of the scale of what Daneels refers to as monumental platforms (e.g., Daneels2008b). The massive platforms discussed below are called out to highlight possible elite residences or administrative structures that may function as political foci.

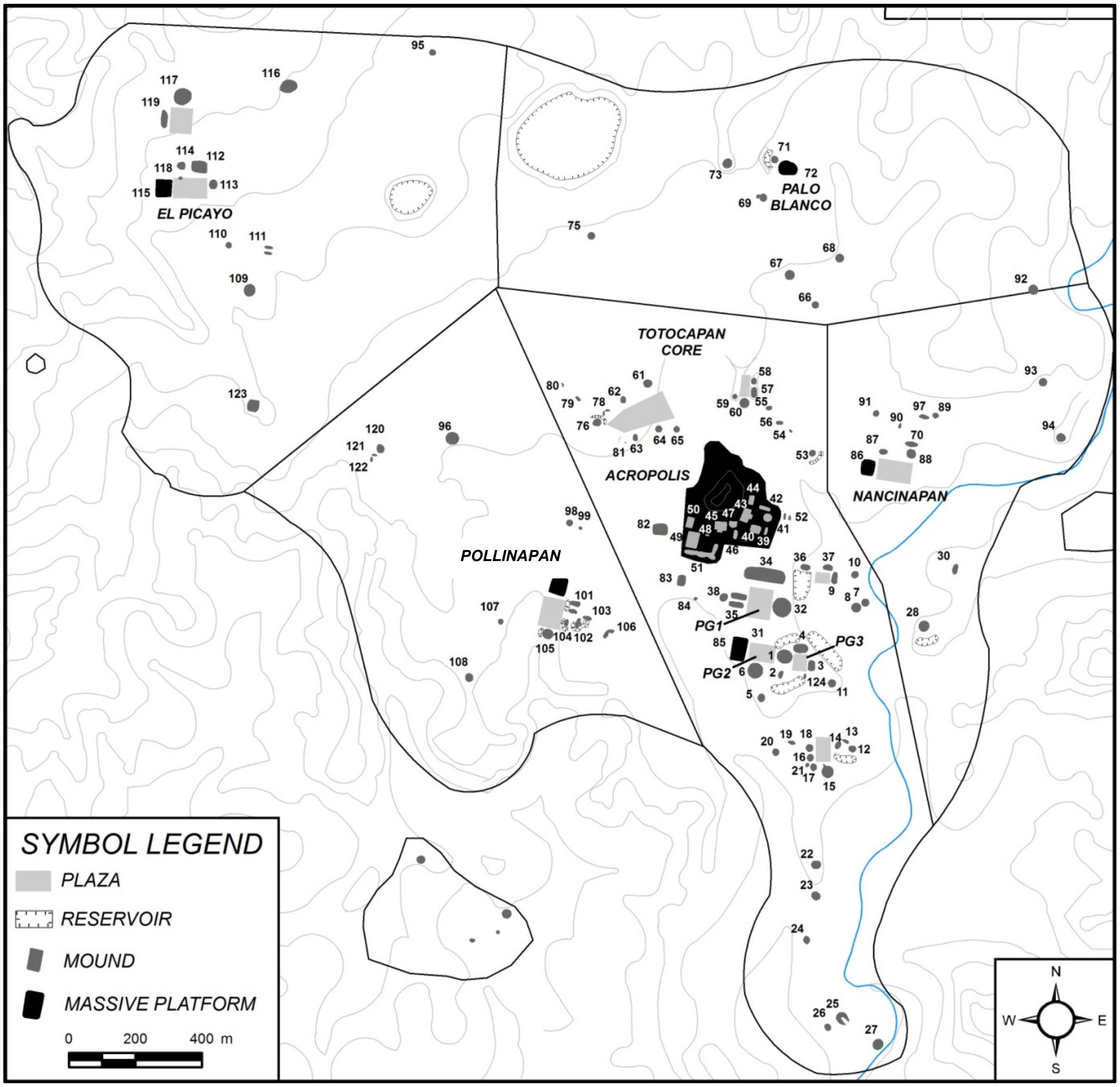

Figure 8.11. Plan view of Totocapan showing districts and district administrators.

The quality and size of the district architecture varies considerably. I describe the architecture of each district according to position within the site, form of individual mounds, their relative scale, whether their boundaries are discreet or interpenetrating, their layout, and the degree to which the layouts are replicated in each district (Pool 2008). I then turn to questions of the interconnectivity among groups and what can be surmised based on the available data regarding the political strategies each district employed.

The Pollinapan District is situated 600 m southwest from the pinnacle of the Acropolis. It appears to be a discreet cluster of mounds, but Highway 180 separates the districts. There is no telling how many mounds were leveled to make way for the road, which is built up at least 10 meters above the original ground surface through most of the site. The plaza is enclosed on the north end by a roughly square shaped massive platform that stood 8 m high (Mound 100). The top is flat and large enough to support several small structures on top. Opposite the platform is a dome-shaped mound that may have originally been a smaller platform. To the right of the plaza, a series of low elongated mounds are oriented at right angles to each other. Two of these mounds appear to form a small ball court (Mounds 101 and 101A). Mound 102 is a low elongated mound with ramp extending east. Among these smaller mounds, several reservoirs were observed. The western edge of the plaza remained open. The remainder of the mounds surrounding this core mound group are assumed to be house mounds. The line running through the center of Mound 100 and 105 is oriented at 193 degrees. I believe this is where Valenzuela (1945b) excavated, which he referred to as Pollinapan.

The El Picayo District is located at the far northwestern corner of the site about 1800 km northwest of the Acropolis. It is a discreet cluster of mounds, but the intervening space between El Picayo and the Totocapan Core is occupied by sparse concentrations and moderate to heavy concentrations of cultural material. Additionally, road construction may have destroyed some mounds along the north-south boundary lines between districts. The massive platform (Mound 115) is 4 m tall and measures about 50 m on each side. The edges are nearly vertical leaving a considerable area on which to construct buildings on the top. The massive platform is positioned to the west of a plaza. To the north are a smaller rectangular platform (Mound 112) and a circular platform. Opposite the massive platform is a circular mound with a modern house built on top. North of this plaza group, which probably served both ritual and administrative functions, is another small plaza delineated by two mounds. Mound 117 is an eroded conical mound that stands about 4 m tall. To the west of the plaza is a long mound (Mound 119). Finally, a small ball court is situated about 200 m southeast of the massive platform. It floats awkwardly in space and is not associated with a plaza or any other mounds that can be seen today. The ball court is oriented at an angle of 97 degrees, but the monumental plaza is oriented to about 92 degrees.

Situated 500 m east of the center of the Acropolis was the seat of authority for the Nancinapan district. Nancinapan is not spatially discreet from the Totocapan Core, there is a relatively continuous scatter of mounds from the Acropolis to the plaza group in Nancinapan. The massive platform stands at a height of 5.9 m and measures 50 m north-south and 41 m east west. To the north, is a cluster of mounds of various sizes and shapes. Many of these are probably simple house mounds. The layout of Mounds 70, 86, 87, and 88 are roughly oriented at right angles to each other. The space immediately east of the massive platform was likely the plaza. It is notable that no ball court was situated here. It does not seem that there was a temple mound either. As a whole, the mound group is oriented at 99 degrees.

Finally, the Palo Blanco monumental plaza is located about 1000 m north of the Acropolis. It is not a very formally arranged mound group. Mound 72 is a rather oddly-shaped 6.6 m tall dome that slopes to the east. Mound 71 is smaller dome-shaped mound. These two mounds sit on a low platform with an embankment, which may have originally been a wall, that travels partially around the perimeter of the platform. This whole complex of mounds is treated as the massive platform and was the seat of authority for the Palo Blanco District. Mound 69 is a keyhole-shaped structure like those seen at Tilzapote and Cruz de Vidaña. Mound 73 is a dome-shaped mound built at the end of a long finger ridge. This was likely a temple mound. Augmenting natural topography like this was a rather common practice within the TVAS. It likely indicated that the district elites could not conjure enough labor to build a sizable temple from the ground up. The human modified mound on top of the ridge was only 2.8 m tall, but from the bottom looking up it appeared much larger.

While other formally arranged mound groups occur within Totocapan as a whole, the examples detailed above are the only ones that display massive platforms and could likely serve as district heads. A major question of how Totocapan functioned as the capital of a polity will likely revolve around how these district level elite related to each other. This can be addressed along several lines of inquiry with the data at hand.

First, intrasite position, distance from the core, and boundedness among groups speaks of the degree to which groups of elites are related. The growth of Totocapan took place from the center out, with the exception of El Picayo. The center-out pattern of growth suggests that lineage groups may have fissioned off as the families of hereditary elite grew. Descent groups that became district heads may have therefore held some blood link to the primogenitors of the city. This process could explain the establishment of massive platforms in the Pollinapan, Nancinapan, and Totocapan Core Districts. These are the most central elite groups, and probably possessed the most power. These three groups are also connected by a continuous scatter of residential, ritual, and administrative mounds. The boundaries among the central groups are gradational. El Picayo and Palo Blanco, on the other hand, are marginally positioned within the site and are separated by a sparse scatter of mounds and moderate material densities. El Picayo in particular developed alongside the Totocapan Core beginning in the Picayo phase. The El Picayo district may represent a distinct faction that was not closely tied into Totocapan's central regime, but drew upon its own long history of growth to legitimate its political authority. Palo Blanco, on the other hand, was not extensively settled until the Santiago B phase. This likely is a product of immense population pressure in the other districts and rapid population growth.

Second, architectural replication is an indicator of a cohesive political system. Did Totocapan display a cohesive architectural plan? Not really, but there are some similarities. The construction of plaza groups in each district followed a set of guidelines: 1) one side of the plaza remains open in all cases; 2) a massive platform is either built into, or situated next to, the plaza groups; 3) orientation of the plaza groups and individual mounds is generally within 5 degrees of the orientation of Plaza Group 1 on the Principal Terrace, or 90 degrees from that angle range depending on overall orientation; and 4) reservoirs occur adjacent to plaza groups in many cases. There are many variations seen among the district plaza groups that suggest some freedom to reinterpret this pattern was possible. One more element that is not always incorporated into the plaza group is ball courts. A ball court was found in the Totocapan Core (possibly a second at the southeastern toe of the acropolis), Pollinapan, and El Picayo districts. This could suggest unity or decentralized ritual competition. It suggests that the regime occupying the Acropolis failed to control all ritual within the city.

Third, distribution of materials among the districts does not suggest a pattern of exclusion for any district. In fact, the city as a whole displayed a relatively coherent set of material culture, considering both utilitarian wares and highly decorated serving wares. The only spatially restricted patterns that occur are related to chronology. The most elaborately decorated ceramic type at Totocapan was found in all five district plaza groups, or nearby. I refer to this material set as the Cipactli Cult further below, and it is important for understanding the spread of Totocapan's politico-ritual ideology through the valley.

In sum, Totocapan was segmented into political districts, each of which displayed its own group of elites. However, the scale of architecture among the districts strongly indicates that the Totocapan Core possessed a disproportionate amount of authority. Furthermore, they dictated certain architectural rules that district heads adhered to in the construction of their monumental plazas. All elites displayed a unified set of symbols. However, the El Picayo District is a possible political deviant from centralized rule. Its physical separation in space may indicate dissent with the Totocapan Core. Why separate oneself to the margin of the political capital? A small community was established at El Picayo during the Formative period which was nearly as old as the Totocapan Core.

Political Strategies of the Totocapan Regime

How did the Totocapan regime relate to its subjects? The ball game was of paramount importance as it is seen built into the central axis of Plaza Group 1. Ritual, and in particular the ball game ritual, must have been a mechanism to preserve sociopolitical and cosmological order. Valenzuela (1945b) recovered a *palma* and an *hacha* in his excavations in an altar in the Pollinapan District, which also possessed a ball court. The *palma* was made of serpentine. Also found in this excavation was a stone carving of a duck head, and what appears to be a crocodile head. Certain design elements on the crocodile appear similar to depictions of crocodiles, or *cipactlis*, on ceramic serving wares that occur throughout the site (see below). Totocapan seems to have developed an ideology revolving around these saurian figures, which they broadcast to other sites in the TVAS. The fact that Valenzuela found several examples of the Cipactli Cult in his Altar 3 excavations at Pollinapan suggest that they were of considerable ritual importance. Furthermore, their association with ball game paraphernalia indicates a combination of ritual themes that the regime of Totocapan likely controlled. Koontz (2008) documents the important connection among ball game, decapitation rituals, scaffold sacrifice, political accession for El Tajín. Scenes played out on panels, columns, and sculptures on the Mound of the Building Columns at El Tajín, in particular, refer to the process of political legitimation through rituals linked to the ball game. These rituals were stylistically associated with settlements in the Río Blanco region of south-central Veracruz. Control over this ritual knowledge is essential to maintaining political power. Below I present an argument that links the Cipactli Cult to the ball game, and, in turn, the legitimation of political authority at Totocapan.

The organization of space at Totocapan provides additional clues as to how subjects were meant to perceive space. The Acropolis was designed to restrict public access, as described above. In fact, from the ground surface below, one cannot even observe events taking place in the two plaza groups on the Acropolis. Mound 51 is a mounded wall that wraps around the south and east of the Southwest Acropolis Plaza. Mounds 49 and 50 function similarly to prohibit both sight and entrance into the plaza from the west. The common Totocapeño was not intended to experience the space of the Acropolis, unless for displays of power. The pinnacle of the Acropolis is visible from almost the entire site. A fire lit on top of this palace could be seen kilometers away.

The plaza groups on the principal terrace, on the other hand, were designed to be experienced on highly formalized occasions. The entire terrace was sculpted into highly ritualized space. While events like the ball game would be attended by a select segment of the population, this was a space that was not experienced on a daily basis by non-elites and that some would never experience in their lifetimes. No market or other casual public services were held within the principal plazas. District plaza groups also were restricted spaces to a lesser degree. However, in comparison to most Standard Plan and Long Plaza Group configurations, the Totocapan Plaza Groups are relatively open architectural layouts. This open form of architectural space resembles both the Tres Zapotes Plaza Group and the later versions of the Standard Plan in the Mixtequilla.

On the continuum between collective and exclusionary political strategies, Totocapan displays a mixed picture. The Acropolis was occupied by the social untouchables. They would probably make rare public appearances on ritual occasions. However, scale is an important issue to consider here (Pool 2008). The political representatives that resided on massive platforms may have been the public face of Totocapan's political regime. Each district representative employed its own exclusionary strategies that involving rituals like the ball game and worship of the Cipactli Cult. But, they were "closer to the people" than the residents of the Acropolis. As a whole, Totocapan appears to have employed a much more exclusionary political strategy than Matacapan.

Replication, Modification, and Interconnectivity among Regimes in the TVAS

Elsewhere the Tuxtlas, Teotepec and Tres Zapotes are the closest architectural affines to Totocapan. In comparison to Teotepec, the position of the ball court in line with the long axis of the main plaza group is very similar. Both ball courts are enclosed on the opposite end by a small platform, a pattern also described by Valenzuela (1945b) for Mata Canela. Opposite the plaza from the ball court was the principal conical/pyramidal mound for both sites. Both main plaza groups have secondary groups bordering them. The orientation of the main plazas is nearly identical. Finally, the main plaza group is bordered by the main massive platform at both sites. Differences include a closed plaza at Teotepec rather than the open plaza of Totocapan. Additionally, Teotepec has an elongated plaza while Totocapan's is rather short. Not enough data is available to evaluate any potential connection between Totocapan and Teotepec, but it is interesting that the largest site in the Catemaco Valley, Matacapan, breaks with the broader Gulf Coast architectural programs seen both to the west at Totocapan and the east at Teotepec.

With respect to Tres Zapotes, architectural commonalities include the long mound positioned to the north of a plaza opened to the south, one end enclosed by the principal conical/pyramidal mound, and the opposite end enclosed by additional mounds (compare Pool 2008). The latter differs considerably between the two sites. At Totocapan, the end opposite the principal pyramidal mound is enclosed by a ball court. At Tres Zapotes, it is enclosed by two small conical or platform mounds. The inclusion of a ball court at Totocapan is a major difference, considering its importance to establishing and maintaining political authority. It is likely that most of the TZPGs were constructed prior to the completion of Plaza Group 1 at Totocapan. It is possible that the general layout of Plaza Group 1 at Totocapan echoes the layout of Mound Group 2 at Tres Zapotes, in particular, but the addition of the ball court may have taken place much later.

At least four of the six Middle Classic centers in the Tepango Valley had ball courts. Severe mound destruction at Oteapan raises the possibility that a fifth is to be included in this tally. During the TVAS we collected a fragment of one carved stone yoke and photographed another from a private collection: both came from Oteapan. At Tilzapote, the Eastern Plaza Group presents a small ball court that extends north from the principal pyramidal/conical mound (see Figure 8.10). The ball court defines the western margin of the plaza, and the main pyramidal/conical mound is in the southwest corner of the plaza. This configuration is not common to either the Standard Plan or VAQA. Like many ball courts identified in central and south-central Veracruz and at Teotepec, Tilzapote's ball court was raised on a low platform. A low platform encloses the southern edge of the plaza. This platform (Mound 14) may originally have been attached to Mound 13, which would have formed a keyhole shaped structure. Mound 1 in the Western Plaza Group is also a keyhole-shaped structure. The north and east sides of the Eastern Plaza Group are delineated by long mounds. At least one basalt marker stone was identified within the plaza. This was a basalt column planted vertically into the ground south of Mound 10. More than one other basalt column was observed, but they were lying horizontally on the ground surface. While the Eastern Plaza Group does not precisely fit the Standard Plan, it displays some of its elements. Its plaza is roughly square. It contains a ball court, but its placement and orientation is not in line with the long plaza axis. A secondary plaza borders the main plaza to the south. Recesses occur to the south and west of Mound 13, but these may be natural. Mound 6 of the Western Plaza Group is a massive platform that may have served as a palace. In fact, the entire

Western Plaza Group is built on a human-modified terrace. It may have therefore served an administrative function much like the Acropolis at Totocapan.

Cruz de Vidaña possessed a closed plaza group that is very similar to the layout of Tilzapote's Eastern Plaza Group (see Figure 8.10). The plaza is roughly square with the ball court enclosing the eastern end. Mound 1 on the northern end of the plaza functions as the principal conical mound of the group, though, it is not very big. A platform extends to the east from Mound 1, which produces a similar effect as Mounds 13 and 14 at Tilzapote. The western edge of the plaza is formed by a dome-shaped Mound 3, and two mounds situated on top of a low platform (Mounds 4 and 5). Mound 6 is a rather expansive, but low, platform. Like at Tilzapote, the largest mound, Mound 10, is situated away from the ritual plaza.

Francisco Madero displays a small mound group (see Chapter 7). The plaza is deeply sunken below the level of the mounds. A large pyramid borders the plaza to the north. The south and east edges are enclosed by relatively small elongated mounds. A conical mound is positioned to the west of the plaza. A human-modified terrace is situated about 30 meters south of the plaza group. No ball court was identified at Francisco Madero.

Unfortunately, the mounds at Xiguipilincan could not be mapped because of our failure to reach an agreement with local community leaders. While the configuration of mounds is not known, an enclosed plaza group and a ball court were observed.

Among the remainder of Classic period sites displaying mound construction, the majority either contained simple house mounds or the plaza configurations were too simple to observe patterns to be useful for this analysis.

In comparison to Totocapan, the regional centers of the TVAS display architectural similarities and differences. The plaza groups at Tilzapote and Cruz de Vidaña were completely closed, which is a deviation from Totocapan's number one architectural rule. The ball courts are positioned on the side of the plaza, like in the Pollinapan District, but they are oriented north-south. All of the regional centers have a plaza group that drew upon architectural conventions manifest in both the Standard Plan and the Tres Zapotes Plaza Group. I suggest that Totocapan controlled its hinterland through secondary centers, but allowed them to direct their own hinterlands. This hypothesis is supported by the relatively close positioning of tertiary centers to secondary centers, indicating a hierarchical pattern of interaction moving up through the settlement ranks rather than direct interaction with Totocapan (see Chapter 7). Secondary centers were also relatively free to develop their own variations on the Standard Plan architectural layout.

ARCHITECTURAL SUMMARY

Formal plaza groups at Totocapan, Tilzapote, Xiguipilincan, and Cruz de Vidaña all contained a ball court as a central architectural element. Oteapan, situated only two kilometers south of Totocapan, lacked a ball court, but fragments of a yoke were collected there. Francisco Madero, situated within two kilometers of Tilzapote, lacked a ball court, but it did display a small plaza group. The presence of ball courts at the most important political centers in the Tepango Valley suggests a deep conjuncture between ball game ritual and the legitimation of political authority. In this respect the survey area followed broader cultural currents on the Gulf Coast (Borstein 2005, Daneels 2002a, Koontz 2008, Stark 2008, Symonds 2002, Urcid and Killion 2008).

Was there architectural coherence within the Tepango Valley? Similarities were observed among most formal architectural complexes observed TVAS area. Plaza groups described for Totocapan, Tilzapote, Francisco Madero, and Cruz de Vidaña all displayed mound groups with elements of the Standard Plan. Similarities include square-shaped plazas that include a ball court, a pyramidal/conical temple mound, a massive platform within 200 m of the plaza, and secondary plazas adjacent to the main plaza. Totocapan, Tilzapote, and Francisco Madero additionally contained reservoirs adjacent to the plaza, which were probably reflecting pools or possibly raised-field gardens (Stark 2003). However, there were greater similarities among the mound centers located toward the southern survey boundary than with Totocapan, which may result from interaction with groups to the south. Cruz de Vidaña and Tilzapote present a related architectural program. In particular, the ball court positioning along the side, rather than in line with the long axis of the plaza, is more commonly observed to the south and east of the Tuxtla

Mountains (Urcid and Killion 2008, Borstein 2001, Symonds 2002), but it is also a variant of the Standard Plan. Totocapan displays its ball court opposite the main pyramidal/conical mound across the plaza, and it is oriented in line with the long axis of the plaza group. This resembles the Standard Plan observed to the west and north of the Tuxtla Mountains (Daneels 2002a, 2008a; Stark 1999, 2003, 2008; Urcid and Killion 2008:Figure 7), and at Teotepec (Arnold 2007).

The biggest architectural anomaly is that Matacapan lacked a Standard Plan and the potential ball court is small and marginalized. This suggests that Matacapan did not emphasize the ball game as the central source of political authority, which is unique for principal centers on the Gulf Coast. As Daneels (2008a) suggests, the ball game and associated decapitation rituals and paraphernalia (palma, hacha, yoke, volute style motifs) were important to centralize political authority because this was not a high-risk environment, land was plentiful and fertile, and there was little to no need for centralized control over agricultural irrigation. Highland models of political centralization therefore do not hold much explanatory power for the interpretation of political evolution on the Gulf Coast. In addition to control over long distance exchange and foreign connections, Gulf Coast elites imagined for themselves a central politico-ritual role. That Matacapan partially rejected and/or underemphasized these architectural and ritual themes suggests that the regime based its political authority on another principle. I suggest that principle was the association with Teotihuacan.

Within the TVAS, architectural similarities are similar enough to suggest political unification. At least, political authority was based on the same or similar principals. This coupled with the size differentials between Totocapan and secondary and tertiary centers in the TVAS indicate a situation of political subordination, at least during the Middle Classic period.

SIGNIFICATION OF REGIMES AND THE IMAGINATION OF POLITICAL UNITY

The goal of the stylistic analysis is not to present an inventory of all stylistic motifs recovered per site. Because collections were made on the surface, a low percentage of ceramics recovered retained well preserved decorations. Relatively few decorated specimens were collected per unit of space over the entire TVAS. The sample of specimens that display any single decorative motif is very small as a result, and patterns are difficult to observe with such small sample sizes. One notable exception is Totogal Engraved, which displayed a consistent set of symbols that form interesting distributions in space. In part, these motifs were used to reconstruct the Postclassic settlement patterns presented in Chapter 7. The focus of this chapter is the Classic period though. I focus on a narrow set of ceramic materials that appeared to embody the identity of Totocapan and other spatial distributions that indicate patterns of Classic period interaction in the Tuxtlas.

TEOTIHUCAN-STYLE AS A SYMBOL OF THE MATACAPAN REGIME

As mentioned in the introduction of this dissertation, previous research conducted at Totocapan by Ortiz (1975) and Valenzuela (1945a) recover few Teotihuacan-related materials. Among the materials described by Valenzuela (1945b), three artifacts bear a remote resemblance to Teotihuacan materials. The first is a marionette-style hollow figurine found in an excavation in Altar 3 in the Pollinapan District. While figurines are made using this general technique at Teotihuacan, they are also made elsewhere on the Gulf Coast and there is little about its style that suggests interaction with Teotihuacan.

The second Teotihuacan-related artifact depicted by Valenzuela is a plate with a broad horizontal rim upon which the engraved image of a warrior is depicted (Figure 8.12). The general artistic style of this decoration is similar to Maya or Río Blanco styles, but three specific decorative elements are common on Teotihuacan-related materials found throughout Mesoamerica. The warrior wears disks around the eyes,

Figure 8.12. Engraved plate recovered by Valenzuela (1945b) at Pollinapan.

which invokes the image of the goggles worn by Tlaloc. Teotihuacan Tlaloc warriors were buried with shell disks covering their eyes, so this was probably a feature of the costume they wore into battle rather than pure artistic license. The second motif of interest is the atlatl dart that the warrior carries in the left hand in both frames. In the right hand, the figure on the left holds an atlatl, and the figure on the right has raised the atlatl as if poised to throw. Directly above his throwing arm is a bundle of atlatl darts. These three images can be found on depictions of Teotihuacan warriors at home and abroad, but several elements are missing. Common elements associated with the Teotihuacan warrior are back mirrors, shields, three-tasseled headdresses, the year sign (in the headdress), sandals, and owl or butterfly imagery. Perhaps the most interesting feature of this plate is that the panel dividers, the rattle supports, and Valenzuela's description of the slip (orange slip on the interior and cream slip on the exterior) match perhaps the most coherent style set that defines the Totocapan polity (discussed in the next section). The age of this plate is not known, but Valenzuela's description of the slipping techniques is very similar to the bi-slipped and double-slipped bowls described by Stark (2001) for the Mixtequilla region. These slipping techniques were present throughout the Classic period but were most common during the Late Classic. If this chronological assessment is appropriate, any allusion to Teotihuacan on this plate is a late stylistic echo of its former presence in the Tuxtlas.

Found within the same offertory cache was a bowl depicting the sculpted design of a Maya god. Valenzuela (1945:88) suggests it to be God K. The panels flanking this god to either side may depict butterflies. The butterfly imagery is very strong at Teotihuacan (Headrick 2007:125-143) and in areas, like Escuintla (Berlo 1984), known to have connections to Teotihuacan. The glyph on this vessel found at Totocapan, though, does not stylistically resemble those found on Teotihuacan imagery.

Ortiz (1975) excavated one test pit at Totocapan (El Picayo). He did not recover any clear indications of Teotihuacan interaction, but at least two Fine Buff vessels were recovered that displayed a cylindrical form that could be Teotihuacan-related (Ortiz 1975: Figure 84).

Aside from these artifacts recovered by Ortiz and Valenzuela, Teotihuacan influence is nearly absent in the material culture of the TVAS area (Figure 8.13). Potential Teotihuacan-style finds include five ceramic rim sherds that appear to be from cylindrical jars, and three sherds that appear to be lids for cylindrical vases. It must be stressed that below when I refer to cylindrical vases I speak of those that appear Teotihuacan-related. These have high, straight or slightly bowed, vertical to slightly divergent, walls. Cylindrical is a term that could be used to describe several local vessel forms, but those tend to be shallow bowls rather than vases with high vertical walls. Furthermore, cylindrical vases documented at Matacapan tended to be executed in Fine Buff pastes.

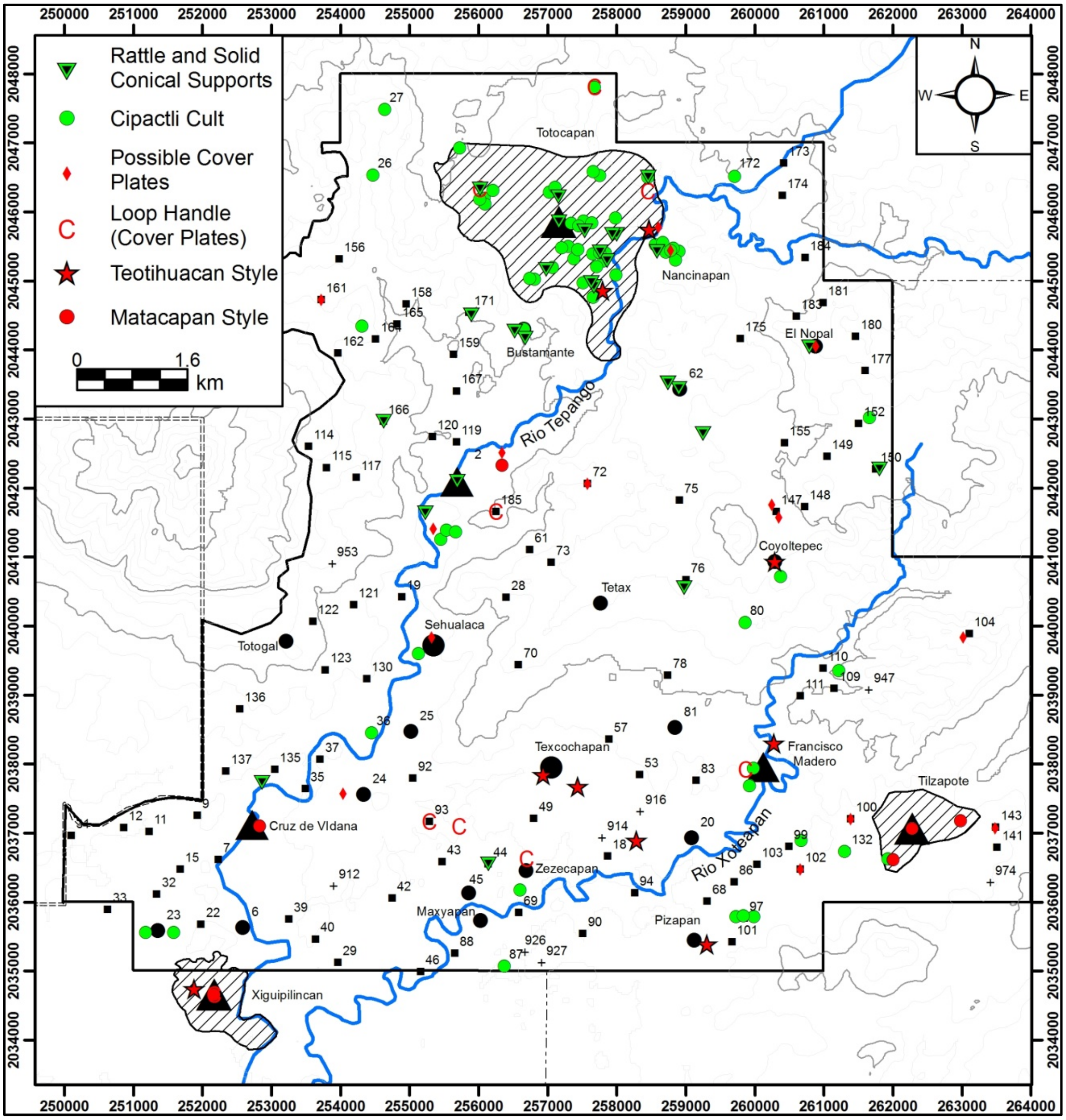

Figure 8.13. Distribution of Ceramic Materials Discussed in the Text.

Among the cylindrical vessel forms identified, only two rims and one lid strongly resemble cylindrical tripod jars found at Matacapan or Teotihuacan. Both rim sherds that display a cylindrical profile were formed on Fine Buff pastes, but the lid was made on Fine Orange. Three additional cylindrical vessel forms were recorded, but these only tentatively resemble Teotihuacan-like cylindrical vases. The lids are all made on Fine Orange pastes. Two *florero* vessel forms were identified. One found at Site 183 was executed on a Fine Buff paste, the other came from Francisco Madero on Brown-Slipped

Coarse Brown paste. Additionally, one Fine Orange sherd was found at the rural Site 87 that depicts an incised solar motif identical to that depicted on a Fine Buff bowl at Matacapan (Santley 2007:Figure 6.7). The motif is a semicircle incised under a horizontal line with rays radiating outward. While it is not necessarily a "Teotihuacan motif" it invokes the general solar motif style, or the circle-and-ray motif, found at Teotihuacan. Additionally, two examples of cover plates, or censers with three loop handles/supports could be tentatively identified

Possible three-handled cover plates in the style found at Teotihuacan were identified by loop handles made on a yellowish-red to dark-red paste (Code 2611) (n=10) and very open plate forms on the same paste (n=17). In no case was a loop handle found attached to a cover plate, so the association with the three-handled cover plate form known from Teotihuacan is tenuous for all cases. Loop handles are frequently found on the *cazuela* form in the Tuxtlas, though they do not tend to occur on this paste. Between the two indicators, I place more confidence in the loop handles, though both are relatively weak markers of Teotihuacan appropriations. The loop handles are found in greater frequencies in the southern half of the survey area, particularly in the vicinity of Texcochapan. The possible cover plate sherds do not display any significant patterning.

This handful of possible Teotihuacan-related materials was found primarily at the centers of Totocapan, Xiguipilincan, Francisco Madero, the large village of Texcochapan, and rural sites surrounding these locations (Figure 8.6). It is not the presence of Teotihuacan materials that I wish to highlight, though. There is no strong indication that any group of people in the TVAS area adopted a central Mexican identity for either prestige purposes or otherwise. There are no rectangular or slab supports for cylindrical tripod vessels, no Teotihuacan-style figurines, no *candeleros*, no *copa* ware forms, no Thin Orange, and low percentages of green obsidian at Classic period sites. Although several mounds were paved in basalt rock, it is unknown if *talud tablero* architecture is present at Totocapan. The architectural patterns seen there are typical for the Gulf Coast. Potential cylindrical tripod vase forms are rare, and those identified are only weak evidence for interaction with Teotihuacan. In fact, they more likely point to stylistic interaction with Matacapan, much like what Pool and I argued for Tres Zapotes (Pool and Stoner 2004). Valenzuela's plate is demonstrates a selective symbolic appropriation of warfare related motifs that post-dates the decline of Teotihuacan. The semi-circle-and-ray motif found at Site 87 appears more closely related to a nearly identical motif found at Matacapan. Furthermore, Totocapan was apparently outside the Teotihuacan economic distribution network. Only one of 225 pieces of obsidian collected at Totocapan was from the Pachuca source. Roughly four percent of the total obsidian assemblage in the TVAS was assigned to this source, and most of the 109 green obsidian specimens collected came from sites with substantial Postclassic occupations. None of Teotihuacan's other exports were collected from the entire survey area.

Teotihuacan-inspired artifacts are concentrated in the southeast third of the TVAS. While this distribution has little meaning due to the low sample size, and the possibility that some of the indicators are only tenuous evidence of Teotihuacan interaction, the pattern is expected if the materials or symbols entered the survey area from the south around Tilzapote. Tilzapote itself does not display Teotihuacan-style materials, but it is the only site in the region with more than one ceramic specimen that resembles decorated ceramics at Matacapan. Also depicted in Figure 8.6 is the distribution of Matacapan-like painted designs on bichrome serving wares that date to the Early and Middle Classic periods. These motifs include wide vertical wavy lines, painted frames, painted circles, and painted spirals. Within the TVAS, all of these were executed on Fine Orange vessels either on the natural polished paste or on a white or cream colored slip. Taken together, the Matacapan stylistic elements and the possible Teotihuacan-related materials appeared to have come into the TVAS region from the south around Tilzapote. In the following chapter, I present evidence that suggests this was the major trade route between the Tepango and Catemaco valleys.

TOTOCAPAN AND THE CIPACTLI CULT

Among all of the decorative motifs and ceramic types and forms searched to model style zones in the TVAS, none displayed distributions more strongly skewed toward Totocapan than a standardized and coherent set of ceremonial vessels that most frequently depict crocodiles or *cipactlis* (Figures 8.14, 8.15, 8.16, and 8.17). In Aztec

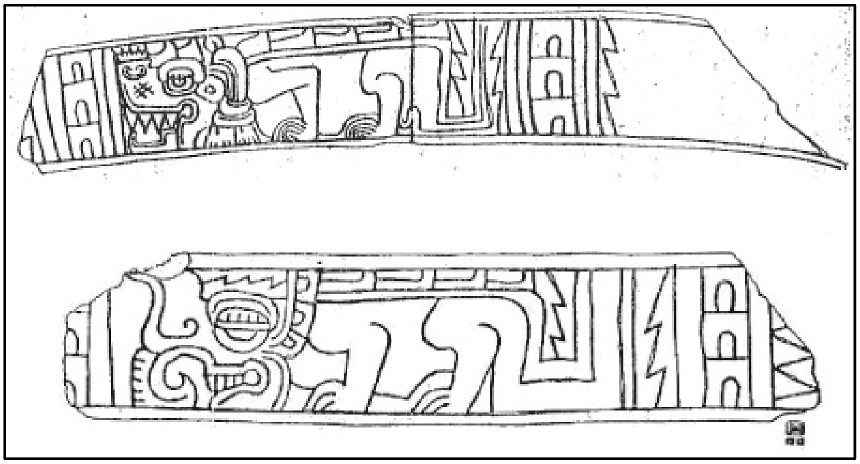

Figure 8.14. Engraved images of cipactli recovered from the Pollinapan, Totocapan (Valenzuela 1945b: Laminas 1.a. and 1.b.). The lower image may be an iguana or saurian animal.

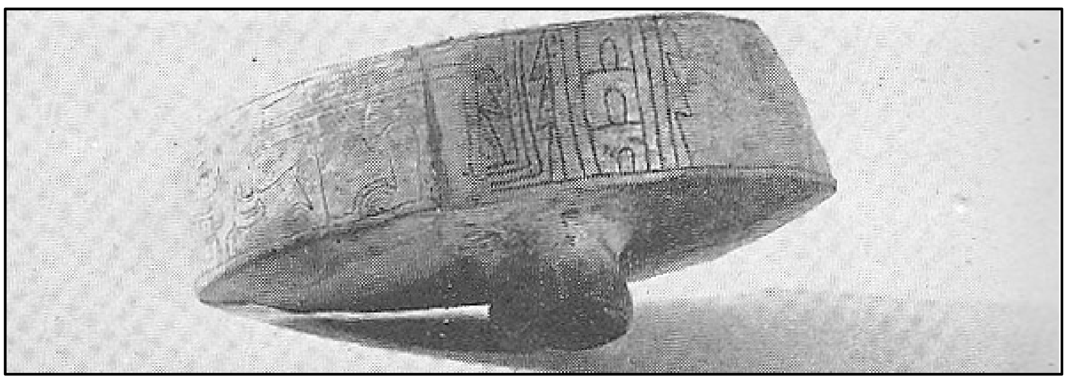

Figure 8.15. Partial vessel recovered by Valenzuela in the Pollinapan district of Totocapan (Valenzuela 1945b: Figure 16).

mythology, Cipactli was a great primordial crocodile who was cut asunder by Tezcatlipoca and Quetzalcoatl. From its body, they made the earth and sky. The earth monster plays a similar role in Olmec creation as Cipactli for the Aztecs. This is probably best represented at La Venta during the Middle Formative period, where a sandstone coffin was found carved to feature the earth monster floating on the primordial sea of creation (Reilly 1995:35). Both Aztec cipactli and Olmec earth monster display saurian features. Cipactli may also be related to the gods Tlaloc and Chac. Saurian related motifs are not the only themes presented on this set of materials, but they are the most frequent and clearly intended to be the most important.

Figure 8.16. Ceramic types and forms that frequently display saurian images collected during the TVAS.

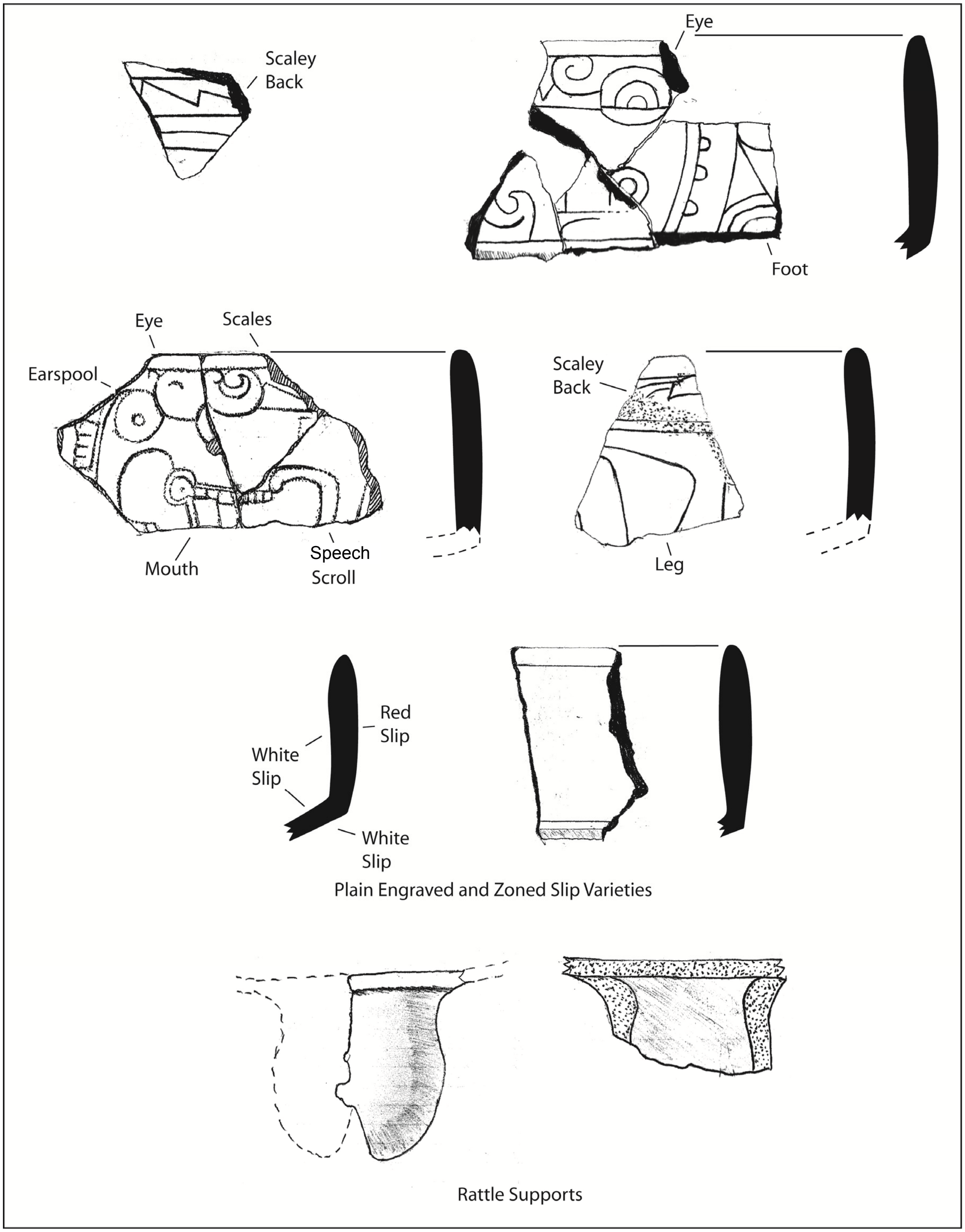

Figure 8.17. Sample of Cipactli Cult engravings and vessel forms collected during the TVAS.

The most complete reptilian motifs were recovered by Valenzuela in his excavations in the Pollinapan district of Totocapan (1945b) (see Figures 8.14 and 8.15).

Two vessels displayed complete depictions of crocodiles on bowls with short, vertical or slightly convergent vessel walls, a slightly curved, almost flat base, and large rattle supports. The outer vessel walls and the base were covered in a cream slip, but the interior displayed an orange slip (1945b:87). Valenzuela did not say, but on many of the variants recovered during the TVAS survey the orange interior slip was applied over a thick cream slip like the exterior surfaces. Again, by comparison with the double-slipped and bi-slipped ceramic types described for the Mixtequilla (Stark 2008), many of these may be Late Classic in date. Due to correlations with Santiago B phase indicators, however, I believe that this cult began at least by the Middle Classic.

The two complete cipactli images depicted in Figure 8.14 are similarly engraved through the thick cream slip of the exterior vessel walls. Both crouch low between the horizontal panel borders engraved about 2 mm beneath the lip and 2 mm above the sharp-angled transition to the base. The scales on their backs display slight inconsistencies. On the top of their backs, the scales display a curved appearance; while the scales running vertically down the base of the tail appear more triangular. I raise this distinction, because the latter type of scale profile is also used as a panel divider on most cipactli vessels and the plate with echoes of Teotihuacan stylistic elements described above. Also part of the panel divider in both cases on Figure 8.14 are vertical rows of scales in a frontal perspective. The clawed feet are engraved with little detail.

The heads of these two reptiles are quite different. The top image is much more crocodilian than the bottom image. In particular the mouth, teeth, snout, and eye are true to the form of a crocodile. The bottom image, though, has some almost anthropomorphic characteristics, particularly around the mouth and teeth. The top cipactli wears an ear spool and a single tassel on its head. Also, an image that appears like a crown is poised above its snout. The bottom cipactli wears some type of ear flare. Its snout bears resemblances to the Mayan god Chac, which was prevalent in the Yucatan. While Chac and Tlaloc were related gods, this image bears little resemblance to depictions of the latter at Teotihuacan. Given that saurian features were commonly shown on Olmec art, the Cipactli Cult iconography is likely a local development. On one specimen depicted in Figure 8.17, a possible speech scroll was identified.

Throughout the survey area, these designs always appear on the same paste type and the same vessel form with a limited range of variation among surface treatments (see Figure 8.16). The paste ranges in color from orange to red to reddish-brown, and it contains a moderate to high amount of white temper (mostly quartz but some feldspar is present). The temper grain size is that of highly uniform fine sand. This paste is found on Codes 2611, 2612, and 2613, and analysts were very restrictive in assigning ceramics to these categories.

Vessel form is almost always bowls with short, straight or slightly convex, vertical walls that may range to slightly convergent or slightly divergent (see Figures 8.15 and 8.17). The transition from vessel wall to the base is sharp and angular. The base itself is slightly convex to flat. One of three support types were attached to the base (Figure 8.13). The first is globular/spherical and hollow. The second is hollow rattle supports. These are globular/spherical supports with a slit cut into the bottom and a clay pellet was contained inside. A few of these supports were found with the pellet still intact. Rattle supports were on all of the cipactli vessels recovered by Valenzuela, and the hollow globular supports may be fragments of rattle supports that could not be identified as such. The third type, solid conical supports, is associated with this set of material culture based on similarities in paste, slip, and co-variation among their distributions over the TVAS area.

Surface treatment is perhaps the most telling characteristic of this material set. The overwhelming majority of specimens are slipped on at least part of the vessel surface with an extremely thick white to cream colored slip. At its thickest, this slip is as thick as an eggshell. The thickness of the slip is important because the deep red to reddish brown color of the paste would show through a thinner slip. Thinly slipped ceramics of this paste would appear pink, a color observed on one or two eroded specimens. After the slip was applied, the vessel was polished.

There are many slipping alternatives that occur on the same paste and vessel forms with the same decorations. The most common variant (Code 2612.2) consists of a double-slipped interior, orange over white, with the exterior slipped in white and polished. The orange slip in the interior usually remained only in parts on these surface collected specimens. Excavated ceramics may yield better-preserved overslip. Type

2613.2 is a half-and-half slipped vessel. The exterior vessel walls are slipped in red, which sometimes has a specular character. The interior and exterior of the base display the characteristic thick white slip. Rarely, the red portions of this type display the remains of black paint, though they were too eroded to discern painted motifs. Painted varieties are rarely engraved or incised, but the vessel form, paste, and slip technique are identical to those that bear cipactli motifs. This type actually displays a vibrant red slip, but there is a variant where the potter let the natural red color of the paste to stand on its own. On a few specimens, the white and red slips on the exterior surface are swapped so that the red appears on the bottom and the white appears on the superior part of the vessel walls. The final variant, Type 2611.2, is also the rarest. It presents a brown slip on the exterior walls with a white slip covering the interior surface and the exterior base. On the example depicted in Figure 8.16, the scaly, triangular panel divider can be seen on the right side of the exterior surface.

The apparent purpose of applying the thick white slip was to provide a surface for complex engravings. The result is bright white surface with deep red lines showing the natural paste underneath. The engravings range from simple horizontal lines to complex depictions of cipactli. If animal images are present, they are always saurian as opposed to the avian or serpentine motifs commonly found at Matacapan.

As a whole, I refer to this set of material culture as the Cipactli Cult. Based on associations with phase-sensitive materials and comparison to decorative and slipping techniques elsewhere, the Cipactli Cult likely was introduced during the Middle Classic and persisted, or even increased in frequency, into the Late Classic. Materials identified as pertaining to the Cipactli Cult are always associated with ceramics sensitive to the Middle Classic, but they are not always associated with Late Classic ceramics. The distribution of Cipactli Cult vessels in the TVAS is strongly skewed toward Totocapan (see Figure 8.13). Collections at Totocapan and the outlying barrios of Nancinapan East and Bustamante accounted for 59 percent (n=41) of the sherds that could be confidently placed into this material set. Cipactli Cult materials generally fall off in frequency with distance from Totocapan, which suggests that the vessels were probably produced at Totocapan. However, a secondary concentration is found in the southeast corner of the survey area around Tilzapote and Francisco Madero and a steady trickle followed the

Tepango River to the southwest corner of the survey area. Materials that can be less confidently placed into the Cipactli Cult consist of rattle supports and solid conical supports executed on the same paste with the same white slip. These are common support types so they were not lumped into the Cipactli Cult by default, but given the similarities in paste, slip, and distribution they can be used to map the distribution of Cipactli Cult materials with moderate confidence (mapped separately from more confident Cipactli Cult materials in Figure 8.13). Of all supports that resemble the general Cipactli Cult materials, greater Totocapan, Nancinapan East, and Bustamante accounted for a combined 54 percent (n=15). All but two supports were collected within a four kilometer radius of Totocapan.

The Cipactli Cult comprises a set of goods and beliefs produced both materially and conceptually by regime leaders based in Totocapan. The outgoing exchange of these materials was likely accompanied by a politico-ritual ideology controlled by regime authorities at Totocapan. Only more intensive research at Totocapan and other centers in the region might suggest precisely what this ideology entailed. For the current research, the intravalley distribution of Cipactli Cult materials suggests interaction among the TVAS regional centers. I suggest that during the Middle and Late Classic, regime leaders at Tilzapote and Francisco Madero, and to a lesser extent Xiguipilincan and Cruz de Vidaña, were subordinate to Totocapan and drew upon their developed system of ball game ritual and the Cipactli Cult to legitimate their own authority.

Did Matacapan possess Cipactli Cult ceramics? A search of the available literature returned similarities in ceramic types, but nothing like the double slipped variants observed in the Tepango Valley. A few potential saurian motifs were depicted at Matacapan (Ortiz and Santley 1988:Appendix), but these were not executed in the styles or on the same vessel forms as at Totocapan. Pool comments that saurian motifs were painted in polychrome on fine paste ceramics at Bezuapan, but not through incision (personal communication 2010). An equivalent set of political and ritual materials may have revolved around the serpentine motifs painted on bichrome and polychrome Fine Orange vessels. As Arnold and Santley (2008) observe, feathered serpent motifs appear at Matacapan and surrounding settlements about the time Teotihuacanos arrived.

CONNECTIONS TO THE LOWER PAPALOAPAN BASIN?

Several lines of data support an interpretation of close interactions between Totocapan and the lower Papaloapan Basin. Totocapan specifically displays certain architectural elements that can be found in the Mixtequilla region. In particular, Totocapan's version of the Standard Plan employs only one long mound, leaving the southern edge of Plaza Group 1 open. Stark (1999, 2008) indicates that this is a Late Classic arrangement in that region, which she defines as 600-900 CE. Plaza Group 1 at Totocapan is situated in the oldest part of the site, with roots into the Middle Formative. The mounds themselves are principally associated with Middle Classic ceramics, but it is certainly possible that the layout changed over the course of the hundreds of years of use. Pool (personal communication) points out the similarity between the TZPG and Plaza Group 1 at Totocapan. While the positioning and layout of the ball court opposite the principal temple mound displays a greater likeness to the Standard Plan found in the Mixtequilla and the Cotaxtla Basin, it certainly cannot be ruled out that Tres Zapotes had some early influence of this mound group. In fact, examination of the timing of construction episodes for Plaza Group 1 in the future may show that it was constructed early, perhaps during the Formative period, and modified later to conform to the Standard Plan style. In either case, the mound configuration of Plaza Group 1 at Totocapan is inspired, or perhaps even influenced, the architectural layouts of groups to the west.

Portable material culture style also bears some similarities to groups to the west. Simple scrolls, or volutes, like those described for Patarata (Stark 1998), occur in minor percentages in the Tepango Valley. One of the pottery types that display these scrolls is the set of paste, vessel form, and slipping characteristics that in part define the Cipactli Cult. Other types of pottery present volutes, such as Fine Orange and Fine Gray, but their presence on Cipactli Cult materials is significant. As discussed above, Cipactli worship was important to Totocapeños. While nothing closely resembling the Cipactli Cult pottery has been identified in published literature from the Mixtequilla, similar Cipactli images were identified on the Papaloapan Stela described above (Sanchez 1999). This underworld deity seems to be linked to sacrifice rituals associated with the ball game. This connection can also be seen at Totocapan, as Valenzuela identified his two

Cipactli ceramic bowls and the carved basalt Cipactli head in direct association with ball game paraphernalia (an *hacha* and a *palma*). All of these finds were identified during excavations into an altar in the Pollinapan district, a district that possesses a ball court. Add to this that the Cipactli Cult is often executed on bi-slipped and double-slipped ceramic bowls. This slipping technique is rare everywhere on the Gulf Coast, but probably occurs in the highest proportions in the Mixtequilla region. As a whole, the Cipactli Cult, double-slipping and bi-slipping techniques, the ball game, the architectural similarities to the Mixtequilla, and the Patarata-like scrolls employed at Totocapan point to not only stylistic emulation, but close adherence to a set of rituals common to both regions.

An additional line of evidence pointing to interaction with the lower Papaloapan Basin is the presence of Red-Slipped Coarse Orange ceramics, similar to Acula Red-Orange found at both Patarata (Stark 1989) and in the Mixtequilla region (2000). These ceramics are most prevalent at Totocapan and occur in lesser frequencies at other sites in the TVAS (see Figure 6.20). Loughlin notes a strong presence of ceramics of this appearance in the area around El Mesón along the Tecolapan River (personal communication). He reviewed photographs of the ceramics that I have identified as similar to Acula Red-Orange and suggested that they resemble those recovered in his survey area. If this connection holds up to future testing, the likely route of interaction between the Papaloapan Basin and the TVAS region would have followed the Tecolapan River into the Tuxtlas, climbing up the narrow transportation corridor to Totocapan as proposed in Chapter 4. This route of interaction either coexisted with the route of interaction passing to the south of Cerro el Vigía, as proposed in Chapter 7 for Formative period interaction between Tres Zapotes and the TVAS area, or it may have supplanted it due to the waning influence of Tres Zapotes.

PERCEPTION AND IMAGINATION OF POLITICO-RITUAL AUTHORITY ON THE TUXTLAS POLITICAL LANDSCAPE

By the Classic period, Totocapan was the oldest political and ritual authority within the Tepango Valley. The city displays uninterrupted growth from the Middle

Formative (Initial Picayo phase) to the Late Classic (Chaneque phase). It is the only regional center during the Classic period that can be characterized this way. Xiguipilincan, Francisco Madero, and Oteapan did not become regional centers until the Classic period. Tilzapote emerged as a regional center in the Protoclassic, but displays little evidence of occupation during the Early Classic. Cruz de Vidaña and Arroyo Salado both achieved the status of regional centers during the Formative, but Arroyo Salado collapsed prior to the Classic period never to regain its former rank and Cruz de Vidaña briefly resurfaced during the Middle Classic to serve as a tertiary center. Maxyapan did not become a regional center until the Late Classic, after Totocapan had begun its decline.

Totocapan's temporal depth in the Tepango Valley is summarized here because it had a constitutive effect on the material manifestations of Classic period culture in the survey area. The tools of political and ritual order in the Tepango Valley were likely dictated by Totocapan. The ball game and associated ritual, the Cipactli Cult, several decorative motifs (pendent lines hanging from straight horizontal lines on Fine Orange pastes and simple volutes similar to those reported by Stark [1998] for Patarata), certain slipping and engraving techniques, and a narrow set of more mundane material culture were promulgated by Totocapan. One exception to these patterns may be Cruz de Vidaña, which displayed ball court architecture before Totocapan. The secondary and tertiary centers in the region recognized Totocapan as an ancient power and a source of politico-ritual knowledge and based elements of their own political ideologies after her.

Four kilometers west of Totocapan's limits, the saddle ridge and slopes where the modern community of Cobata sits was littered with boulders with hundreds of petroglyphs. Among these carvings are naturalistic images (birds, iguanas, turtles, frogs, rabbits), simple human faces, gods (Tlaloc, Xipe Totec, a cross section of a spondylus shell as is often depicted at the belt of Quetzalcoatl), and spirals. Many of these images may be Postclassic, particularly, the Xipe Totec depictions. However, it is the ritual significance of this landscape feature that I wish to highlight here. This saddle ridge separates the Tepango Valley from the Eastern Lower Papaloapan Basin. It was an important part of the economic and ritual landscapes for thousands of years. Basalt boulders and columnar basalt used for monuments litter the area. Additionally, it has been of politico-ritual importance since the Middle Formative period when artisans from Tres Zapotes carved the Cobata head. This landform is situated within a short walk from Totocapan, which would have given the Totocapan regime access to and possibly control over an important node on the ritual landscape during the Classic period.

In contrast to the temporal depth of Totocapan within the Tepango Valley, Matacapan was a newly established center during the Early Classic period. During its early years within the Catemaco Valley, Matacapan's political regime possessed unrivaled political power. It was able to establish a new political ideology based on certain Teotihuacan symbols, values, and behaviors because of this. During the founding of Matacapan, Totocapan was already established in the neighboring Tepango Valley as a regional political and religious power. No doubt the new Matacapan regime knew about Totocapan's importance in the region. The rulers of Matacapan may have promoted their own political ideology among their would-be subjects in opposition to that employed by Totocapan (Pool 1992a). This would explain the underrepresentation of traditional Gulf Coast architectural patterns among settlements along the Catemaco River. The only ball courts identified at sites along the river are the very small ball court at Matacapan and the ball court at Chuniapan de Abajo, which may date to the Late Formative period. In place of the more traditional Gulf Coast architectural patterns, Matacapan offered a new ideology based on the large central Mexican power. In this scenario, Matacapan's ball court and associated ball court paraphernalia (*hachas* and yokes) may have been more of a "tip of the hat" acknowledging a long standing local tradition featured at nearby Teotepec among other Tuxtla regional centers.

What about Teotepec? Teotepec emerged as a regional center during the Middle Classic period. While the site was occupied as early as the Middle Formative, it was not a potent political or ritual force until after Matacapan rose to power. It displayed elements of both the Long Plaza Group and Standard Plan architectural layouts that define political authority on the Gulf Coast. It also incorporated a ball court into its primary architectural complex. Not a single Teotihuacan-style artifact has been recovered at Teotepec, Agaltepec, Tenagre, or at any site along the rugged valley corridor that leads north from the lake to the coast (Santley 2007: Figure 6.4). Stela 1 at Piedra Labrada, however, depicted several Teotihuacan-style glyphs, including the reptile eye glyph, a torch bundle, and “tiled-earth” symbols (Blom and La Farge 1927:41). Furthermore, Mata Canela located south of Lake Catemaco displayed architectural affinities to Teotepec. Teotepec was as architecturally invested as Matacapan, and poor ground surface visibility around the former has surely led to an underestimation of its size. In short, there are few data available to suggest that Teotepec was part of the Matacapan polity.

If the reconstruction detailed above withstands future testing, Matacapan and settlements to the south along the Catemaco River experienced social, political, and ritual disjunctures from the localized course of Tuxtleco evolution displayed at centers like Totocapan and Teotepec. The disruptions initiated by immigrants from central Mexico did not affect the entirety of the Catemaco Valley cultural identity, as many stylistic affinities are displayed with the broader Tuxtlas region. However, the disruption was severe enough to influence the core beliefs promoted by each regime to its subjects. This led to a developmental divergence that can be seen through material expressions of cultural identity across the Tuxtlas landscape.

EVALUATION OF POLITY BOUNDARIES

The data presented above, and in Chapters 6 and 7, are used here to evaluate the geospatial political models proposed in the previous chapter.

No geospatial models were presented for the Middle Formative period, but it appears that Cobata was an important political boundary. Tres Zapotes exercised some political influence up to that point in space. The Tepango Valley and the Catemaco Valley comprised a number of dispersed but politically autonomous units. While both valleys probably remained independent of Tres Zapotes, stylistic commonalities had already arisen among the material culture employed by different groups throughout the Tuxtlas. While this implies interaction, it does not necessarily indicate any directional influence at this time,

The Late Formative period brought more political unification by Tres Zapotes. The regional center rose to its maximal size and power. In the Tepango Valley, the regime at Arroyo Salado had built a mound group by this time that resembles individual elements of architectural groups found at contemporary Tres Zapotes. Pool (personal communication) argues that the position of the long mound at Arroyo Salado to the south of the plaza is significantly different from Tres Zapotes, where the long mounds typically occur north of the plaza. For this reason, the Arroyo Salado plaza group is not considered a copy of the TZPG. It may, however, represent a reinterpretation of Tres Zapotes architectural plans by the Arroyo Salado regime[1]. Based on cross-dating with ceramic collections, it appears as though the latter was built or was under construction during the Late Formative. Material culture between these two sites displayed similar decorative motifs and technology. Furthermore, Arroyo Salado closely followed the trajectory of growth and decline seen at Tres Zapotes. As the larger center had begun its long and gradual decline, Arroyo Salado collapsed and never regained political significance in the Tepango Valley. This suggests that the fate of Arroyo Salado was intertwined with the political currents at Tres Zapotes. Recent research by Pool (2008) indicates that the Late Formative was a period of corporate political unity among different factions within Tres Zapotes. This cooperation likely facilitated their ability to exercise political and ritual influence beyond their core hinterland. This factional competition intensified in the Protoclassic. Political infighting at Tres Zapotes may have led to the demise of its political influence in the Tuxtlas to the west. Added to this is the rise of nearby centers like El Mesón during the Protoclassic (Loughlin 2005). I cannot thoroughly evaluate the Late Formative models with the data at hand. The possible links between Tres Zapotes and Arroyo Salado may suggest a rejection of LF 1 is in order (see Figure 7.9), which sees each regional center as a sovereign unit controlling its own hinterland. The political relationships between these two centers is speculative, though. Evaluation of the LF2 (see Figure 7.10) and LF3 (see Figure 7.11) models requires more knowledge as to whether Totocapan also fell under the political sway of Tres Zapotes. Totocapan outlasted the decline of Tres Zapotes and, in fact, thrived. This may indicate that the site

[1] Pool suggests (personal communication), that Totocapan Plaza Group 1 bears similarities to the TZPG, but ceramic cross-dating currently suggests that this mound formation was not constructed until the Classic period. Elements of Plaza Group 1 at Totocapan may have been borrowed from Tres Zapotes, but the configuration of the ball court and associated mounds is more similar to Late Classic configurations documented in the Mixtequilla (Stark 1999, 2008a).

did not become reliant on Tres Zapotes during the Late Formative like Arroyo Salado. Model LF2 is therefore the most supported model for Late Formative political boundaries.

The collapse of Arroyo Salado is telling of the Protoclassic political landscape as well. I suggest that the loss of Arroyo Salado as a potential administrative center, or at least a potential ally, adversely affected Tres Zapotes hinterland. Tres Zapotes may have still had some influence at Cruz de Vidaña and La Mechuda. La Mechuda displays a carved basalt column, which is a sculptural tradition that was present at Tres Zapotes, El Mesón, and the Alvarado region. El Mesón itself may have been subordinate to Tres Zapotes during the Protoclassic (Loughlin personal communication). If Tres Zapotes exercised political influence at La Mechuda, they probably also had influence at Cruz de Vidaña. I therefore tentatively find support for PTC2 (see Figure 7.14), where Tres Zapotes administered parts of the lower Tepango and Catemaco valleys, but not the upper segments. The loss of Arroyo Salado likely precludes acceptance of PTC3 (see Figure 7.15), which projects Tres Zapotes influence over the entire study region. If Tres Zapotes ever had political influence over the entire region considered by these models it was in the Late Formative. However, the large center generally had symbolic and ritual influence on the regional culture.

The Early Classic was a time of political equalization. Power discrepancies among the three known centers – Totocapan, Tres Zapotes, and Matacapan – evened out. In none of the three models presented did any center possess command over another. I reject the third hypothesis, EC3 (see Figure 7.19), because Totocapan and Oteapan display many symbolic, economic, and ritual associations throughout the Classic period and were likely part of the same polity. They share the highest percentages of Cipactli Cult materials, ball game paraphernalia, and they are situated very closely together. The Cipactli Cult likely postdates the Early Classic, but there are few other ways to evaluate stylistic similarities for the Early Classic given the current difficulty in isolating the Early Classic. Between EC1 (see Figure 7.17) and EC2 (see Figure 7.18) I favor hypothesis EC1. The political territory projected for Tres Zapotes in EC2 would have been difficult to administer with no secondary centers to intervene.

The Middle Classic displays a large regional power shift away from Tres Zapotes and divided relatively equally by the two primary centers in the Catemaco and Tepango valleys. Model MC1 (see Figure 7.29) is rejected simply because the size differentials between Totocapan and Matacapan and their respective hinterlands were too great to envision a political landscape of small autonomous polities. Nor do I believe models MC2 (see Figure 7.30) and MC3 (see Figure 7.31) accurately describe the political landscape. Instead, I propose a combination of MC2 and MC3. The extent of Matacapan's power probably followed the distribution of Teotihuacan-related goods and symbols. Teotepec appears to have remained outside Matacapan's political administration. The architectural configurations at the two centers are rather different, but the overall investment in political and ritual architecture is roughly equal. This suggests relatively equivalent political power based on different ideologies. Furthermore, Teotepec apparently rejected Teotihuacan-related symbols, and they only consumed low percentages of Matacapan-produced Coarse Orange vessels (Stoner et al. 2008). Teotepec was positioned well to administer the corridor to the coast, the islands on Lake Catemaco, and probably Mata Canela to the south. In this regard, I find the political territory allocated to Teotepec in model MC2 compelling. Matacapan and Teotepec were likely engaged in a cooperative relationship as neither could afford a hostile relationship with the other.

Aside from the role of Teotepec on the regional political landscape, model MC3 is compelling principally due to Tilzapote. Tilzapote displays architectural affinities to Totocapan, at least more so than with Matacapan. They also consumed the Cipactli Cult materials and ideology promoted by Totocapan. Furthermore, no Teotihuacan materials have yet been identified there. On the other hand, Tilzapote displays the highest number of Matacapan-like painted decorations on bichrome vessels (n=3). These stylistic motifs were not controlled by Matacapan, but they were rare in the TVAS area, with the only other examples showing up at Oteapan (n=1), Cruz de Vidaña (n=1), and Xiguipilincan (n=1). I suggest two alternative roles for Tilzapote in the region. First, it could have been supported by Totocapan to conduct boundary maintenance services for the polity. Support for a political boundary north of Tilzapote is a relatively uninhabited buffer zone and its general position at the most easily traversable pass connecting the valleys. To the north of Tilzapote, not a single site was identified in the narrow valley that follows Cerro Amarillo to the east. Tilzapote falls on the Totocapan side of this potential political boundary. Tilzapote displays very low proportions of Comoapan-produced Coarse Orange jars, but it may have benefitted from its position relative to Ranchoapan for access to obsidian raw materials (see Chapter 9). The political boundary predicted by model MC3 is likely accurate. Tilzapote was either an autonomous political entity on the boundary between two major polities, or they were a boundary center at the edge of Totocapan's political territory. Either way, I find the greatest support for model MC3 with a few alterations relative to Teotepec and Tilzapote.

The Late Classic saw the beginning of declines at both Totocapan and Matacapan. They were both still the primary regional centers in their respective valleys, but Matacapan loses ground to Teotepec and Ranchoapan and Totocapan loses ground relative to Tilzapote, Xiguipilincan, and Francisco Madero. In particular, the southern half of the TVAS region is employing new ceramic types that do not appear at Totocapan (see summary in Chapter 6). For this reason, I do not believe that Totocapan controlled a large territory as depicted in model LC3 (see Figure 7.37). Neither do I believe that the polity was as weak as depicted in model LC1 (see Figure 7.35). Totocapan was still much larger than any other center in the region. Additionally, the Cipactli Cult likely continued or became more important during the Late Classic. Model LC2 (see Figure 7.36) has the most supporting data, but, if Cipactli Cult ceramics can be considered an indicator of Totocapan influence during the Late Classic, the better solution may reside in some combination of LC2 and LC3. If researchers can split the Chaneque phase in two subphases, as is seen in the Catemaco Valley, or rather define a phase that occurs between Chaneque and Vigía phases, I believe the early half of the Late Classic may appear more like LC3 with the end of the Late Classic ending up like LC1 or LC2. Once the decline of both Totocapan and Matacapan began, it probably happened at a fast pace. Following the Late Classic in the Tepango Valley, the focus of settlement strongly shifted to the south of the TVAS. Tilzapote, Francisco, Maxyapan, and Xiguipilincan continue to be influential, and the addition of Totogal saw the rise of Aztec influence in the Late Postclassic. No political influence ever arose to replace what was lost at Totocapan after the city's demise.

SUMMARY

In this chapter, I presented architectural and stylistic data that draws a distinction between Totocapan and Matacapan. Matacapan lacked most architectural elements that defined political authority in other areas of the south-central and southern Gulf Coast. Alongside this architectural anomaly was an underrepresentation of ball courts in the Catemaco Valley. Ball game rituals served essential to the legitimation of political authority in the Gulf Coast. That Matacapan, in particular, underemphasized the importance of the ball game suggests that they looked elsewhere to establish and maintain authoritative legitimacy. The regime's connection to Teotihuacan seems to have satisfied that need, as they promoted central Mexican ritual and beliefs to the general populace (see Pool 1992a). Totocapan and settlements in the Tepango Valley, on the other hand, almost completely ignored Teotihuacan style, ritual, and beliefs. Instead, they promoted a more traditional Gulf Coast set of ideas associated with the ball game, particularly centered on Cipactli worship. Totocapan displays much greater similarities to groups within the Papaloapan Basin than Matacapan with regard to the ritual landscape, with a ritual disjuncture forming between the Tepango and Catemaco Valleys.

The Cipactli Cult was promoted by Totocapan much like central Mexican beliefs were promoted by Matacapan. These materials were concentrated at Totocapan and the northern half of the TVAS area, but occurred in lesser quantities in the southern half. (see Figure 8.13) This distributional pattern suggests that Totocapan was the source of this ideology for the region. The adoption of Cipactli Cult ceramics, images, and beliefs by other settlements in the region would have given the regime at Totocapan significant power over the regional population. Control of ritual belief for the region would have encouraged cooperative state-controlled construction projects, or other labor obligations, at Totocapan, gift exchange or tribute among regime officials at regional centers, and guarantee of political allegiances to the regime leaders at Totocapan, and exchange relationships that may have differentially benefitted Totocapan. This last point, and possible tribute relationships, will be discussed in the next chapter. It appears that Totocapan was a consumer of goods produced in its periphery, particularly during the Chaneque phase. The obligations garnered from Tilzapote, in particular, by Totocapan regime officials in exchange for establishing a solid foundation for its ideology may have pertained to boundary maintenance and overseeing exchange relationships with Matacapan.

In general, Matacapan and Totocapan were founded on very different principles, which resulted in the development of different cultural institutions at the two polities. The disruption caused by Matacapan's promotion of central Mexican ideals affected much of the Catemaco Valley, but did not spread into the Tepango Valley, where Totocapan had developed a long history of well-established beliefs which it promoted to its own hinterland. The variable influences that took place in the southwestern Tuxtlas created a number of social contrasts that differentially affected the identities of people living in different segments of the region. Underlying all of the social contrasts listed above, however, a substrate of common identity, expressed through basic material cultural styles united the region into a coherent cultural expression that differs from other regions on the Gulf Coast (see Chapter 6). The points of contrast between valleys discussed in this chapter shaped the different expressions of identity and political relationships among settlements in the study area (see also Chapter 7), but the various groups that populated the region internalized a shared cultural *habitus*. This shared identity did not overtly affect relationships among groups *within* the region to the same degree as the actively promoted identities that operated in the political, ritual, and economic realms of interaction. It did, however, define the regional realm of cooperative and competitive interactions in contrast to the external world, from which both Totocapan and Matacapan regimes sought to draw legitimacy in different ways. The net sum of all decisions made by agents in the Classic period Tuxtlas was a series of interconnected disjunctures and conjunctures that simultaneously divided and united different groups into a complex, multiscalar landscape of interaction.

CHAPTER 9: ECONOMIC LANDSCAPES IN THE TUXTLA MOUNTAINS

Economic interaction is embedded within the political landscape in many ways. This conjuncture is often viewed as inseparable, which is not true in all cases. An inseparably conjoined political economic landscape is one where every political connection has a predictable economic outcome and *vice versa*. I proceed in this chapter with the idea that the Tuxtlas political, economic, symbolic, and ritual landscapes are characterized by disjunctures as well as conjunctures. I do not seek to determine only how the exercise of political authority affected the production and exchange of goods. Instead, I examine all evidence for production and exchange regardless of the political units described in the previous chapters and reserve the discussions of conjuncture and disjuncture for Chapter 10.

The data collected by the TVAS is somewhat limited in the materials that can be studied economically and the detail with which production facilities can be described. I employ a diverse methodology below to reconstruct production and exchange networks for the different phases of occupation. The materials of study are pottery and obsidian tools.

POTTERY

POTTERY PRODUCTION

Pottery production within the survey region was difficult to identify using the methods described in Chapter 5. However, several collections stood out as probable locations of pottery specialists. These production loci were dated to the dominant phase or phases defined by relative proportions of temporally diagnostic artifacts, or by the waster types present at each production context (Table 9.1). Below, certain phases are combined because most collections could not be clearly split. The Picayo and Chininita phases are examined together. The Santiago A and Santiago B phases were inseparable. Every Santiago A collection had a substantial Santiago B occupation because of the

Table 9.1. Production loci for the Tepango Valley Archaeology Survey sorted by phase.

Phase	Site	Location	Context[1]	Size[2]	Intensity[3]	Wares Produced[4]
Picayo to Chininita	Totocapan	C1231	A	S	L	2701, 2519
Picayo to Chininita	El Picayo	C1377	I	S	M	2701, 2519
Picayo to Chininita	Arroyo Salado	C515/992	A	S	L	2904, 2519
Picayo to Chininita	Cruz de Vidaña	C364/377	A	M	M	2701, 2821, 2904
Picayo to Chininita	Site 163	C1470	I	S	L	2701, 2200, 2519
Picayo to Chininita	La Cuchilla (Site 167)	C1482/1483	I	M	M	2701, 2654
Picayo and Chaneque	Site 144	C1166/1167	I	M	L	2701
Santiago A to Santiago B	Totocapan	Totocapan C1229	A	S	L	2614
Santiago A to Santiago B	Totocapan	Totocapan C1333	A	S	M	2701, 2614, 1211
Santiago A to Santiago B	Totocapan	Totocapan C1273	A	S	L	2701, 2811
Santiago A to Santiago B	Totocapan	Totocapan	I	M	M	1211, 2701
Santiago A to Santiago B	Totocapan	El Picayo C1376	A	S	M	2701, 1211, 2611, 2614
Santiago A to Santiago B	Totocapan	El Picayo	I	M	L	2654, 2701, 1211
Santiago A to Santiago B	Totocapan	El Picayo	A	S	M	2654, 1211
Santiago A to Santiago B	Oteapan	C1000	A	M	L	2701, 1213
Santiago A to Santiago B	Pizapan (Site 3)	C875/890	I	S	L	1211, 2701, 2811
Santiago A to Santiago B	Site 31	C165/169/176	I	M	H	2701, 1211, 1213
Santiago A to Santiago B	Site 53	C551	I	S	L	2701
Santiago A to Santiago B	Site 81	C1602	I	S	M	2701, 1211
Santiago B to Chaneque	La Cuesta (Site 62)	C640/641/647/665	I	L	L	1111, 2811, 1211, 2701
Santiago B to Chaneque	Francisco Madero West	C731/736/737	I	M	L	2701, 1211, 2614, 1111
Santiago B to Chaneque	Site 122	C1014	I	S	L	2654, 1211, 2701
Santiago B to Chaneque	Site 141	C1157	I	S	L	2701
Santiago B to Chaneque	Tilzapote East	C1158/1163	I	M	L	2701, 1111
Santiago B through Vigía	Francisco Madero East	C923/941/1080	I	L	M	2701, 1111, 1232, 2611
Santiago B through Vigía	Site117	C958/959	I	M	L	1211, 2701
Santiago B through Vigía	Tilzapote South	C1103	I	S	L	2701, 2651
Chaneque	Cruz de Vidaña	C147	I	S	L	1211
Chaneque	Texcochapan	C553/564	I	M	M	2701, 1111
Chaneque	Site 155	C1204/1203	I	M	M	2701, 1111
Chaneque	El Nopal (Site 182) and Site 183	C1552/1571/1558/ 1559/1577/1612/1584 / 1613	I	L	H	1111, 2811, 2701, 2614
Chaneque through	Tilzapote West	C1104/1105	I	S	L	1111, 1211, 1214
Chaneque through	Maxyapan	C799	I	S	M	1211, 2614, 2701
Vigía to Totogal	Totogal (Site 124)	C1049	I	S	M	1211

[1] A=Attached, I=Independent
[2] S=Small, M=Medium, L=Large
[3] L=Low, M=Moderate, H=High
[4] 1111=Fine Gray; 1211=Fine Orange; 1213=Fine Buff; 1214 Fine Orange with a dark core and highly compact paste; 1232=Brown Slipped Fine Orange; 22xx=Differentially Fired black with a buff rim; 2512=Coarse Paste Polished Black; 2519=Polished Brown with medium paste; 2611=Brown Slipped Coarse Brown (white temper); 2614=Coarse Brown Cazuelas (white temper); 2651=Coarse Red (white temper); 2654=Coarse Brown (white temper); 2701=Coarse Brown (volcanic ash temper); 2811=Coarse Orange; 2904=Polished Orange

overlap in ceramic diagnostics. Many collections displayed equal frequencies of Santiago B and Chaneque diagnostics, so a temporal period was assigned that spanned the two phases. The Santiago B to Chaneque period can generally be thought as the second half of the Classic period while the Santiago A to Santiago B phases are relatively earlier in the Classic. Several collections displayed production that clearly dated to the Chaneque phase, though.

Picayo to Chininita

The first solid evidence for pottery production in the Tepango Valley dates to the Picayo phase, but Totocapan, Cruz de Vidaña and Arroyo Salado all have production evidence in collections that coincide with Initial Picayo phase ceramics. A total of seven production localities were identified at five sites, which is just under eight percent of Picayo phase settlements (Figure 9.1). Almost half of these production loci were attached to architecture inferred to be elite residences. The attached producers exclusively occur at Totocapan, Arroyo Salado and Cruz de Vidaña – the only three centers in the region at the time. Independent producers were situated close to the larger sites, suggesting they may have been supplying inhabitants of the large sites with

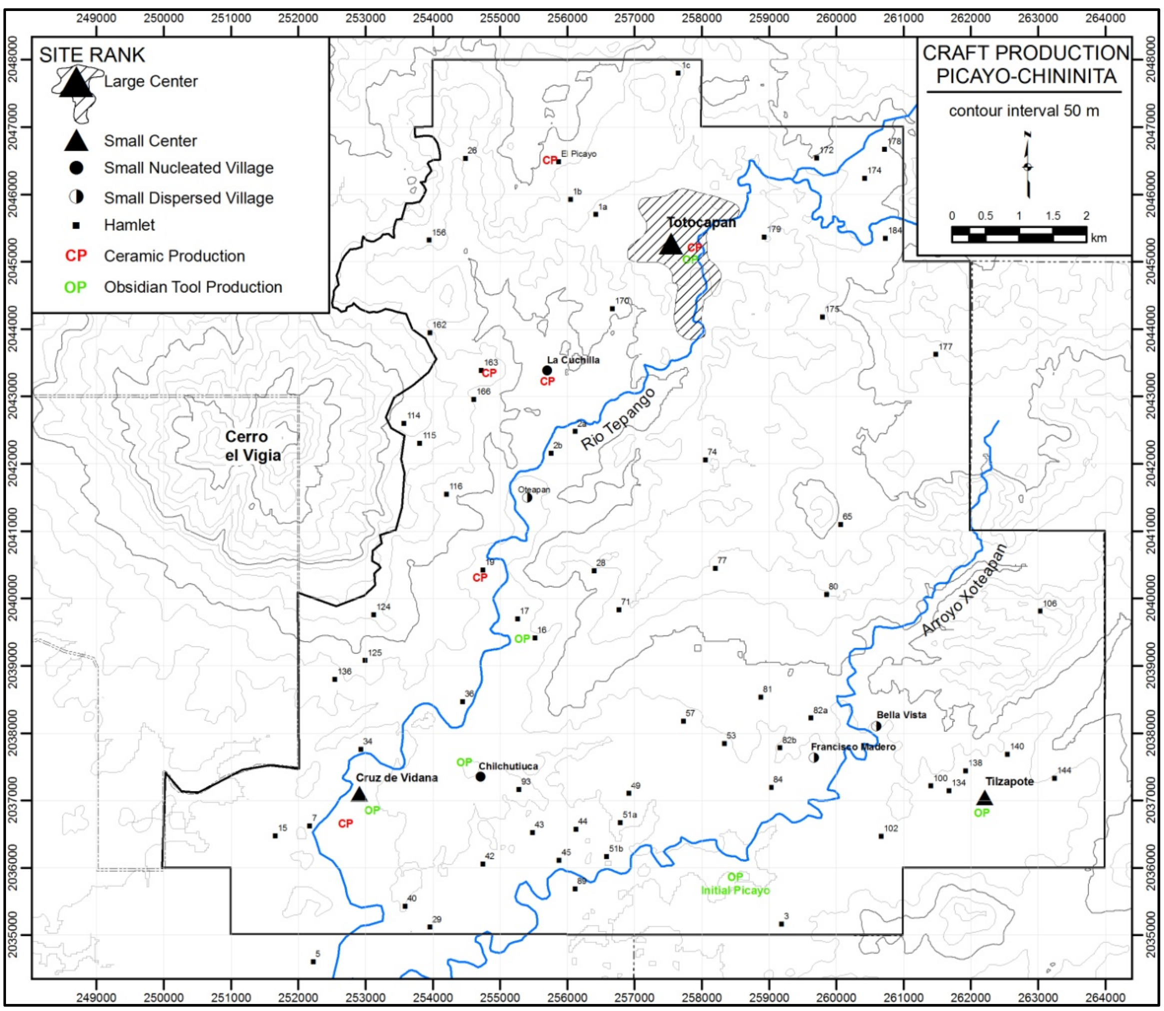

Figure 9.1. Locations of identified ceramic and obsidian tool production during the Picayo and Chininita phases.

pottery. Most Picayo phase ceramic production covered a very small area and displays low to moderate intensities of production. Considering the production loci identified through this study, all sites except Arroyo Salado and Site 144 manufactured a mix of utilitarian and serving wares. Attached producers at Totocapan and Arroyo Salado commonly made Polished Brown bowls, which were frequently decorated. Differentially fired bowls, another serving ware, were also made at several of the Picayo phase production loci. The attached producer at Arroyo Salado exclusively produced serving wares. Site 144 on the other hand exclusively produced Coarse Brown jars, which makes it difficult to accurately date the production. This is the only site with Picayo phase ceramics production that does not continue into the Chininita phase. Site 144 also displays an intensive occupation during the Chaneque phase that could account for the production of Coarse Brown jars. Six production loci that were established in the Picayo phase continued operation into the Chininita phase (see Table 9.1).

Santiago A to Santiago B

For this report, Santiago A and Santiago B phase production evidence are lumped together; however, three sites can confidently be placed toward the beginning of that range (see Table 9.1 and Figure 9.2). Oteapan, Texcochapan, and Site 31 all have an abundance of Fine Buff ceramics, which tend to date to the Santiago A phase. Oteapan had an attached producer that likely made Fine Buff bowls. Teotihuacan design elements were often executed on Fine Buff bowls and cylindrical tripod vessels in the neighboring Catemaco Valley (Arnold and Santley 2008; Santley et al. 1987), but this is not one of the sites where potential Teotihuacan-style material was recovered. Site 31 also appears to have made Fine Buff bowls. Site 31 was situated within one kilometer of the large site of San Marcos (Kruszczynski 2001, Stirling 1943), and probably supplied this site with ceramics. Production intensity there was rather high.

Ceramic production evidence that probably dates to the later Santiago B phase consists of 20 ceramic producers identified at 12 sites (10 percent of Santiago B phase sites). The general pattern of pottery production in the Santiago B phase appears to be

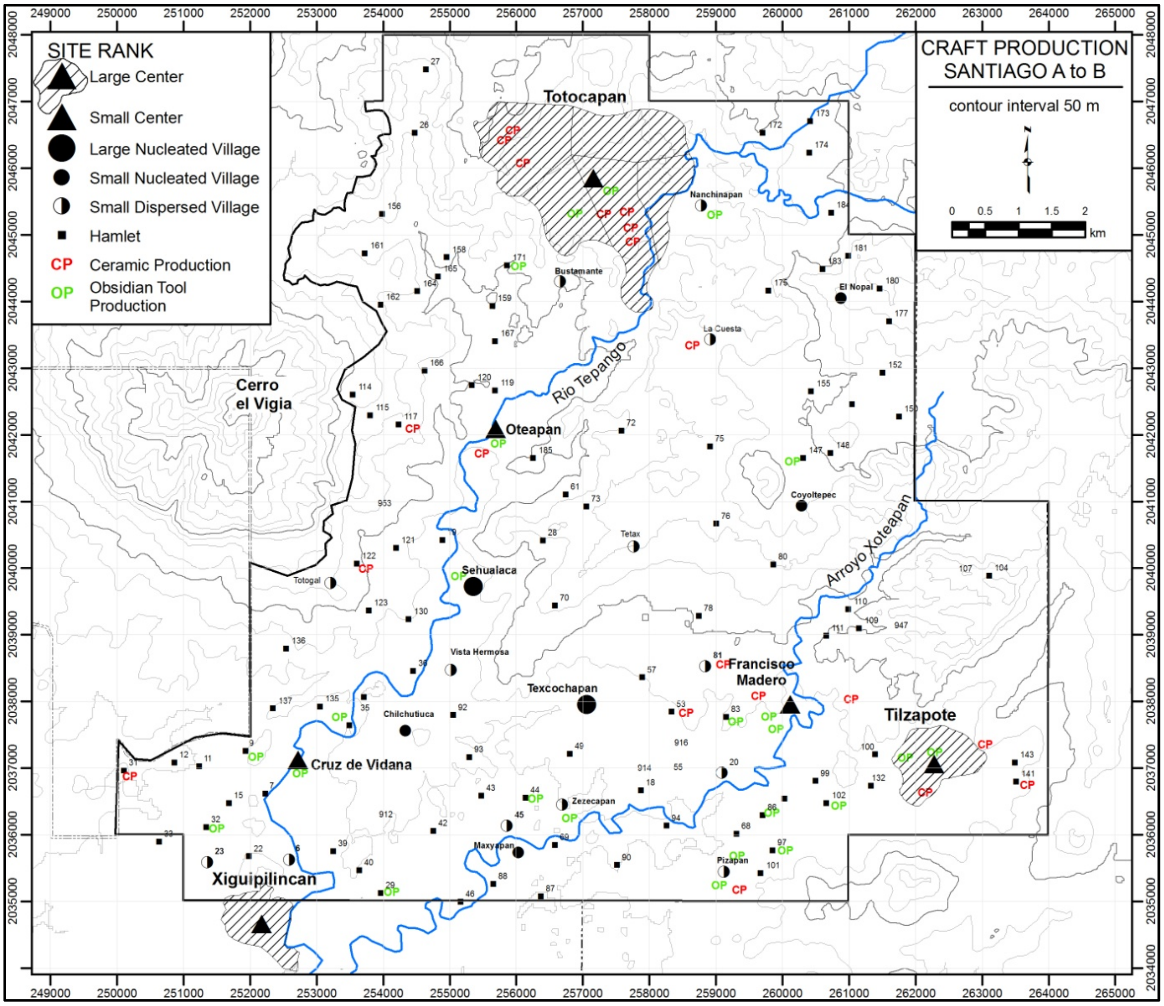

Figure 9.2. Locations of ceramic and obsidian tool production during the Santiago A and Santiago B phases.

associated with the larger sites in the region. About two-thirds of the producing sites are among the top 10 largest sites in the region. The hamlets that were found to manufacture pottery were generally located within 1-2 km of a center or large village. Ceramic production, therefore took place at or near population centers where demand was greatest.

At Totocapan, ceramics were manufactured in the Totocapan Core and El Picayo districts. These account for five out of six Santiago B phase attached producers characterized for the entire survey region. Attached producers are inferred from production indicators found in collections spatially associated with elite or administrative architecture. The reliance on attached production at Totocapan and independent production elsewhere suggests that the general population of Totocapan may have relied on potters in the countryside to provide for their ceramic needs. However, the collection strategy employed at Totocapan was skewed toward mounds. Elites employed a number of craft specialists to provision their households and to create decorated serving wares, like Cipactli Cult ceramics. Alternatively, the elites may have been provisioning the general population of the site to instill among their subjects a perception that they were benevolent providers. It is possible that the regime of Totocapan held feasts to spread its political ideologies through symbols engraved on bowls. This would require a large number of serving vessels. Pottery manufacture at Totocapan was, however, of too small scale and low intensity to suggest that they were making pots for exchange to a large segment of the Tepango Valley. La Cuesta is the only ceramic producing site in the immediate hinterland (within 2-3 km) of Totocapan. While production evidence at La Cuesta covers a large area, the intensity of production appears rather low.

A cluster of pottery producing sites was located on the eastern flanks of Cerro el Vigía on the terraces overlooking the Tepango River, including Oteapan, Site 117, and Site 122. The size of these facilities ranged from small to medium with low to moderate production intensities. They were likely producing pots for intrasite consumption and to exchange with their non-producing neighbors. Site 31 was a ceramic producer located in the southwestern corner of the TVAS. The size and intensity of production of this facility was greater than those discussed above. It likely arose to supply the nucleated populations living at Cruz de Vidaña and San Marcos (Kruszczynski 2001). No production was identified at Cruz de Vidaña during the Santiago B phase. Farther east, a fourth cluster of pottery producing sites emerged, including Francisco Madero, Tilzapote, Pizapan, and Sites 53, and 81. On a regional scale, this segment of the survey displays the greatest concentration of potters. However, the size and intensity of these production facilities are fairly low. One exception occurs at the eastern extent of Francisco Madero. Here, production evidence is spread over a relatively large area with a moderate intensity of production. Utilitarian and serving wares were both produced, probably intended for consumption at Francisco Madero and surrounding hamlets. Francisco Madero East was one of two production loci at the site. The other, Francisco Madero West, manufactured pottery at lower intensities.

Chaneque

During the Chaneque phase, a total of 14 production loci were identified at 11 sites (12 percent of the Chaneque phase site total) spread throughout the survey area (see Table 9.1 and Figure 9.3). These figures are calculated based on the Santiago B to Chaneque period as well as more pure Chaneque phase collections. La Cuesta, El Nopal, and Site 155 all occur within a four square kilometer block in the northeast corner of the survey area. This concentration of potters likely arose due to high demand in Totocapan. Totocapan during the Chaneque phase only produced evidence for one small pottery producer located in the Pollinapan District, though other small scale producers were likely missed by the methods employed here. These three sites to the east of Totocapan had ceramic workshops of relatively large size and higher intensities of production than is typical for the survey area. It appears as though Totocapan may have 'outsourced' its ceramic industry. El Nopal, in particular, was a large scale and intense producer of ceramics. A total of 128 wasters and 3 kiln fragments were identified within two closely spaced surface collections. Of these wasters, 81 percent were Fine Gray dishes, 7 percent were Coarse Brown in the *cazuela* form, 5 percent were Coarse Brown *ollas*, 5 percent were Coarse Orange *ollas*, and 2 percent were unidentified. Non-waster type proportions closely resemble those represented among the wasters. Three Fine Gray rim sherds from plates with straight divergent walls and everted lips were found fused together due to firing. While the overall size of this production locus is not confidently known, Site 183 located about 500 m to the northwest also possessed relatively a high proportion of Fine Gray wasters. This suggests that El Nopal and Site 183 were related and may have both been part of the same large production workshop. If these two sites are considered together, production evidence covers over 12 ha, with kiln fragments and a high proportion of wasters identified on the surface.

The majority of the remaining Chaneque phase potters continued their trade from the Santiago B phase and will not be discussed again. Exceptions are a moderate intensity producer at Texcochapan North and two small, low intensity producers at Tilzapote West and Cruz de Vidaña. All three of these were independent producers.

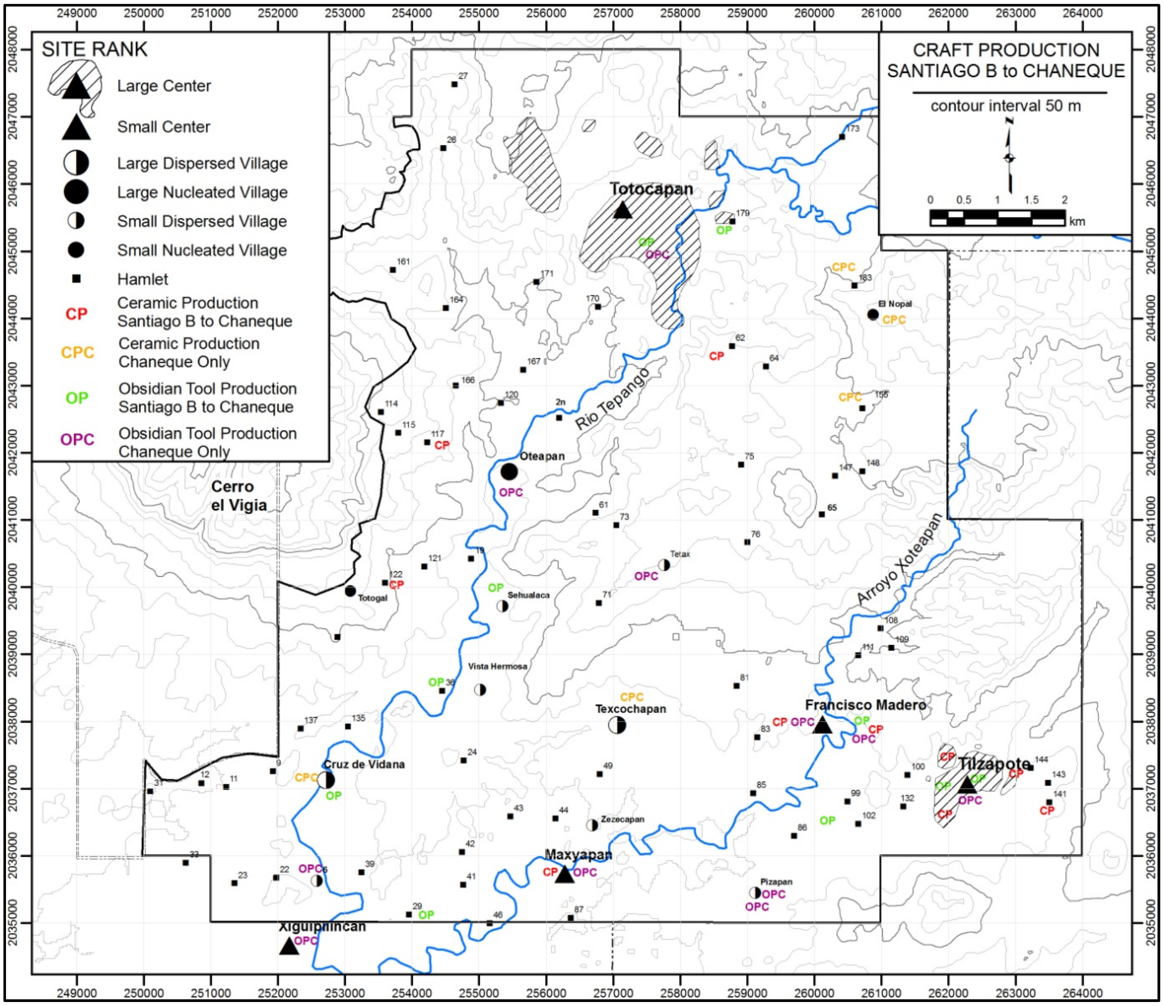

Figure 9.3. Locations of ceramic and obsidian tool production during the Santiago B and Chaneque Phases.

Vigía and Totogal

Only 5 sites (10 percent of the Postclassic site total) have production evidence associated with Postclassic contexts: Francisco Madero, Maxyapan, Totogal, Tilzapote and Site 117 (see Table 9.1 and Figure 9.3). Most of these carried over from earlier time periods. This is not to say that potters manufactured their wares for nearly 1000 years in the same workshop. Instead, data limitations make it difficult to tease apart the precise date with regard to these facilities. One site appears to have pottery production for the first time during the Postclassic. Venter (2005) recovered molds to make Texcoco Molded ceramics at Totogal. No direct indicators of production were identified during the current survey, but collections at Totogal produced high sherd densities (upper decile) for the survey. The combination of these finds provided data to characterize the Totogal ceramic production industry in Table 9.1. Because Texcoco Molded censers are Late Postclassic diagnostic, pottery production at Totogal took place during the Totogal phase.

Summary

In summary, pottery production in the survey area was generally of small size and low-to-moderate intensity for every phase. These workshops were scattered throughout the survey region. It does not appear as though the region was characterized by a centralized system of ceramics production and exchange, as was the Catemaco Valley (Arnold et al. 1993, Santley et al. 1989, Stoner et al. 2008). The one exception is a workshop that intensively produced Fine Gray serving bowls on a rather large scale at El Nopal/Site 183 during the Chaneque phase. This fits with observations that the Late Classic over much of Mesoamerica experienced increased commercialism after the collapse of large states like Teotihuacan and Monte Alban (Blanton et al. 1993).

Attached production occurs mostly at Totocapan and is most prevalent during the Formative period. Elites during the Formative often commissioned craft specialists to manufacture prestige goods that they could trade over long distances, or use locally to display their wealth and power (Pool 2007). This allowed potters, for example, to procure part of their livelihood from crafts production. Attached specialization during the Formative may have provided the seeds for the development of larger independent craft specialists during subsequent periods. Attached production was a major feature of the craft industry of Totocapan into the Classic period, though the workshops changed locations. This is admittedly a coarse grained characterization of pottery production within the survey area. Intensive survey and excavation should target the organization of ceramic production facilities in the future.

COARSE ORANGE PRODUCTION AND EXCHANGE

One ceramic ware in particular was of interest for a more intensive study of its distribution through compositional analysis. Coarse Orange use in the Tuxtla Mountain reached its greatest popularity during the Santiago B phase, or Middle Classic period. In a previous ceramic compositional study, employing both neutron activation and petrographic point counting analyses, I argued that the Comoapan pottery production facility at Matacapan manufactured Coarse Orange jars for exchange throughout a large segment of the Tuxtla Mountains (Stoner 2003, Stoner et al. 2008; see also Arnold et al. 1993, Santley et al. 1989). Coarse Orange occurs primarily in utilitarian forms, but it is a finely made ware often painted with complex geometric designs with examples of funerary use (Figures 9.4 and 9.5). Its importance to the economy of Matacapan is evident by the specialized manufacture of Coarse Orange jars at two large independent production facilities at the southern edge of the site. Comoapan was the largest ceramics producer at Matacapan, and one of the largest known to Mesoamerica (Arnold et al. 1993, Santley et al. 1989; cf. Feinman 1999). Of the ceramics produced by Comoapan, almost 60 percent were Coarse Orange jars (Pool 1990). Survey and excavation documented the remains of 36 updraft kilns (Figure 9.6), which demonstrate a specialized knowledge of ceramic production and an effort to efficiently produce a relatively standardized product.

Figure 9.4. Coarse Orange jar on display at the Museo Tuxtleco in Santiago Tuxtla. This vessel functioned as a funerary urn, containing the remains of two infants

Figure 9.5. Coarse Orange rim sherds from neckless jars (photograph by Christopher A. Pool).

Figure 9.6. Updraft kiln excavated at the Comoapan production facility in Matacapan (photograph by Christopher A. Pool).

Coarse Orange is a common ceramic type in the Catemaco River valley. It occurs at nearly all sites that were occupied during the Middle Classic period. The same can be said for the presence of the Coarse Orange type in the Tepango Valley, but it occurs in lower proportions. Table 9.2 and Figure 9.7 depict the proportion of Coarse Orange among all Santiago B phase-sensitive pottery for sites that returned 10 or more sherds of this type. The Coarse Orange type was a much more important component of Middle Classic ceramic assemblages in the eastern half of the survey area. Proportions of this type decrease with distance from Matacapan, suggesting that the political capital of the

Table 9.2. Percentage of Coarse Orange sherds of total Santiago B phase-sensitive sherds (sites with fewer than 10 Coarse Orange sherds excluded).

Sites	2811	Total	%CO
143	94	129	72.9
111	23	32	71.9
184	10	15	66.7
150	29	45	64.4
132	38	69	55.1
183	27	59	45.8
152	10	23	43.5
98	80	204	39.2
110	36	88	40.9
97	32	81	39.5
Nancinapan	28	77	36.4
La Cuesta	36	110	32.7
Texcochapan	52	168	31.0
83	12	43	27.9
10	10	36	27.8
Tetax	28	103	27.2
Totocapan	392	1634	24.0
Francisco Madero	126	528	23.9
Coyoltepec	18	76	23.7
El Nopal	33	141	23.4
Sehualaca	21	92	22.8
147	23	102	22.5
Oteapan	65	302	21.5
Chilchutiuca	19	90	21.1
Vista Hermosa	13	62	21.0
Pizapan	42	217	19.4
36	13	68	19.1
Tilzapote	66	400	16.5
42	10	62	16.1
Zezecapan	30	192	15.6
Xiguipilincan	10	71	14.1
Totogal	12	131	9.2
103	11	140	7.9

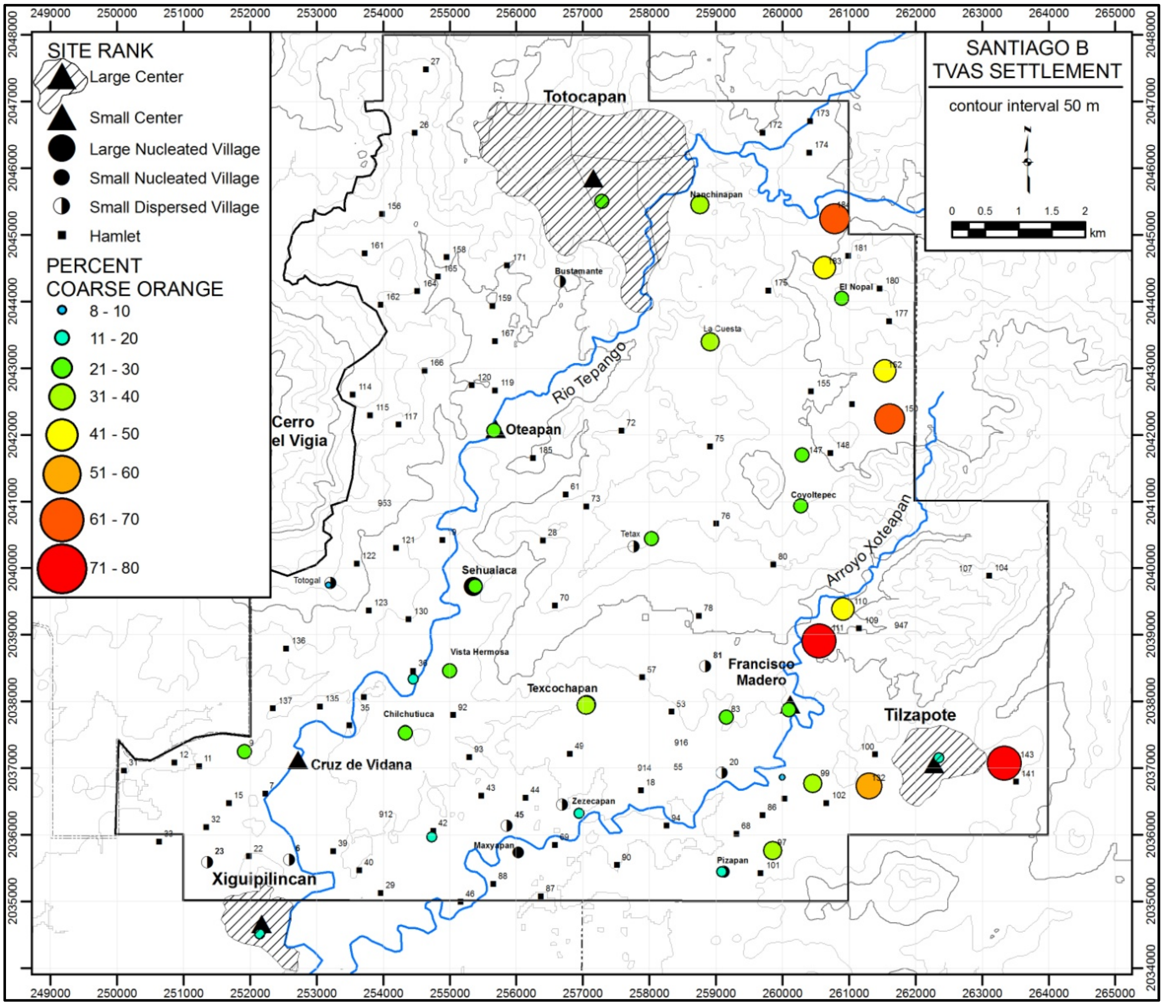

Figure 9.7. Percentages of the Coarse Orange type of all Santiago B phase-sensitive ceramics at sites within the TVAS (excluding sites with fewer than 10 Coarse Orange specimens).

Catemaco Valley was either the origin of the Coarse Orange style and/or it was the primary producer of these jars that were then traded through a regional market system.

Tres Zapotes, the western-most site sampled for my earlier compositional analysis (Stoner 2003), produced a very low proportion of Coarse Orange jar sherds from survey (Pool personal communication 2001). Many of the sherds classified as Coarse Orange during analysis of survey materials from Tres Zapotes (Pool 1997), displayed characteristics that could be visually distinguished from Matacapan Coarse Orange without the use of a hand lens. As will be discussed below, none of the 14 sherds sampled from Tres Zapotes closely resembles the chemical composition of Coarse Orange sampled from the Comoapan production facility. Tres Zapotes therefore represents a continuation of the fall-off in Coarse Orange frequency with distance from Matacapan.

Chemical and Mineral Sourcing of Coarse Orange in the Southwestern Tuxtlas

For my master's thesis, I analyzed a sample of Coarse Orange from the Catemaco Valley, the Hueyapan Survey area to the south, and Tres Zapotes using petrographic point-counting analysis and INAA (Stoner 2003). The results indicated that Comoapan likely exchanged these jars to settlements principally along the Catemaco River, but, at the time, there appeared to be a boundary limiting exchange westward into the Tepango Valley (Stoner 2003; Stoner et al. 2008). For the current project, I expanded the Coarse Orange sample analyzed by neutron activation into the Tepango Valley. Exchange or non-exchange of this ware between river valleys will provide a key piece of data to interpret intervalley relationships.

The western Tuxtlas region displays some geological characteristics that are advantageous for compositional sourcing. Using X-ray Fluorescence, Pool (1990) identified, and Stoner (2002) later verified using INAA, an east-to-west trend of clay chemistry (see "Geology" section of Chapter 4). The clays available in the Tepango Valley were primarily "Group S" clays from the upper Concepción clay formation. The upper part of the Concepción formation, which contains relatively high percentages of quartz sand inclusions and low concentrations of Ca, were used to produce the CO2 Coarse Orange paste recipe that was found to dominate assemblages to the western edge of the Catemaco Valley and Tres Zapotes. "Group C" clays, which contain very few quartz sand inclusions and higher levels of Ca, are not commonly exposed at the surface in the western sub-region of this study area. This is because Group C clays are from the lower Concepción formation and neither the Tepango nor Xoteapan rivers have exposed clay those lower strata. Group C outcrops appear primarily in the Catemaco Valley, where the larger Catemaco River has exposed deeper clay deposits. Both Group C and Group S clay outcrops appear to the east of Tilzpote within the survey area, as assessed through chemical analysis of two specimens collected during the TVAS. Group C clays were used to produce the CO1 paste recipe, such as that employed at Comoapan.

Calcium (Ca) concentrations are a primary method of group discrimination. As discussed in Chapter 4, the Concepción formation is a tertiary marine clay, primarily composed of kaolinitic clay minerals. The clays are calcium-rich due to the inclusion of calcium carbonate ($CaCO_3$) minerals from marine shell. During firing, the calcium carbonate minerals convert to calcium hydroxide as carbon is driven off and oxygen bonds with hydrogen from water that remains within the clay matrix. Calcium carbonate minerals are not visible in thin sections of pottery due to their degradation during firing Higher levels of calcium occur the deeper strata of the Concepción formation (Group C), resulting from the higher density of $CaCO_3$ minerals within the clay matrix. Contributing to the relatively lower levels of Ca in upper strata Concepción strata (Group S) is the more frequent and larger quartz sand inclusions, which causes dilution of Ca in bulk analysis. The upper part of the Concepción formation grades into the overlying Filisola sands. The Tepango and Xoteapan rivers have not exposed Concepción clays of the lower, Group C, strata. The expected result of this is that pottery produced in the TVAS, with the possible exception of the Tilzapote area, would be made from Group S clays from the upper parts of the Concepción formation.

The second major discriminatory variable identified by my initial study of Coarse Orange from the Catemaco Valley and clays from the broader region related to the addition of volcanic ash. Volcanic ash temper elevates the concentrations of a suite of related metal elements compared to the raw clays. These include chromium (Cr), iron (Fe), nickel (Ni), manganese (Mn), and vanadium (V). The addition of volcanic ash temper therefore separates Coarse Orange pottery from the composition of the natural clays. The more temper that is added, the greater the difference between pottery and clay (Figure 9.x). In Figure 9.8, Group C and Group S are clays that clearly display the lowest concentrations of the most important elements contributed by volcanic ash (chromium and iron). The remainder of the specimens depicted represent Coarse Orange pottery sampled from the Catemaco Valley. The most lightly tempered pottery in this sample is the COP6 group, which consisted of Coarse Orange made at an attached production

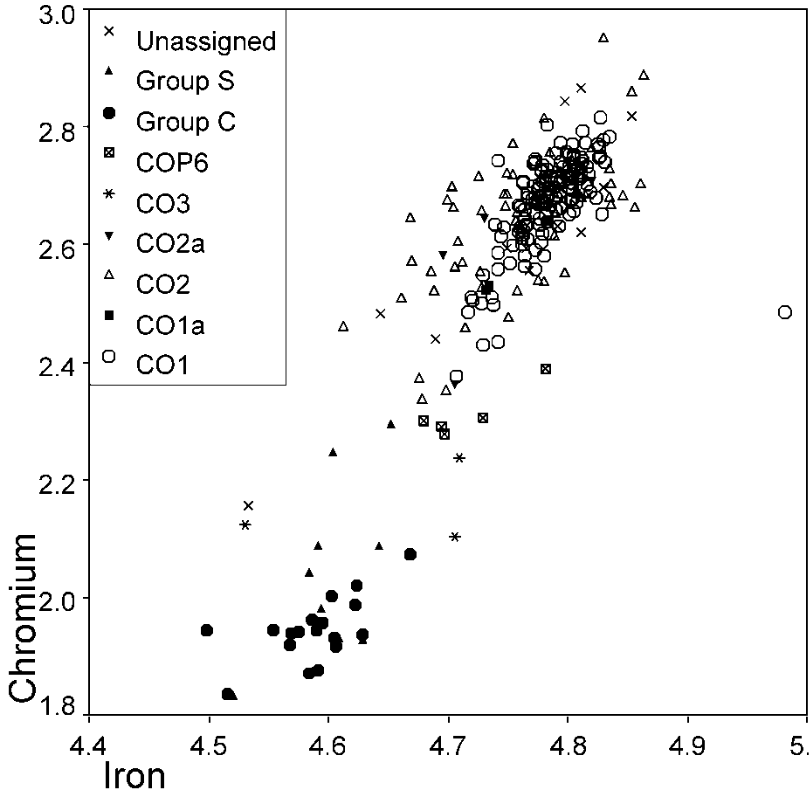

Figure 9.8. Comoapan Valley Coarse Orange pottery and Concepción clays plotted on axes of chromium and iron (Stoner et a. 2008: Figure 10).

facility in central Matacapan. Note how the COP6 group contains among the lowest levels of Cr and Fe among Coarse Orange pottery.

Comparing chemical compositions of ceramics and clays determined by Pool's XRF analysis and NAA conducted at Brookhaven (Pool 1990, Pool and Santley 1992), Pool demonstrated that Fine Orange ceramics from both Matacapan and Totocapan (referred to as El Picayo) were rather easily distinguished. Fine Orange from Totocapan was made from Group S clays, while Group C clays were used to produce Matacapan Fine Orange. Fine Orange is untempered, so the chemistry of the pottery closely matches the chemistry of the clays use to make them. These data led me to anticipate that the majority of Coarse Orange jars sampled from within the Tepango Valley would belong to the CO2 paste recipe characterized through previous research (Stoner et al. 2008). A CO2 paste recipe for Coarse Orange would be expected for a locally made product.

Figure 9.9 is a scatter plot of the INAA data from the Tepango Valley Coarse Orange sample, analyzed as part of the current project, projected over 90 percent

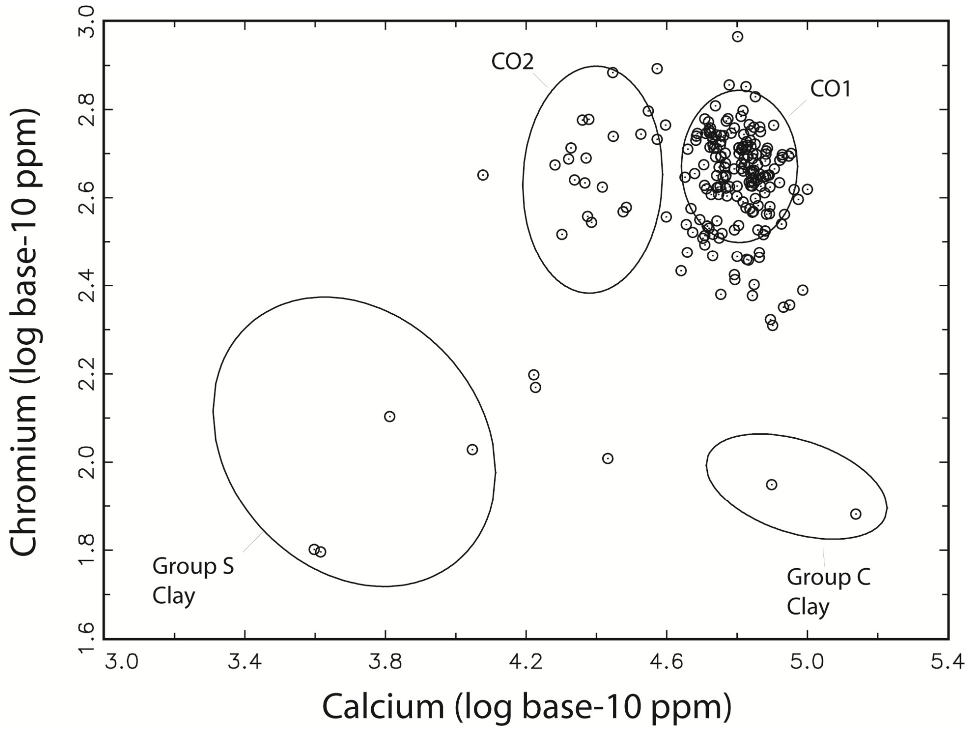

Figure 9.9. Scatter plot showing the Coarse Orange sample from the Tepango Valley projected on calcium and chromium axes. Ninety percent confidence ellipses were calculated from Coarse Orange compositional data from the Catemaco Valley (see Stoner et al. 2008).

confidence ellipses of my original Coarse Orange compositional study from the Catemaco Valley. My initial expectation was wrong. The majority of specimens in the Tepango Valley possessed the CO1 paste recipe, made from Group C clays. Many of these specimens, however, tend to fall outside the CO1 confidence ellipse due to relatively lower concentrations of transition metals introduced through volcanic ash temper. This likely indicates that they were more lightly tempered. Before addressing the potential exchange of Coarse Orange jars from Matacapan into the Tepango Valley, I must address the fundamentals of these data.

Sampling, Statistical Analysis, and Group Formation

I sampled a total of 198 Coarse Orange jar sherds from the TVAS region and added four Concepción clay specimens. The chemical data for these specimens were combined with the data previously collected from the Catemaco Valley and clays for the region, producing a total sample of 430 Coarse Orange sherds and 32 clay specimens (Table 9.3). All data were analyzed through INAA at the University of Missouri Research Reactor using the same procedures and standards (see Chapter 5). Precautions were made while collecting both samples to represent sites located throughout the study area and all ranks of the Middle Classic settlement hierarchy. Coarse Orange jars generally occurred in lower frequencies in the TVAS area than in the Catemaco Valley (see above). A total of 1723 sherds were typed to Code 2811 (3.3 % of all pottery sherds recovered through the TVAS). This ceramic code which was rigorously maintained as a category including only those Coarse Orange specimens that were visually indistinguishable from the Coarse Orange produced at Matacapan based on form, color, texture, slip, temper type, temper size, and temper amount.

Through an internship at the University of Missouri Research Reactor (MURR), I conducted INAA on the Tepango Valley sample of Coarse Orange. All statistical analyses were calculated on the entire 462 specimen sample for the combined ceramic and clay dataset described above. Initially, principal components analysis was employed to look for patterns in the chemical data. The first two components explain 60 percent of the variability among the chemical data (Table 9.4). The most influential variables on Principal Component 1 are Ca, Sr, Cr, and Ni in order of decreasing importance (Tables 9.5 and 9.6). As seen in Figure 9.10, however, Ca and Sr are highly correlated and explain variation along the same axis. This because Ca and Sr ions are of similar size and charge and substitute readily for each other in the clay matrix. Chromium, on the other hand, diverges from Ca and becomes the most important counterpart to Ca on Principal Component 2. The chemical groups discussed below can be readily distinguished using PC1 and PC2 (Figure 9.11), or logged concentrations of Ca and Cr (Figure 9.12).

Three major groups of Coarse Orange and two groups of clays are distinguishable within the chemical dataset. Both clay groups (Group C and Group S) score lower than most ceramics on Principal Components 1 and 2 (Figure 9.11). Among the clays, Group S scores higher on PC 2 (influenced strongly by Cr and Ni), and Group C scores higher on PC 1 (influenced mainly by Ca and Sr). CO3, however, is chemically similar to the Group S clays. These Coarse Orange sherds contain many medium and coarse sand-sized

Table 9.3. Coarse Orange and Clay Sample and Group Assignments.

Site	CO1	CO1A	CO2	CO3	COP6	GROUP C	GROUP S	Unassigned	Total
Tepango Valley Sample									
Totocapan	13	1	1					5	**20**
Chilchutiuca	4	3	3						**10**
Zezecapan	5	1	1					3	**10**
Maxyapan	5		2					3	**10**
97	5	4	1						**10**
Totogal	1	6		2				1	**10**
Tilzapote	4	4						2	**10**
143	3	6						1	**10**
147	5	5							**10**
152		2	4					2	**8**
El Nopal	6	2	1					1	**10**
110/111	4	3						3	**10**
9/23/31/33	5	1	2					2	**10**
156/161/162/164	5	2		1				2	**10**
Sehualaca	5	4	1						**10**
Oteapan	5	3	2						**10**
Francisco Madero	5	4						1	**10**
Tetax	3	3						4	**10**
Texcochapan	5	1	1					3	**10**
TVAS Clay K1							1		**1**
TVAS Clay K2 L							1		**1**
TVAS Clay K2 U							1		**1**
TVAS Clay K3						1			**1**
Catemaco Valley Sample									
132C	6	3	2					3	**14**
143C	10	1	2					2	**15**
154C	1		11					3	**15**
170C	1		14						**15**
39C	6	1	8						**15**
48C	10	3						2	**15**
Apomponapam	9	2	3					1	**15**
El Salado	8	3	2					1	**14**
Hueyapan	11	4	6	4				5	**30**
Isla Agaltepec	6	5	1					3	**15**
Ranchoapan	8	5						2	**15**
Teotepec	4	2	5					4	**15**
Tres Zapotes		1	14						**15**
Matacapan Production Facilities									
-Southeastern	3	5	1						**9**
-Comoapan	6								**6**
-Pit 6					5				**5**
-Western	2	2							**4**
Total	**179**	**92**	**88**	**7**	**5**	**19**	**12**	**60**	**462**

Table 9.4. Eigenvalues and Percentage of Variance Explained.

	Eigenvalue	%Variance	Cum. %Var.
1	0.1725	37.2356	37.2356
2	0.1058	22.8367	60.0723
3	0.0353	7.6231	67.6954
4	0.0266	5.7435	73.4389
5	0.024	5.1807	78.6196
6	0.0156	3.3587	81.9783
7	0.0132	2.8472	84.8255
8	0.0104	2.2439	87.0695
9	0.0093	2.001	89.0705
10	0.0074	1.596	90.6665
11	0.0067	1.4399	92.1064
12	0.0053	1.1509	93.2573
13	0.0049	1.0553	94.3127
14	0.0049	1.0551	95.3677
15	0.004	0.8593	96.2271
16	0.0027	0.5785	96.8056
17	0.0022	0.4848	97.2903
18	0.0021	0.4435	97.7338
19	0.0017	0.3625	98.0964
20	0.0015	0.3176	98.414
21	0.0013	0.2771	98.6911
22	0.0011	0.2448	98.9358
23	0.001	0.2111	99.1469
24	0.0009	0.1973	99.3442
25	0.0008	0.1806	99.5248
26	0.0007	0.1414	99.6662
27	0.0005	0.1114	99.7776
28	0.0004	0.0896	99.8672
29	0.0003	0.0689	99.9361
30	0.0002	0.0328	99.9689
31	0.0001	0.0311	100

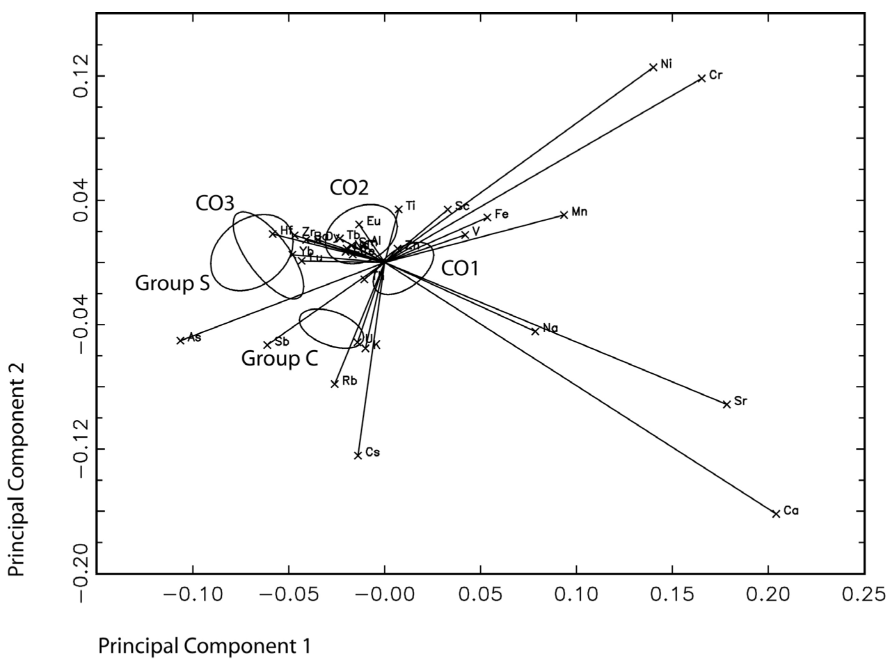

Figure 9.10. RQ-Mode plot of ceramic and clay compositional groups and factor loadings for the entire sample of Coarse Orange jars and Concepción clays.

Table 9.5. Eigenvector Loadings.

Element	1	2	3	4	5	6
As	-0.2563	-0.1545	0.7614	-0.4283	-0.0908	0.0322
La	-0.049	0.0208	-0.0361	-0.0727	-0.0334	-0.1407
Lu	-0.1042	0.0032	-0.0314	-0.1086	-0.0199	-0.1541
Nd	-0.0478	0.0272	-0.031	-0.0904	-0.0459	-0.178
Sm	-0.0418	0.033	-0.0253	-0.0879	-0.0495	-0.1654
U	-0.0339	-0.1577	-0.0295	-0.0141	0.056	0.0675
Yb	-0.1158	0.015	-0.0321	-0.119	-0.0438	-0.1633
Ce	-0.0402	0.0157	-0.0206	-0.044	-0.0394	-0.2156
Cr	0.3981	0.364	-0.0847	-0.2356	-0.1087	-0.007
Cs	-0.0335	-0.3819	-0.4058	-0.2852	-0.3088	-0.0117
Eu	-0.032	0.0753	-0.0199	-0.0793	-0.0312	-0.2008
Fe	0.129	0.0891	0.0321	-0.0797	-0.0464	-0.0686
Hf	-0.1407	0.0565	0.006	-0.0005	-0.0141	-0.151
Ni	0.3372	0.3858	0.0193	-0.3972	-0.1734	0.3311
Rb	-0.0626	-0.2407	-0.3012	-0.2154	-0.1819	-0.0371
Sb	-0.1475	-0.1633	-0.0229	-0.2607	-0.0775	0.0833
Sc	0.0793	0.1046	-0.0562	-0.1067	-0.0359	-0.0512
Sr	0.4296	-0.2809	0.0118	0.0238	0.371	-0.1511
Tb	-0.0564	0.0474	0.0131	-0.1112	-0.0828	-0.2241
Th	-0.0257	-0.0334	-0.0371	-0.0536	-0.0099	-0.0375
Zn	0.0162	0.0273	-0.0081	-0.1513	-0.0444	-0.0286
Zr	-0.113	0.0536	-0.0119	0.0182	0.0112	-0.3331
Al	-0.0264	0.0361	-0.0605	-0.0496	0.013	-0.0355
Ba	-0.0986	0.0448	-0.1449	-0.4291	0.7973	-0.0276
Ca	0.4916	-0.4974	0.2123	-0.0929	-0.0215	0.0517
Dy	-0.0837	0.0447	-0.0781	-0.2005	0.0076	-0.0415
K	-0.0242	-0.1701	-0.2029	-0.1795	-0.0312	0.0312
Mn	0.2252	0.0938	0.1399	-0.0441	-0.0813	-0.6137
Na	0.1892	-0.1365	0.0454	0.1117	-0.0535	-0.2346
Ti	0.0177	0.105	-0.0664	-0.0778	0.0244	-0.0607
V	0.1011	0.0547	-0.0311	-0.0848	-0.064	-0.0336

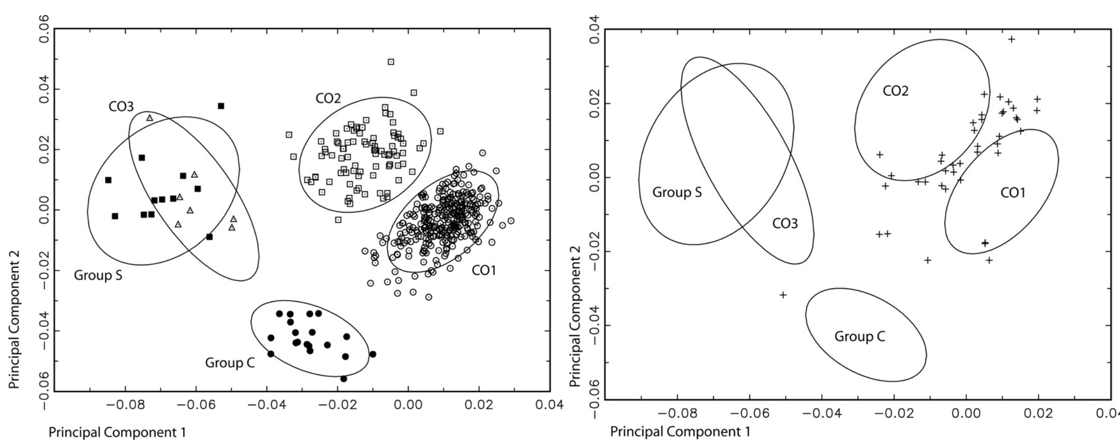

Figure 9.11. Chemical groups depicted on Principal Components 1 and 2, ellipses represent 90 percent confidence intervals.

Table 9.6. Scaled Factor Loading Matrix.

Element	1	2	3	4	5	6
As	-0.1065	-0.0503	0.1431	-0.0699	-0.0141	0.004
La	-0.0204	0.0068	-0.0068	-0.0119	-0.0052	-0.0175
Lu	-0.0433	0.001	-0.0059	-0.0177	-0.0031	-0.0192
Nd	-0.0198	0.0088	-0.0058	-0.0147	-0.0071	-0.0222
Sm	-0.0173	0.0107	-0.0048	-0.0143	-0.0077	-0.0206
U	-0.0141	-0.0513	-0.0055	-0.0023	0.0087	0.0084
Yb	-0.0481	0.0049	-0.006	-0.0194	-0.0068	-0.0204
Ce	-0.0167	0.0051	-0.0039	-0.0072	-0.0061	-0.0269
Cr	0.1653	0.1184	-0.0159	-0.0384	-0.0168	-0.0009
Cs	-0.0139	-0.1242	-0.0763	-0.0465	-0.0478	-0.0015
Eu	-0.0133	0.0245	-0.0037	-0.0129	-0.0048	-0.025
Fe	0.0536	0.029	0.006	-0.013	-0.0072	-0.0086
Hf	-0.0584	0.0184	0.0011	-0.0001	-0.0022	-0.0188
Ni	0.14	0.1255	0.0036	-0.0648	-0.0269	0.0413
Rb	-0.026	-0.0783	-0.0566	-0.0351	-0.0282	-0.0046
Sb	-0.0612	-0.0531	-0.0043	-0.0425	-0.012	0.0104
Sc	0.0329	0.034	-0.0106	-0.0174	-0.0056	-0.0064
Sr	0.1784	-0.0914	0.0022	0.0039	0.0575	-0.0188
Tb	-0.0234	0.0154	0.0025	-0.0181	-0.0128	-0.028
Th	-0.0107	-0.0109	-0.007	-0.0087	-0.0015	-0.0047
Zn	0.0067	0.0089	-0.0015	-0.0247	-0.0069	-0.0036
Zr	-0.0469	0.0174	-0.0022	0.003	0.0017	-0.0415
Al	-0.011	0.0117	-0.0114	-0.0081	0.002	-0.0044
Ba	-0.0409	0.0146	-0.0272	-0.07	0.1235	-0.0034
Ca	0.2041	-0.1618	0.0399	-0.0152	-0.0033	0.0064
Dy	-0.0348	0.0145	-0.0147	-0.0327	0.0012	-0.0052
K	-0.01	-0.0553	-0.0381	-0.0293	-0.0048	0.0039
Mn	0.0935	0.0305	0.0263	-0.0072	-0.0126	-0.0765
Na	0.0786	-0.0444	0.0085	0.0182	-0.0083	-0.0293
Ti	0.0073	0.0342	-0.0125	-0.0127	0.0038	-0.0076
V	0.042	0.0178	-0.0058	-0.0138	-0.0099	-0.0042

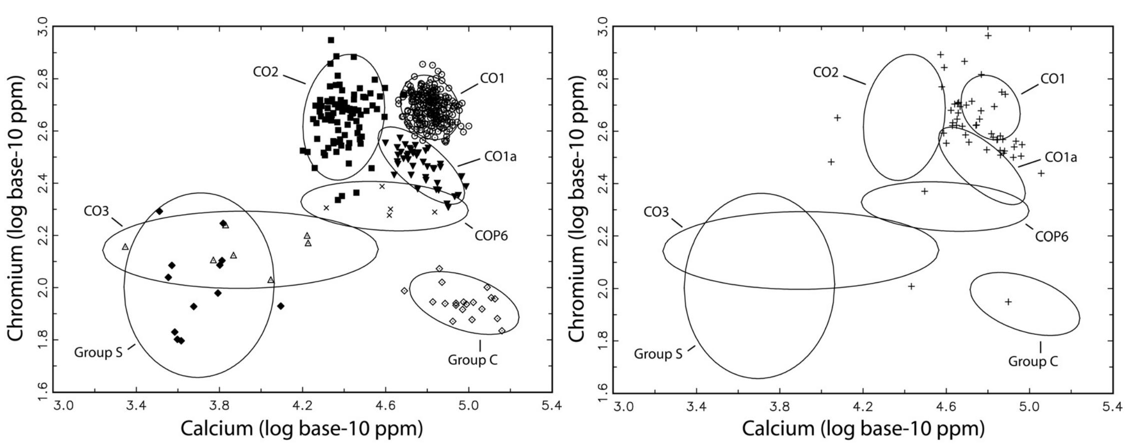

Figure 9.12. Chemical groups depicted on logged axes of Ca and Cr, ellipses represent 90 percent confidence intervals.

quartz inclusions, characteristic of the upper Concepción, and small amounts of volcanic ash temper. Coarse Orange group CO1 scores higher on PC 1 and lower on PC2 than Coarse Orange group CO2 (see Figure 9.11). The major difference between these two ceramic groups is Ca, indicating that CO1 was produced from Group C clays and CO2 was produced from Group S clays (see Figure 9.12).

For this dissertation, I am concerned specifically with identifying possible exports from Matacapan's Comoapan production facility. Many of the Tepango Valley specimens fall outside the confidence ellipse for CO1 ceramics previously established for Coarse Orange from the Catemaco Valley (see Figure 9.9). Figure 9.13 shows where the Comoapan specimens plot within the larger CO1 paste recipe. Claiming that all CO1 ceramics were products of Comoapan would probably overstate the importance of this production facility. I therefore separated the CO1 specimens that scored lowest on PC2 as subgroup CO1a, leaving the CO1 variant to represent the most plausible products of Comoapan (see Figure 9.12).

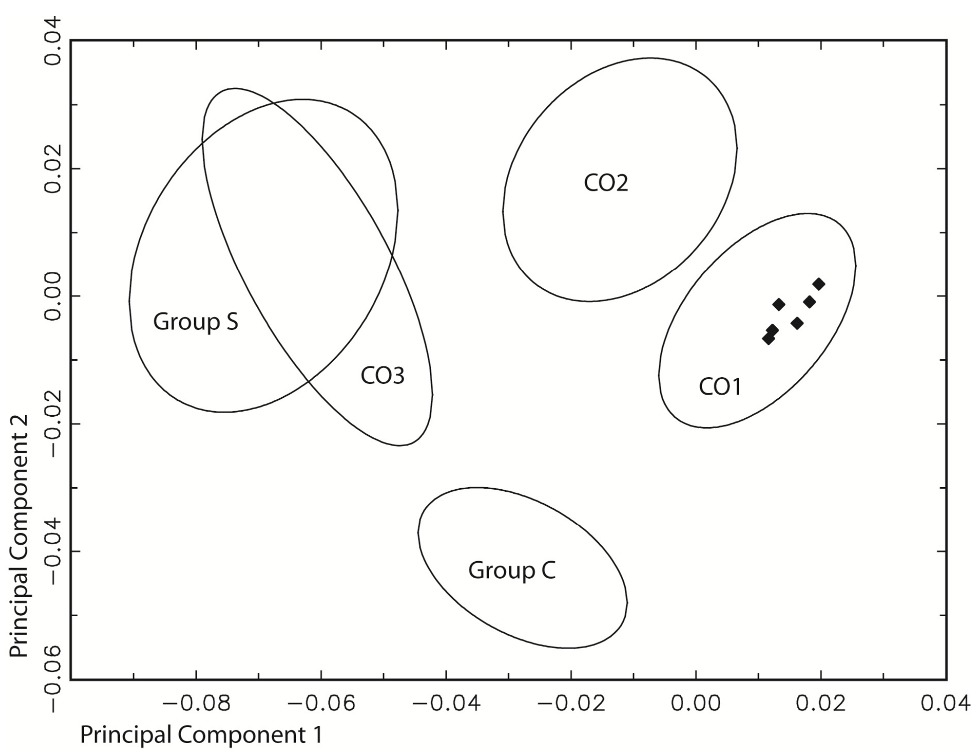

Figure 9.13. Coarse Orange specimens from Comoapan projected over 90 percent confidence ellipses calculated from the entire Tuxtlas Coarse Orange and Concepción clay chemical database.

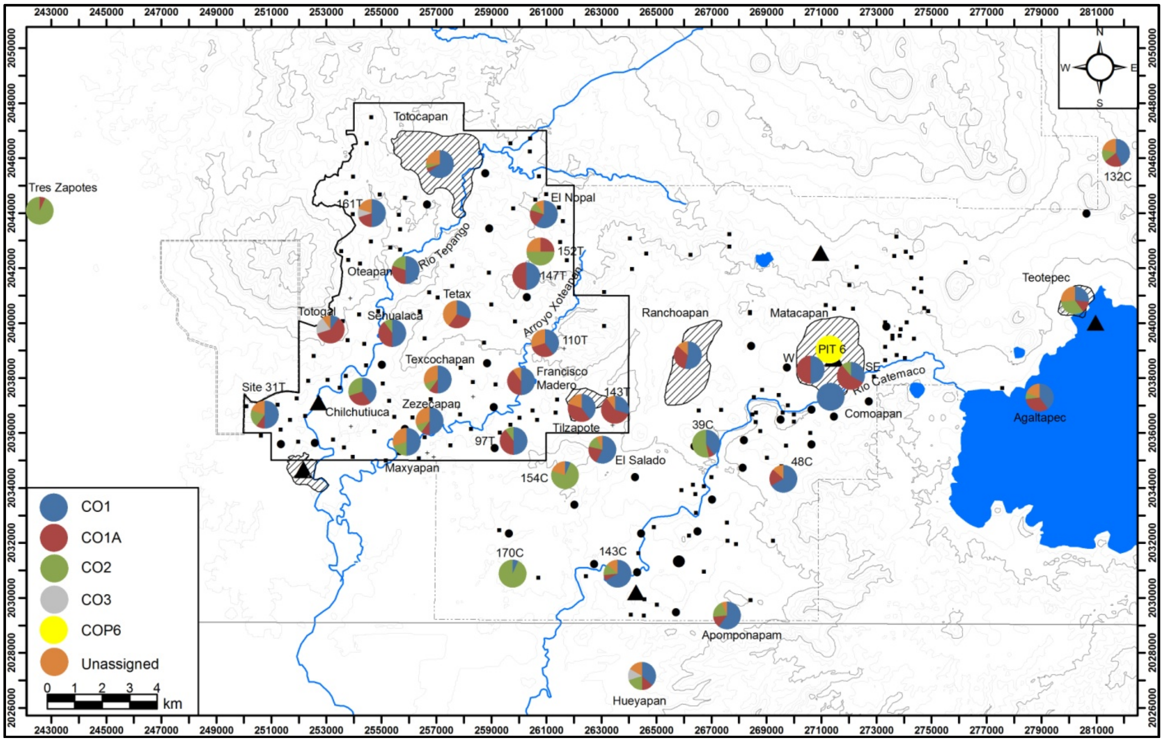

Figure 9.14. Distribution of Coarse Orange paste recipes.

Plotting the CO1 paste variant on a map of the region demonstrates that there was exchange between these two river valleys (Figure 9.14). In general, the prevalence of Coarse Orange pottery of this paste recipe suggests importation of these ceramics from the Catemaco Valley, specifically Comoapan. The lowest percentages of this paste recipe occur at sites within the "Tuxtlas Region Survey" near where the two survey boundaries meet, including Sites 39C, 154C, and 170C. The *majority* of Coarse Orange sampled from Totocapan and EL Nopal displays the CO1 recipe. Within the Tepango Valley, a few sites display an absence or underrepresentation of the CO1 paste recipe, including Sites 143T, 152T, Totogal, and Tetax. Three of these sites were situated in upland areas, and all of them were positioned away from major rivers. This may support the idea, presented in Chapter 6, that major routes of interaction followed the rivers and the uplands may have remained on the margins of popular interaction networks. The Absence of the CO1 paste recipe at Tres Zapotes is likely due to its distance from Matacapan.

The CO1A paste recipe was also produced from the Group C clays found primarily in the Catemaco Valley. This alternate paste recipe may have been imported as well, but from a different producer in the Catemaco Valley. Surprisingly, there is an underrepresentation of the CO2 paste recipe, which was produced from Group S clays prevalent in the Tepango Valley. This pattern combined with the overall distribution of the Coarse Orange type, as presented in Figure 9.7, suggest that a minor percentage of Coarse Orange found in the Tepango Valley was actually produced there.

Because of the prevalence of Group S clays in the Tepango Valley and Pool's previous research demonstrating that Fine Orange at Totocapan was produced using local Group S clays, the Coarse Orange compositional data strongly indicate the importation of these jars from the Catemaco Valley. Based on data for the differential size and intensity of ceramic production facilities in the Catemaco Valley, Comoapan is the most likely producer for many of these trade goods. It therefore appears that Totocapan imported Coarse Orange jars from Matacapan and subsequently distributed them to parts of its hinterland.

One exception exists to counter this claim. Four potential producers of Coarse Orange were identified in the Tepango Valley. At two of these sites, Coarse Orange manufacture was inferred by relatively high proportions of this ceramic type in the collections with production evidence. Pizapan and one production location within Totocapan were characterized this way. Both of these production loci were of very small size, low intensity production, and Corse Orange was only one of several wares potentially made there. Coarse Orange wasters were recovered only from La Cuesta (n=2) and El Nopal (n=4). Unfortunately, the INAA sample was collected before the ceramic analysis was completed. None of these six wasters were sampled for chemical analysis. However, speaking from a contextual perspective, the only site that could have produced quantities of Coarse Orange significant enough for intersite exchange was El Nopal.

El Nopal probably did trade Coarse Orange jars to Totocapan. Just over half of the specimens analyzed from El Nopal resembled the CO1 paste recipe. While El Nopal was situated more closely to Group S outcrops, it is reasonable to think that they may have traveled farther to procure the finer textured Group C clay outcrops located about 5 km north of Ranchoapan (see Figure 4.2). Despite these caveats, it is still probable that Comoapan was the main production source for the CO1 recipe found in the Tepango Valley. El Nopal was a Chaneque phase production facility that focused primarily on Fine Gray production. Fine Gray wasters at the site outnumber Coarse Orange wasters by about 50:1. Furthermore, half of the Coarse Orange sampled from El Nopal did not resemble the CO1 paste recipe prevalent at Comoapan and Totocapan. Also throwing into doubt the possibility that El Nopal produced Coarse Orange jars for exchange (see discussion above) is the fact that the closest site sampled displayed no Coarse Orange jars that were assigned to the CO1 paste recipe. Potters at Totocapan, where there is very little evidence of Coarse Orange production of any paste recipe, would have to travel about 10 km to procure Group C clays, while the suitable Group S clays were available within about 4 km distance.

The way the map in Figure 9.14 is figured, the proportion of unassigned specimens has a large affect on the percentages of the CO1 paste recipe perceived. The percentage of the CO1 recipe with unassigned specimens removed from the total provides another way to look at the data, which may be more meaningful in different ways (Table 9.6). Totocapan is second in percentage of the CO1 paste recipe only to the production locality of Comoapan at Matacapan. In fact, many of the sites with the highest percentages of CO1 Coarse Orange jars are in the Tepango Valley. This could potentially support arguments that the Comoapan production facility was oriented toward export (Arnold et al. 1993, Santley 1994) in addition to provisioning settlements in the Catemaco Valley (Stoner et al. 2008). Exchange to the neighboring river valley does not really constitute "export", but it is interesting that sites within Matacapan's hinterland commonly has less access to Comoapan-produced goods than sites in the Tepango Valley. This pattern is a strong one considering the prevalence of Group S clays in the Tepango Valley and Fine Orange pottery made from Group S clays at Totocapan (Pool and Santley 1992, see above).

These data strongly indicate that Totocapan and Matacapan were networked together on the regional economic landscape during the Middle Classic. The two polities were not perpetually engaged in a hostile pattern of interaction, but instead cooperated to satisfy economic needs for at least part of their history together. The data also indicate

Table 9.7. Percentage of the CO1 paste recipe among all assigned specimens per site.

Site	Valley	Percent CO1*
Matacapan (Comoapan)	Catemaco	100
Totocapan	Tepango	86.66667
143C	Catemaco	76.92308
48C	Catemaco	76.92308
Zezecapan	Tepango	71.42857
Maxyapan	Tepango	71.42857
Texcochapan	Tepango	71.42857
El Nopal	Tepango	66.66667
Apomponapam	Catemaco	64.28571
9/23/31/33T	Tepango	62.5
156/161/162/164T	Tepango	62.5
El Salado	Catemaco	61.53846
Ranchoapan	Catemaco	61.53846
110T	Tepango	57.14286
Francisco Madero	Tepango	55.55556
132C	Catemaco	54.54545
97T	Tepango	50
Tilzapote	Tepango	50
147T	Tepango	50
Sehualaca	Tepango	50
Oteapan	Tepango	50
Tetax	Tepango	50
Isla Agaltepec	Catemaco	50
Matacapan (Western)	Catemaco	50
Hueyapan	Catemaco	44
Chilchutiuca	Tepango	40
39C	Catemaco	40
Teotepec	Catemaco	36.36364
143T	Tepango	33.33333
Matacapan (Southeastern)	Catemaco	33.33333
Totogal	Tepango	11.11111
154C	Catemaco	8.333333
170C	Catemaco	6.666667
152T	Tepango	0
Tres Zapotes	TZ	0
Matacapan (Pit 6)	Catemaco	0

*unassigned specimens eliminated from percentage calculations

that Totocapan was probably an important provisioning center for the distribution of "imported" ceramics within the Tepango Valley. Zezecapan, Texcochapan, Maxyapan and Site 110 were among the consumers that relied most heavily on products funneled down through Totocapan. Perhaps more importantly, the other regional centers in the TVAS area did not rely heavily on Totocapan for redistributed goods from the Catemaco Valley. Cruz de Vidaña and Xiguipilincan were not sampled for INAA because not enough Coarse Orange was identified there to collect a robust sample. Tilzapote, Francisco Madero, and Oteapan did employ Coarse Orange jars within their general ceramics repertoire, but about half was made from paste recipes other than CO1.

The decisions of these regional centers to either not utilize Comoapan-produced Coarse Orange ceramic jars, or to produce or procure them from an alternate source suggests that this ceramic type was not politically charged. Recall from the previous chapter that all regional centers in the TVAS procured at least a minor quantity of Cipactli Cult vessels from Totocapan. The pattern of Comoapan-produced Coarse Orange consumption is the opposite: villages and hamlets were the primary consumers. This reflects two distinct decision processes. For prestige ceramics, emphasis was placed on association with Totocapan. For utilitarian ceramics, decisions were likely made based on practicality.

CHIPPED STONE

A major aspect of the Tepango Valley Archaeological Survey was to characterize obsidian by source and technology to better understand long distance exchange routes and interaction among sites within the survey area. Obsidian was the material of choice to form a cutting edge throughout the entire occupation sequence discussed in this report. It was therefore an essential commodity used to produce utilitarian tools throughout the survey area. Obsidian does not occur naturally within to the Tuxtlas, so it serves as a proxy to evaluate economic connections in the Mesoamerican macroregion.

A total of 2701 pieces of obsidian, weighing 2828 g, were collected and characterized by source, technology, and edge wear. Certain traits of the stone tool industry in the Tuxtlas are chronologically sensitive, but all obsidian collections were cross dated with associated ceramic collections. In the case of multicomponent collections, the obsidian assemblage was assigned to the dominant phase or phases dictated by the ceramic chronology. While this process mixed obsidian sources across phases in multicomponent collections, major trends are similar to what has been published previously for southern and south central Veracruz (Barrett 2003; Knight 1999; Santley 1991; Santley et al 2001; Stark et al. 1992).

As a whole, the obsidian assemblage for the TVAS was dominated by the Zaragoza Oyameles source (68 percent) (Table 9.8). Guadalupe Victoria and Pico de Orizaba occupied roughly equal proportions of the assemblage (14 percent and 13 percent respectively). Pachuca (green) obsidian comprised four percent of the assemblage. El Chayal, Otumba, chert and unidentified specimens account for less than one percent apiece.

Obsidian tool technology for the total TVAS assemblage was focused on production of blades. Sixty-nine percent (n=1862) of all obsidian artifacts recovered pertained in some way to the blade-core reduction trajectory, with the remaining 31 percent (n=839) assigned to the flake reduction trajectory. This is nearly double the percentage of flake tool trajectory artifacts than was found in the Catemaco Valley (Barrett 2003). One explanation for this is that the TVAS sample consisted entirely of surface collections while much of the assemblage the Barrett worked with was from excavation and surface contexts. More breakage takes place on the surface, so production by-products of the prismatic blade trajectory may be unrecognizable as such on very fragmented pieces of obsidian. The number of production by-products I have identified may be an underestimation. However, the TVAS produced a similar ratio of blades to prismatic by-products as the TRAS and MAP. A complimentary explanation involves Ocelota. One collection there produced 10 percent of the entire obsidian assemblage. It dates primarily to the Formative, and displays almost entirely small broken angular fragments of Guadalupe Victoria obsidian. Removing this anomalous collection brings the percentage down considerably. Another explanation is that flake tools may have been more commonly used in the Tepango Valley, which may relate to the higher Initial Picayo phase population compared to the Catemaco Valley. Only a handful of dart/spear points were identified.

A very simple production indicator is used here to determine the relative intensity of blade production at every site where production by-products were present. The blade production ratio (BPR) measures the ratio of blade by-products to blades. This is the primary source of production evidence used in this section. Ratios for each production context are presented in Table 9.9. These ratios are compared to the BPR for the entire assemblage for each time period to identify contexts with elevated levels of blade production. Not every site has direct evidence for stone tool production (i.e., production debris, cores, early stage reduction, production errors). While coarse-grained sampling probably missed considerable production evidence, it is likely that some sites were strictly consumers. As a general measure of consumption, I present the total number of blades consumed at all sites for each phase. Evidence for production at sites that consumed the highest number of blades in the region, for example, represents a proportional rise in supply and demand and does not necessarily indicate intersite exchange. The analysis here attempts to recognize sites that produced a relatively high volume of stone tools. With these data, inferences are made regarding production and exchange of stone tools within the TVAS.

Table 9.8. Obsidian source use patterns over time (percentages shown in parentheses).

Phase	Chert	El Chayal[1]	Guadalupe Victoria	Otumba	Pico de Orizaba	Pachuca	Zaragoza Oyamele	Unid	Total
Initial Picayo		1(<1)	171(48)		128(36)		60(17)		**360**
Picayo – Chininita			42(23)		29(16)	3(2)	107(59)	1(<1)	**182**
Santiago A – Santiago B	1(<1)	1(<1)	57(7)		51(7)	32(4)	620(81)	1(<1)	**763**
Santiago B – Chaneque			43(7)	1(<1)	51(8)	26(4)	488(80)		**609**
Chaneque		3(<1)	60(11)		66(11)	15(3)	451(76)	1(<1)	**596**
Vigía – Totogal	2(1)		5(3)		37(20)	33(17)	111(59)		**188**
Unassigned			2				1		**3**
Total	**3(<1)**	**5(<1)**	**380(14)**	**1(<1)**	**362(13)**	**109(4)**	**1838(68)**	**3(<1)**	**2701**

[1] El Chayal sources were identified using XRF using calibrations set by Michael Glascock. These five specimens did not precisely fit the El Chayal calibration, but it was the best match. None of the specimens assigned to the El Chayal source are from central Mexican sources.

Initial Picayo Phase

During the Initial Picayo phase, 48 percent of the obsidian was from the Guadalupe Victoria source, followed in order of decreasing frequency by Pico de Orizaba (36 percent), Zaragoza-Oyameles (17 percent) and less than one percent El Chayal. The percentage of Zaragoza-Oyameles obsidian was considerably lower than what other projects in the area have found for the Initial Picayo phase (cf. Santley 1991:17). Santley (1991) reported 40 percent Zaragoza-Oyameles obsidian for the combined Early and Initial Picayo phases. There are several collections in the current survey with minor Initial Picayo phase components that were lumped into the Santiago B phase. The major reason for the very low

Table 9.9. Ratio of obsidian blade production indicators to finished obsidian blades[1].

Phase	Site	Rank	Production Indicators	Blades[2]	Ratio	Average
Initial Picayo	Ocelota	Hamlet	4	16	**0.250**	0.114
Picayo to Chininita	Totocapan	Large	1	6		0.156
Picayo to Chininita	Site 16	Hamlet	1	8		0.156
Picayo to Chininita	Site 24	Hamlet	4	19	0.211	0.156
Picayo to Chininita	Cruz de Vidaña	Small	6	17	**0.353**	0.156
Picayo to Chininita	Tilzapote	Small	1	4		0.156
Santiago A to Santiago B	Totocapan	Large	1	58	*0.017*	0.058
Santiago A to Santiago B	Ocelota	Small	1	13	0.077	0.058
Santiago A to Santiago B	Pizapan South	Small	1	4		0.058
Santiago A to Santiago B	Pizapan North	Small	1	9	0.111	0.058
Santiago A to Santiago B	Site 9	Hamlet	1	3		0.058
Santiago A to Santiago B	Site 44	Hamlet	1	12	0.083	0.058
Santiago A to Santiago B	Zezecapan	Small	1	27	*0.037*	0.058
Santiago A to Santiago B	Francisco Madero	Small	6	74	0.081	0.058
Santiago A to Santiago B	Site 83	Hamlet	2	10	**0.200**	0.058
Santiago A to Santiago B	Site 86	Hamlet	1	9	**0.111**	0.058
Santiago A to Santiago B	Site 97	Hamlet	1	8		0.058
Santiago A to Santiago B	Site 102	Hamlet	1	15	0.067	0.058
Santiago A to Santiago B	Tilzapote West	Large	6	39	**0.154**	0.058
Santiago A to Santiago B	Tilzapote Core	Large	5	15	**0.333**	0.058
Santiago A to Santiago B	Site 147	Hamlet	1	3		0.058
Santiago A to Santiago B	Site 171	Hamlet	1	3		0.058
Santiago A to Santiago B	Site 32	Hamlet	1	2		0.066
Santiago B to Chaneque	Totocapan	Large	2	11	**0.182**	0.066
Santiago B to Chaneque	Sehualaca	Large	6	172	*0.035*	0.066
Santiago B to Chaneque	Site 29	Small	1	8		0.066
Santiago B to Chaneque	Site 36	Small	1	9	0.111	0.066
Santiago B to Chaneque	Cruz de Vidaña	Small	2	6		0.066
Santiago B to Chaneque	Francisco Madero East	Small Center	3	17	**0.176**	0.066
Santiago B to Chaneque	Tilzapote West	Large	5	18	**0.278**	0.066
Santiago B to Chaneque	Tilzapote Core	Large	6	75	0.080	0.066
Santiago B to Chaneque	Nancinapan	Small	2	32	*0.063*	0.066
Santiago B to Chaneque	Site 98	Hamlet	2	20	*0.100*	0.139
Chaneque	Totocapan	Large	1	29	*0.034*	0.139
Chaneque	Pizapan	Small	1	11	*0.091*	0.139
Chaneque	Xiguipilincan	Small	2	6		0.139
Chaneque	Site 6	Small	1	5		0.139
Chaneque	Oteapan Sur	Hamlet	32	43	**0.744**	0.139
Chaneque	Tetax	Small	2	18	*0.111*	0.139
Chaneque	Francisco Madero	Small	1	11	*0.091*	0.139
Chaneque	Maxyapan	Small	1	59	*0.017*	0.139
Chaneque	Pizapan	Small	7	82	*0.085*	0.139
Chaneque	Francisco Madero East	Small Center	5	49	*0.102*	0.139
Chaneque	Tilzapote Core	Large	2	6		0.139
Vigía to Totogal	Francisco Madero	Small	1	11	0.091	0.079
Vigía to Totogal	Maxyapan	Small	2	49	*0.041*	0.079
Vigía to Totogal	Totogal	Small	2	9	**0.222**	0.079
Vigía to Totogal	Tilzapote West	Small	4	9	**0.444**	0.079
Vigía to Totogal	Tilzapote Core	Small	2	17	0.118	0.079

[1] Numbers in red denote ratios that are lower than average for each phase. These are not considered to be producers for intersite exchange. Boldface numbers highlight collections with a BPR double the average for each phase and should be considered potential specialized producers. Missing values were samples with fewer than 10 artifacts and were eliminated from ratio calculation. These samples show direct evidence of blade production, but small sample size makes the BPR imprecise.

[2] The blade count includes secondary (irregular) blades and tertiary (prismatic) blades

percentage of Zaragoza obsidian is that the large general collection from Ocelota, discussed above, is composed primarily of the Guadalupe Victoria and Pico de Orizaba sources.

Only 23 percent of all obsidian pertains to blade technology, and 67 (n=21) percent of blades are irregular secondary blades. Prismatic blades are found in minor frequencies (n=14). While it is likely that blade production was being conducted during the Initial Picayo phase, it is apparent that it was neither the favored technology nor was it yet perfected. Polyhedral reduction flakes (n=3) and a single pressure core error are the only direct evidence of blade production. Most of the blades are made from Zaragoza obsidian (n=18), but Pico de Orizaba (n=14) and Guadalupe Victoria (n=5) sources are represented.

The only site that is a possible producer of stone tools during the Initial Picayo phase is Ocelota. This site displays a BPR ratio of 0.250 compared to the ratio of 0.114 for the entire Initial Picayo phase assemblage. This is the only site with blade production indicators, all of which were on clear obsidian varieties. A total of nine sites possessed blades at this time, but Ocelota was the site of greatest blade consumption. Forty-five percent of all Initial Picayo blades were recovered from Ocelota. This indicates that Ocelota probably did not exchange blades to the surrounding sites, or very few if they did. Furthermore, the blades are primarily irregularly-shaped, secondary blades. Secondary blades outnumber tertiary (prismatic) blades 7:1. This is probably the result of using poor quality materials (i.e., Guadalupe Victoria).

The remaining 77 percent of the Initial Picayo phase obsidian consists of flakes and flake production debris, primarily executed on clear (Guadalupe Victoria [n=166] and Pico de Orizaba [n=112]) obsidian. Zaragoza comprises a minor percentage (n=29) and a single flake of El Chayal obsidian was recovered. Among the flake types recovered are bifacial thinning flakes (n=4), pressure flakes (n=10), one notching/retouching flake, simple bifaces (n=2), unidentified flakes with platforms (n=24), unidentified flakes without platforms (n=147), percussion flakes (n=33), a large flake with lateral unifacial flaking (n=3), unifacial tools (n=2), one multidirectional flake core fragment, and a large amount of irregular, angular shatter (n=55). The angular shatter, which came almost entirely from Ocelota, was badly fragmented, so its original form may have been altered.

This technological profile suggests that a wide range of stone tool producing activities were undertaken in the survey region during the Initial Picayo phase. By-products and finished tools suggest an emphasis on a bifacial reduction sequence as well as expedient flake use and production of unifacial tools. The angular fragments recovered at Ocelota likely had a special purpose. Santley at one time suggested the use of this type of material for manioc graters at La Joya (1991). He has changed that interpretation to by-products for the production of bifaces (Santley 2006). Although Ocelota produced bifaces, if it was all bifacial reduction debitage, one would expect more bifacial thinning flakes.

Evidence for bifacial reduction occurs at Totocapan, Sehualaca, and Ocelota, but only collections at Ocelota produced actual bifaces. Flake tool technology was evenly distributed throughout the region, suggesting that there was no centralized production and exchange of unifacial or flake tools.

Picayo and Chininita Phases

During the Picayo and Chininita phases the percentage of sources represented are as follows: Guadalupe Victoria (23 percent), Pico de Orizaba (16 percent), Zaragoza-Oyameles (59 percent), Pachuca (2 percent) and unidentified (1 percent). In the neighboring Catemaco Valley, Santley identified a somewhat greater reliance on Zaragoza-Oyameles obsidian (75 percent) during the combined Picayo and Chininita phases.

The dominant technology shifts away from flakes to blade technology (58 percent). Blade-related categories present include macrocore reduction (n=4), polyhedral reduction (n=3), pressure core errors (n=8), secondary blades (n=28), tertiary blades (n=65), and a single needle blade. Obsidian knappers were, by this time period, performing the complete sequence of blade reduction. No cortex was identified on any of the specimens, though. This suggests that initial roughing-out was performed at the site of procurement. The total ratio of blade production by-products to blades is 0.156. Zaragoza-Oyameles obsidian accounts for all blade production by-products, and 81 percent of all blade-related artifacts. The increase in blade production, the increased reliance on Zaragoza-Oyameles obsidian, and the fact that 100 percent of blade production by-products are of this obsidian all seem to be part of a related process that intensifies through the Classic. Guadalupe Victoria and Pico de Orizaba accounted for a small percentage of the blades dating to this period, but the majority of all clear obsidian was still in flake form.

During the Picayo and Chininita phases, five sites display evidence of obsidian blade production (Table 9.9), but blades were found at 20 sites: a ratio of 1:4 producers to consumers. Producing sites include Totocapan, Tilzapote, Cruz de Vidaña, Sehualaca Sur, and Chilchutiuca. Three of these sites were classified as centers for either the Picayo or Chininita phase, but Tilzapote was only a center for the latter phase. Excluding Tilzapote, the producing sites were the top consumers in the TVAS. This suggests proportional production to consumption and does not necessarily indicate intersite exchange.

Two sites displayed more intensive evidence of production. These 'workshops' were located at the regional center of Cruz de Vidaña and nearby Chilchutiuca. This was a population hot spot so it is not surprising that more intensive blade production would have arisen here. The BPR at Cruz de Vidaña is more than double the average for the phases in question, but at Chilchutiuca it is not elevated much above the average. Blade consumption was high at both these sites, they account for almost half of the blades during the Picayo and Chininita phases. Despite the large consumption figure, it is possible that Cruz de Vidaña exchanged blades to the countryside in low quantities. Maxyapan, located 10 km to the east, consumed 10 percent of the blades dating to these phases but no production by-products were recovered.

Forty-two percent of the obsidian dating to this time frame was devoted to flake technology. Of all flake technology artifacts, 48 percent were made from Guadalupe Victoria, 33 percent were made from Zaragoza-Oyameles, and the remaining 19 percent consisted of Pico de Orizaba obsidian. The artifact inventory consisted of bifacial reduction sequence by-products (n=13), two rather large stemmed projectile points, simple flakes (n=45), one core, and angular shatter (n=21). While the absolute number of bifacial reduction by-products remains about the same, the proportion of biface-related artifacts within the flake technology assemblage increases somewhat over the Initial Picayo phase. Roughly one third of all sites during this time frame contain flaked technology artifacts. Totocapan possesses about 30 percent of these artifacts. Only seven sites have evidence of bifacial reduction.

Santiago A and Santiago B Phases

The Santiago A and Santiago B phases display an intensification of the trend of reliance on Zaragoza-Oyameles blades and a decline in the use of clear obsidian and flake technology. Source reliance during this period is as follows: Zaragoza-Oyameles (81 percent); Guadalupe Victoria (7 percent); Pico de Orizaba (7 percent); Pachuca (4 percent); and the final 1 percent are split evenly among El Chayal, Chert, and unidentified obsidian sources. These are similar source use profiles as detected in the Catemaco Valley and other places on the Gulf Coast.

The percentage of Pachuca obsidian in the TVAS is lower than what was identified at Matacapan and surrounding sites (Santley and Pool 1993, Barrett 2003). Barrett summarized that about 6 percent of the entire obsidian assemblage from the Catemaco Valley was of the Pachuca source. If the TVAS area is divided into quarters, like I established in the summary of Chapter 6, a very interesting pattern appears. Settlement at Tilzapote and its hinterland (the southeastern sector) possessed 55 percent (n=18) of all green obsidian that dates to the Santiago A and Santiago B phases. Tilzapote alone accounts for 33 percent of Pachuca obsidian[1]. Recall from Chapter 8 that this southeastern settlement segment also contained the highest percentages of Teotihuacan-related artifacts. Ironically sites that possessed Teotihuacan materials lacked green obsidian and *vice versa*. Despite this caveat, the correlation between potential Teotihuacan materials and green obsidian in the southeastern segment of the TVAS cannot be ignored. Tilzapote will be the subject of extensive discussions in the following chapter. The southwestern segment of the TVAS possessed 36 percent (n=12)

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[1] Tilzapote also possesses a Postclassic component, but all green obsidian with ground platforms and Postclassic diagnostics in these collections were eliminated from the Early and Santiago B phase calculations.

of the green obsidian recovered. Only two green obsidian blades were recovered in the entire northern half of the Santiago A to Santiago B phase TVAS, one at Totocapan and one at Oteapan.

Blade technology now dominates (76 percent) the chipped stone tool industry. Prismatic blades become the most important chipped stone tool, with about 88 percent of this artifact category made from Zaragoza-Oyameles obsidian. Pico de Orizaba (7 percent) and Pachuca (5 percent) obsidian make up small percentages of the prismatic blades recovered from survey, but only five blades (<1 percent) were made from the Guadalupe Victoria source. Interestingly, blade production by-products were almost completely absent for any source but Zaragoza-Oyameles. This suggests that finished blades of Pachuca and Pico de Orizaba obsidian were imported from outside the survey region. For Pachuca obsidian, this is a similar pattern seen at Tres Zapotes (Knight 2007) and along the neighboring Catemaco River (Barrett 2003:164; Table 6.3). Blade production by-products are found at a ratio of 0.070 to finished blade products for this time period. This is less than half the figure presented for the Late Formative/Chininita phase, suggesting either that knappers have gained greater control over the blade production technology or that the materials are entering the region in a different form. It is possible that finished blades are coming into the Tepango Valley from Ranchoapan, where blade-making specialists resided (see Santley 2006).

Fifteen sites display evidence for blade production during the Santiago A and Santiago B time frame, but a total of 71 sites possessed blades. The ratio of identified producing sites to consuming sites is therefore 1:4.7. So there are slightly fewer producers relative to consumers over the preceding period. For the Middle Classic in the Catemaco Valley, Santley (1991:18) identified a ratio of 1:25 producers to consumers. His interpretation was that larger sites, particularly Ranchoapan, were increasingly controlling the production and distribution of obsidian blades. In the Tepango Valley, producers are found at large centers (n=3), small centers (n=2), small villages (n=3), and hamlets (n=9). The Tepango Valley therefore seems to have had a more dispersed obsidian tool industry than the Catemaco Valley during the first half of the Classic period.

There are sites that display elevated levels of stone tool production in the Tepango Valley. Nine sites display an above average BPR, and four have a BPR of more than double the average. Of particular interest are potential workshops at and around Tilzapote and Francisco Madero. Thirty-four percent of all blade production by-products came from Tilzapote and 25 percent came from Francisco Madero. Workshops located in the southeastern sector of the TVAS developed to satisfy demand at these regional centers and surrounding sites. Ocelota and Site 108 in this area, for example, are among the largest consumers of obsidian blades, but only minor evidence of production occurs at the former and no production occurs at the latter. This indicates a centralized pattern of production and exchange for the southeastern sector of the TVAS, but the remainder of the survey area is best characterized as a decentralized economy in regard to obsidian blade tools. Tilzapote, in particular, appears to have been the principal blade producer for the sector. Its proximity to Ranchoapan boosted the economic prevalence of Tilzapote in the region. Santley argues that Ranchoapan is controlling the import of obsidian into the region during the Middle and Late Classic (Santley and Arnold 2005, Santley et al. 2001). It appears that Tilzapote had access to raw materials that Ranchoapan was likely importing. Additionally, it was positioned advantageously between valleys to act as a trade community.

Among the flakes and flake by-products, the Zaragoza-Oyameles source is most prevalent (63 percent) followed by Guadalupe Victoria (28 percent), and Pico de Orizaba (7 percent) with minor percentages of flakes made from the Pachuca source and chert. Among the clear obsidians, 91 percent of Guadalupe Victoria was used to manufacture flakes during the Santiago A and Santiago B phases, but 74 percent of Pico de Orizaba artifacts belonged to the blade industry. This great disparity displays the quality differences between clear obsidian sources. Flake technology categories present during the Santiago A and Santiago B phases are bifacial reduction (n=38), projectile points (n=5), stemmed projectile points (n=3), simple bifaces (n=6), simple flakes (n=87), one unifacial tool, retouched flakes (n=2), flake cores (n=5), and angular shatter (n=37). Bifacial tool technology, while not common in the chipped stone assemblage, continues to gain prevalence over expedient use of simple flakes. This pattern likely exists because blades are overwhelmingly preferred over simple flakes for cutting purposes. However, bifaces are still employed for tasks, like for chopping and propelled tools (atlatl darts and spears) that required a more robust instrument. There are no significant distributional patterns among the flake technology artifacts. Bifacial and expedient flake tools follow a pattern of decentralized production.

Santiago B to Chaneque Phase

Many collections were evenly split over the Santiago B and Chaneque phases based on ceramic diagnostics. Rather than forcing them into either phase, a Santiago B-to-Chaneque group was created. This does not necessarily represent a transitional phase, but I do not attempt to arbitrarily separate the phases. Source reliance in this temporal group is essentially identical to Santiago A and Santiago B phase assemblages: Zaragoza-Oyameles (80 percent); Pico de Orizaba (8 percent); Guadalupe Victoria (7 percent); Pachuca (4 percent); and Otumba (<1 percent). However, there is a slightly greater emphasis on blade technology (81 percent) over flake technology (19 percent). Prismatic blades are again the most important chipped stone artifact, but Zaragoza-Oyameles obsidian (84 percent) loses a small percentage of the prismatic blade inventory to Pico de Orizaba (9 percent) and Pachuca (6 percent). Tilzapote possesses 58 percent of all green obsidian in this category, which is an even greater imbalance than seen in Santiago A and Santiago B phases collections.

10 sites display blade production by-products and 38 sites possessed blades over this time frame. This is a producer to consumer ratio of 1:3.8. Among these, Tilzapote, Totocapan, and Francisco Madero overlap with the Santiago A and Santiago B time frame. For these three sites, blade production likely dates to the Early to Middle Classic. Tilzapote is still the most intensive producer of blades, but they are also one of the largest consumers. More than half of the blade production by-products in the Santiago B-Chaneque phase TVAS were recovered from Tilzapote. The largest consumer of obsidian blades by far is Sehualaca, though. Dense concentrations of obsidian were observed on the surface of this site to the point that we did not collect it all. Tool producers there did produce some of their own blades, but the BPR is well below average

for the time frame. This indicates that inhabitants at Sehualaca were performing some task that demanded large quantities of obsidian blades, more than could be produced locally judging from the BPR value for the site.

The flake industry is composed of a similar source reliance pattern as the Santiago B phase. One significant difference is that Guadalupe Victoria obsidian was almost exclusively used for flake production.

Chaneque Phase

Collections displaying more pure Chaneque phase assemblages exhibit subtle changes in obsidian source reliance: Zaragoza-Oyameles (76 percent); Pico de Orizaba (11 percent), Guadalupe Victoria (10 percent); Pachuca (3 percent); and El Chayal (<1 percent). Xiguipilincan and Site 183 display a slightly higher percentage of Pachuca obsidian than other sites in the region, but there does not appear to be a monopolistic character to the distribution of this material as with the preceding two periods. Teotihuacan influence in the Tuxtlas began to wane into the late Santiago B phase and would have been largely absent into the Chaneque phase.

Blade technology was still favored (81 percent) over flake technology (19 percent). Pico de Orizaba continues to rise slightly in importance for making prismatic blades; it now accounts for 12 percent of all prismatic blades. Zaragoza-Oyameles still dominates (84 percent) the prismatic blade assemblage, though. Pachuca (2 percent) loses importance for prismatic blades, and Guadalupe Victoria (1 percent) and El Chayal (<1 percent) make up only a small percentage of this artifact type. The ratio of blade production by-products to blades is 0.140, which is more than double the same indicator of the Santiago A to Santiago B phase. This indicates that, as a whole, more blade production was taking place in the TVAS during the Chaneque phase than either the Santiago A or Santiago B phases. Almost all of the by-products are Zaragoza-Oyameles obsidian, but a small number of Pachuca macrocore reduction by-products were present. One of these had cortex covering about half of the dorsal surface. While sample size is small, the presence of Pachuca blade production by-products is significant because it indicates the material was coming into the TVAS area in a relatively unprocessed form.

Of the 11 sites with evidence of blade production in the Chaneque phase, eight did not exist in the preceding time frame. A total of 29 sites consumed obsidian blades during the Chaneque phase. This yields a ratio of 1:2.6 producers to consumers. This is the lowest for any phase, but the figure is misleading. Oteapan is perhaps the most intensive blade producer in the TVAS for all periods. About 43 percent of the obsidian recovered from Oteapan was production by-products. It displays a BPR of 0.744. This indicates that a large number of obsidian blades were produced at the site and a lot of them were traded to other sites in the region. Potential consumers for blades produced at Oteapan are Totocapan, Sehualaca, Tetax, and El Nopal. Totocapan and Tetax produced relatively few of their own blades, as indicated by their BPRs (see Table 9.9). El Nopal did not produce any blades but possessed the second highest frequency of blades found at any site in the northern half of the survey area. Recall that El Nopal was an intensive ceramics producer during the Chaneque Phase. The centralized production of blades at Oteapan Sur matches the pattern of increasing commercialization during the Chaneque phase seen with the El Nopal ceramic production facility (discussed above).

Another big shift was the near absence of blade production by-products at Tilzapote. The scarcity of blade production at Tilzapote suggest a disruption of previous relationships that granted them access to obsidian materials. Alternatively, they may have begun to rely on specialized producers from elsewhere in the region, like Oteapan Sur.

Only 39 percent of the flakes recovered were made of Zaragoza-Oyameles obsidian. Guadalupe Victoria accounts for 46 percent of the flakes and flake by-products, followed by Pico de Orizaba (14 percent). Categories pertaining to the flake reduction trajectory consist of bifacial reduction debris (n=24), projectile points (n=8), one stemmed projectile point, bifaces (n=2), simple flakes (n=54), flake cores (n=3), and angular shatter (n=23). Pizapan displayed a disproportionate amount of bifacial thinning and other flake technology debris.

Vigía and Totogal Phases

The Vigía and Totogal phases display a shift in obsidian source reliance. Zaragoza-Oyameles remains the most prevalent material (59 percent), followed in decreasing frequency by Pico de Orizaba (20 percent), Pachuca (17 percent), Guadalupe Victoria (3 percent), and chert (1 percent). The increasing proportion of green obsidian (Pachuca) during the Postclassic has been noted elsewhere in the region (Venter 2008, personal communication), and probably relates to the spread of the Aztec Empire. The highest proportions of green obsidian per collection were recovered from Totogal and Tilzapote, two of the larger Postclassic sites in the region. Furthermore, Venter (2008) argues that Totogal served as a tribute collection point for the Aztec Triple Alliance during the Late Postclassic. Flake technologies (10 percent) lose even more ground to the blade industry (90 percent). Zaragoza-Oyameles obsidian still forms the majority of the prismatic blade assemblage (61 percent), but Pico de Orizaba (25 percent) and Pachuca (14 percent) gain importance.

Blade production by-products are only present at five sites, and these are the five largest sites in the region. A total of 25 sites have obsidian blades from Postclassic collections. The ratio of sites with direct evidence of blade production to consumers is 1:5, a lower ratio than any Classic time frame. This suggests tight control over production and exchange of blades, which in turn indicates greater commercialization. Tilzapote again demonstrates the highest investment in the production of blades. This production likely dates to the Totogal phase. The relatively high percentage of green obsidian in Tilzapote's assemblage likely reflects involvement in Aztec distribution networks, but it could also pertain to Toltec control of the same source during the Early Postclassic.

Among the flakes and flake by-products, Zaragoza-Oyameles still is most prevalent (47 percent), followed by Guadalupe Victoria (24 percent), Pico de Orizaba (18 percent) and chert (11 percent). Among the flake technology categories present during the Postclassic are bifacial reduction sequence (n=5), bifaces (n=2), one projectile point, and simple flakes (n=6).

Summary

Several trends are seen with this analysis. First, blades become an increasingly important component of the regional stone tool technology from the Initial Picayo phase through the Postclassic. The corollary of that trend is that flakes and flaked tools lose importance over the same time span. Due to this shift in technology, there was a greater need for high quality stone with few impurities. Blades made from obsidian produce a sharp cutting edge, but they are very brittle. The removal of a blade from a blade core requires a tremendous amount of focused pressure that travels the length of the blade. A single small imperfection can cause the blade to snap resulting in a step fracture that requires special attention to fix the core. Guadalupe Victoria makes good flakes, but the fracture planes tend to be irregular and possess more imperfections than the other obsidians. It therefore makes sense that the Guadalupe Victoria source becomes less important as the flake industry wanes. Zaragoza-Oyameles was an obvious material to serve as the basis of the emerging blade industry as early as the Late Formative. This trend continued into the Postclassic, but Pico de Orizaba obsidian gained importance through time. Stocker and Cobean (1984) suggest that tunnel mining into Pico de Orizaba was introduced by the Middle Postclassic, which permitted the procurement of higher quality obsidian. A parallel trend is seen with Pachuca obsidian use. Pachuca was not commonly used until the Postclassic in the survey region. This was likely because the trade networks to distribute this green obsidian to the Tepango Valley were not efficient until later time periods. This suggests limited interaction between Totocapan and Teotihuacan, who was thought to have controlled the Pachuca distribution network during the Classic period (Santley 1989, Santley and Pool 1993). Tilzapote represents a different situation though. Throughout the Classic and Postclassic periods, Tilzapote had access to green obsidian. During the Classic periods, it likely took advantage of its proximity to Ranchoapan and, by association, Matacapan. Tilzapote and other sites in the southeast corner of the TVAS area displayed a high proportion of blade production by-products during the Santiago A and Santiago B phases, with less production evidence in the Chaneque phase and Postclassic phases. Again this likely pertains to proximity to

Ranchoapan, which Santley suggests was the principal importer of obsidian to the region (2006).

The TVAS area is also characterized by increasing specialization and commercialization of the stone tool industry over time. During the Formative (Initial Picayo, Picayo, and Chininita phases) there is no indication that blades were produced at intensive workshops. The first evidence for relatively intensive blade production for exchange is found in the southeast corner of the survey area during the Early and Middle Classic (Santiago A and Santiago B phases). The workshops at Tilzapote and Francisco Madero nearly disappeared during the Chaneque phase. At the same time, the most intensive blade producer known to the TVAS area for any phase emerged at Oteapan. The trend of increasing commercialization continued into the Postclassic (Vigía and Totogal phases) as there were relatively fewer producers relative to consumers than for any preceding period.

TUXTLAS ECONOMIC LANDSCAPES

In the Catemaco Valley, economic centralization and relatively high levels of commercialism took place over the Early to Middle Classic periods, whereas most of the Gulf Coast did not begin to experience shifts toward greater commercialization until after the collapse of major states in the Late Classic (or Epiclassic). Evidence for this includes relatively large scale and intensive ceramic production industries at Matacapan (Arnold et al. 1993, Pool 199, Santley 1994, Santley et al. 1989) and centralized production of obsidian blades for exchange from Ranchoapan (Barrett 2003, Santley 2006). Barrett's (2003) analysis of obsidian production and consumption in the Catemaco Valley downplays the role of Ranchoapan considerably. While Ranchoapan did not serve as a central node for an interregional distribution network, producers at the site did provision many sites in the hinterland with blades during the Middle Classic. Another known example of economic specialization in the Catemaco is salt production at El Salado (Santley 2004), though Ceja Acosta expresses doubt that the site was occupied year-round by occupational specialists (Ceja Acosta 2007). In any case, the regional evidence of economic specialization and exchange suggest that the Matacapan polity was integrated through relatively commercial exchanges not present at the time in other Gulf Coast polities.

In the TVAS, the only remotely comparable craft industries are pottery production at El Nopal and blade production at Oteapan. El Nopal may have been a specialized community of potters that produced a narrow range of wares. Fine Gray by far was its most important product. The high frequency of blade production errors and the disproportionately low frequencies of finished blades at Oteapan suggest that a large number of blades left the site through exchange. For the entire TVAS, blades outnumber blade production by-products by a ratio of 11.3:1. Multiplying the 32 blade production by-products recovered at Oteapan by this figure produces a total number of blades produced of 362. While this is not a huge number, it is 41 percent of all blades recovered within the survey area that date to the Santiago B and Chaneque phases. It makes up 87 percent of all blades found in purely Chaneque phase collections. Both of the relatively intensive production workshops discussed above can be confidently placed in the Chaneque phase based on ceramic associations.

During the Middle Classic, Tilzapote also was a relatively intensive producer of obsidian blades. The timing of these industries is split over the Santiago A, Santiago B, and Chaneque phases, but it can primarily be attributed to the Middle Classic. The site was only a small dispersed village during the Early Classic, and the data suggest that blade production dropped off considerably during the Late Classic. If all of its production evidence for the three phases is collapsed into the Santiago B phase, the evidence for specialized production is stronger. This was probably due to interaction with nearby Ranchoapan rather than an industry that developed independently of the economy of the Catemaco Valley.

With respect to levels of commercialism, the Catemaco Valley seems to have been much more commercialized than the Tepango Valley during the Middle Classic. Ceramic or blade production that can be attributed to the Middle Classic in the TVAS was not of the scale that would suggest regional distribution of products. One possible exception is Tilzapote, but I attribute its higher levels of specialization to economic interaction with Ranchoapan and Matacapan. While Tilzapote consumed low percentages of Comoapan-produced Coarse Orange, they possess the highest frequency of bichrome pottery decorated with Matacapan-like motifs, and the highest percentages of green obsidian in the TVAS. These data suggest that Tilzapote was tied to the Catemaco Valley economically and, to a lesser, extent symbolically.

Levels of commercialization increased in both valleys during the Late Classic (Arnold et al. 1993, Pool 1990, Santley 2004, Santley et al. 1989). In the TVAS, the geographic focus of specialization shifted from Tilzapote to the communities surrounding Totocapan. While the economic data demonstrate processes of commercialization coupled with high demand from Totocapan, the ceramic style data (Chapter 6) suggest that Totocapan was declining faster than centers in the south. Interestingly, this a similar pattern seen at Matacapan (Pool 1990). Matacapan was declining in size and inferred political power during the late Middle Classic and early Late Classic, but ceramic production industries there were increasing their intensity of production.

Patterns of center hinterland economic interaction also appear very different between Matacapan and Totocapan. Production activities at Matacapan were focused outward on provisioning its hinterland. Totocapan, in contrast, increasingly relied on producers outside the center to provision its population, an inward-focused pattern. Of the seven Middle Classic production facilities identified at Totocapan, five were spatially-associated (i.e., attached) with elite architecture. A potential bias is that the collection strategy favored collections associated with mounds. The shovel testing grid established over the site did not result in the collection of robust samples away from mounds, so independent specialization may be underrepresented.

The Tepango and Catemaco valleys appeared to have rather different economic structures. This is probably related to their different political structures detailed in the preceding two chapters. It is not known how, or to what extent, the connection between Matacapan and Teotihuacan could have influenced these differences, but there is a correlation nonetheless.

SUMMARY

In this Chapter, I presented the available evidence for production and exchange relationships in the study area. Totocapan, like many regions on the Gulf Coast, consisted principally of small-scale production contexts for both pottery and obsidian tools. The larger-scale workshops did not emerge until late in the Classic period. Matacapan, on the other hand, hosted some of the largest-scale ceramic production workshops known to Middle Classic Mesoamerica. Totocapan was a city that primarily consumed goods produced at the site and in its hinterland. While crafts were produced at Totocapan, most of these industries were destined for elite consumption. Matacapan no doubt consumed goods produced in, or gathered from, its hinterland, but it also was a major producer of goods that they exchanged to other parts of the Tuxtlas and perhaps beyond. The inwardly-focused economy of Totocapan therefore seems to contrast the outwardly-focused economy of Matacapan.

As for goods imported into the Tuxtlas, the Tepango Valley displays similar proportions of obsidian source reliance through time as the Catemaco Valley. The pattern of similar source reliance between valleys would suggest that settlements in both areas developed similar external economic networks. The social, political, and ritual contrasts that emerged between river valleys discussed in the preceding chapters, therefore, did not significantly alter the broader patterns of economic interaction enacted by settlements in both areas. There was certainly intraregional variation among settlements, though. Matacapan and a few other sites show slightly greater reliance on green (Pachuca) obsidian, which was controlled by Teotihuacan. The relatively extensive collections at Totocapan, in contrast, only produced one piece of green obsidian.

Finally, obsidian source and ceramic compositional data provide strong evidence for economic interactions between valleys. Coarse Orange jars produced at Matacapan, and possibly other settlements in the Catemaco Valley, were exchanged into the Tepango Valley, principally to Totocapan. Obsidian also may have been exchanged from the Catemaco Valley into the Tepango Valley, particularly to Tilzapote. Tilzapote was well-situated on the landscape to take advantage of the abundance of obsidian flowing into Matacapan and Ranchoapan. This raises the questions of what mechanisms of exchange operated to bring obsidian into the region and which sites in the Tuxtlas were the points of import? It seems that the southeast quadrant of the survey area drew upon obsidian flowing into the Catemaco Valley, but the extent to which this obsidian exchange penetrated deeper into the TVAS is unknown.

In summary, settlements in both the Tepango and Catemaco valleys were networked together on the economic landscape. This relationship stands in contrast to the significant cultural divergences that developed on the symbolic, ritual, and political landscapes. This level of economic cooperation indicates that the sociopolitical contrasts that developed between the two river valleys were not so disjunctive that they created irreconcilable hostilities. It also demonstrates the disconnect among the forms that each landscape, or network of interaction, assumes in the region. Adoption of foreign political symbols at one place on the landscape, for example, did not dictate that economic interaction followed. Furthermore, Tuxtla groups with different beliefs, social identities, and political allegiances were linked through economic interaction. Each place on the landscape participated in different economic, political, social, and ideological networks. The Tuxtlas case demonstrates that decisions to participate in one network does not necessitate that other types of interaction follow the same trajectory. Each group in the TVAS pieced together its local worlds from these disjoint flows of materials, ideas, symbols, and rituals.

CHAPTER 10: DISRUPTION, DISJUNCTURE, AND DIVERGENCE IN THE CLASSIC TUXTLA MOUNTAINS

In this chapter, the degree to which a Teotihuacan related disruption caused a cultural divergence between the Catemaco and Tepango valleys is evaluated. First, evidence for Classic macroregional interactions are evaluated for each valley. This is followed by a comparison of local institutional structures in both the Tepango and Catemaco valleys. If the Catemaco Valley was significantly affected by Teotihuacan influence or ideas, its political, economic, symbolic, and ritual institutions should display some level of difference compared to the Tepango Valley and other Gulf Coast polities (*à la* Spence 1996a). The presence of foreign symbols and behaviors implies at least a partial disjuncture from local cultural currents. To what degree were other pervasive Gulf Coast institutions present or absent at Matacapan? How did Catemaco Valley institutional configurations compare to Totocapan and the Tepango Valley? Finally, I summarize regional level conjunctures and disjunctures among the symbolic, political, economic, and ritual landscapes. Despite the potential divergences discussed in this text, how were Matacapan and Totocapan networked together? Alternatively, how were intervalley exchange relationships potentially altered due to their differential incorporation into the Mesoamerican world-system?

DIFFERENTIAL EXPERIENCE OF THE CLASSIC MESOAMERICAN WORLD-SYSTEM

The neighboring river valleys that are the subject of the current analysis were incorporated differently into the Classic Mesoamerican world-system. Matacapan appears suddenly on the Classic Tuxtlas landscape expressing symbolic, ritual, and limited economic links to Teotihuacan. Totocapan and the Tepango Valley developed over a long period of time reaching back at least to the Middle Formative, drawing upon long-established traditions found over much of the south and south-central Gulf Coast. Totocapan and Matacapan were never politically integrated, but their political ideologies may have been intertwined in a way that affected the broader organization of the study area.

At Matacapan, the *talud-tablero* architectural style adorns at least one and probably two structures (Valenzuela 1945a). Presence of this architectural style has often been taken to suggest political subordination to the central Mexican city (Charlton 1991, Cheek 1977, Smith and Montiel 2001). Others have pointed out that this architectural tradition began in Puebla and examples are present at sites with no other evidence of a Teotihuacan connection (e.g., Daneels 2002b). At Matacapan, the origin of *talud-tablero* architecture is clear due to the abundance of other Teotihuacan artifact categories. In any case, this architectural style was used to embellish two of the most important temples at Matacapan. Human and canine burials were interred in the floors of a multi-roomed residential structure (Mound 61), a practice common at Teotihuacan (Storey 1991). More specifically, infants were buried inside large ceramic bowls. As Arnold and Santley (2008) argue, no single piece of evidence pertaining to this residential architecture was an overwhelming indication of central Mexican identity, but the complex as a whole is more related to Teotihuacan than to other Gulf Coast groups. This was the only residential structure excavated at Matacapan, so there may have been more examples. As a whole the architectural data indicate an affinity with Teotihuacan in both ceremonial/administrative and residential contexts.

Totocapan does not to my knowledge display *talud-tablero* architecture. That statement must be qualified by the fact that no structures have been excavated archaeologically. Based on my inspection, the only structures at Totocapan that displayed rock-paved surfaces were on the Acropolis. The modern surfaces of the mounds do not display any evidence of *tableros*, but of course the sides of the pyramids are slanted like the *talud* element. In fact, no strong architectural similarities occur between any TVAS site and either Matacapan or Teotihuacan. The experience, perception, and imagination of the built environment were quite different between the two valleys.

Totocapan conforms more to Gulf Coast cultural currents, while Matacapan is aberrant in several ways. Totocapan and several other centers in the Tepango Valley employed versions of the Standard Plan architectural program that is found to the west and northwest of the Tuxtlas, while Matacapan and the centers in the Catemaco Valley did not. The exception is Teotepec, which may have remained independent from Matacapan throughout the Classic period. Teotepec displayed elements of the Cotaxtla-Jamapa Standard Plan as well as the Long Plaza Group configuration identified to the south and east of the Tuxtlas (Borstein 2001, Dominguez 2001, Symonds 2002, Urcid and Killion 2008). Based on the current research and recent survey and excavation at Teotepec (Arnold 2007, Thompson et al. 2008) the ball game appears to have been central to the negotiation of political authority in areas of the Tuxtlas to the east and west of the Catemaco River. Valenzuela (1945b) also describes a possible ball court at Mata Canela south of Lake Catemaco. The Tuxtlas outside the Catemaco River corridor does appear to have tied into broader political, ritual, and symbolic landscapes of the Gulf Coast. Despite the small ball court on the northern margin of the Main Plaza, Matacapan deemphasized the ball game in favor of other politico-ritual strategies.

Matacapan and settlements along the Catemaco River did, however, share much in common with other Tuxtlas groups. The symbolic landscape within Matacapan's political territory very much resembles that seen in the TVAS. The basic set of material culture employed in the Tepango Valley during the Classic period displays much in common with the Catemaco Valley. Paste recipes, vessel forms, decoration techniques and most design motifs form a regionally coherent cultural identity, though the symbolic landscape was punctuated by stylistic expressions influenced by Teotihuacan and other 'foreign' groups. These were not merely superficial appropriations of design elements, but they reflect a blend of foreign and local cultural identities. Pool (1992a, citing Veronica Kann personal communication) argued that figurines recovered at Matacapan presented Teotihuacan-style heads but the bodies were formed according to local tradition. This syncretism occurs on an object used for daily private rituals performed in household contexts. If the style of the figurine was infused with foreign traits, was the ritual similarly altered?

The *candeleros* found at Matacapan may provide a partial answer to this question. *Candeleros* are one of the best indicators of interaction with Teotihuacan because they are strongly associated with the city itself and are rarely found in similar forms elsewhere (Cowgill 1997). Matacapan possessed relatively high quantities of this ritual object, which puts them into a select minority of sites throughout Mesoamerica. *Candeleros* were household ritual artifacts like figurines. Viewing the two ritual objects in conjunction increases the likelihood that the Catemaco Valley ritual landscape became partially disjoined from religious practices seen in the Tepango Valley and elsewhere on the Gulf Coast. Add to this, the Teotihuacan-like mortuary practices observed at a common Matacapeño residence (Mound 61) and one arrives at the conclusion that the identity of a significant portion of Matacapan's population was defined in part on a connection to central Mexico. These materials and behaviors were not designed for display in public spaces, but in the privacy of one's home. These patterns suggest more than a superficial appropriation of style or display of foreign symbols for local political gain.

The cylindrical tripod vases and low percentages of Thin Orange imports may have been used more publically during rituals and feasting. The cylindrical tripod vases with their distinctive slab and hollow rectangular supports would have been important to certify the Teotihuacan connections that the Matacapan regime boasted. These materials, as well as the figurines and *candeleros* described above, were found in elite and non-elite and public and private contexts at Matacapan. The importance of the Teotihuacan connection for legitimation of political authority is best seen at Matacapan's ball court. As discussed previously, the ball court at Matacapan was positioned on the northern margin of the Main Plaza, and it was very small. While the diminutive character of the ball court underemphasizes this pervasive Gulf Coast ritual game, perhaps more telling of the political strategies employed is the relatively high percentage of Teotihuacan-related objects recovered from this area (Santley 2007:157). At least part of the regime's strategy to promote Teotihuacan identity in the region, therefore, took place in a ritual context familiar to the Gulf Coast.

Eleven sites along the Catemaco River display evidence of Teotihuacan interaction. I add to this tally very limited and relatively weak evidence of a connection at seven sites in the Tepango Valley. Most of the sites in the TVAS that display possible Teotihuacan-related materials occur in the southeast corner of the survey area. It therefore seems that Matacapan's promotion of its Teotihuacan identity followed two spatial trajectories. The first went south along the Catemaco River. The second jumped from Ranchoapan to the areas around Tilzapote and Francisco Madero. This was a logical transportation route connecting the valleys, so the pattern makes intuitive sense. No Teotihuacan-style materials have yet been recovered at Tilzapote, but they were found at Francisco Madero, Texcochapan and a few rural sites in this segment of the TVAS (see Figure 8.13).

The most secure indicator of a connection to Teotihuacan, via Matacapan, was the concentration of green obsidian at Tilzapote and the southeastern third of the TVAS. Green obsidian was found in far greater quantities in this area than any other Teotihuacan import: imitated or real. The Teotihuacan-related symbolic and economic distribution networks overlap in this area. Sites that display Teotihuacan-related materials, however, possess low percentages of green obsidian. This disjuncture between the symbolic and economic networks may be an artifact of small sample sizes, but it is a rather potent example of selective interaction. Decision makers at Tilzapote appear more concerned with procuring obsidian materials from the Catemaco Valley than foreign symbols or ideas. This is supported by the relative abundance of obsidian at Tilzapote and surrounding sites, green obsidian specifically. From the Early to Middle Classic, and possibly the early parts of the Late Classic, Tilzapote displays some of the best evidence for specialized blade production in the TVAS. This pattern emerged because of its physical proximity to Ranchoapan and Matacapan, and its position at the primary gateway connecting the valleys. Tilzapote officials seem to have been less enthused about the Teotihuacan symbols that this interaction surely brought their way, but central Mexican images still managed to trickle through in small quantities (see Figure 8.13).

Totocapan displays the opposite pattern. Potential Teotihuacan-related artifacts are rare at Totocapan (n=7). The two potential Teotihuacan-related artifacts recovered at Totocapan in this study consist of a cylindrical jar rim sherd made on Fine Buff and a lid for a cylindrical jar made on Fine Orange paste. Both of these objects were associated with residential mounds located outside the architectural core. Valenzuela's Teotihuacan-related finds were also located outside the architectural core, but in an elite/ritual context. Additionally, Ortiz (1975) depicts a few specimens on Fine Buff paste that display cylindrical vessel forms like those seen at Matacapan. It is hard to conclude anything from so few artifacts, which itself is telling of a lack of Teotihuacan influence on symbolic and ritual institutions at Totocapan.

What stands out about Totocapan is the almost complete absence of green obsidian (n=1 out of 225 pieces). These minor symbolic appropriations were therefore not accompanied by actual economic exchanges with Teotihuacan. However, Totocapan *did* interact economically with Matacapan (see Chapter 9). So the few Teotihuacan-inspired artifacts found at Totocapan most likely came from Matacapan through economic or symbolic interaction.

In summary, a Teotihuacan-related disruption originated at Matacapan which was then promoted to settlements along the Catemaco River. The central Mexican connection was combined with more local themes to legitimate authority at Matacapan. The Teotihuacan set of materials and behaviors spread out from the node of disruption to Ranchoapan and then into the TVAS area where it did not thrive. Instead, Totocapan made decisions more in line with other Gulf Coast cultures. Perhaps the overarching difference between river valleys that helps to explain these divergences is the developmental histories of the two valleys. Totocapan displays a continuous sequence of development from the Middle Formative through the Late Classic whereas Matacapan was newly established on uninhabited lands by a group claiming central Mexican ties during the Early Classic. Afterwards a complex set of multiscalar interactions disjoined regional symbolic, economic, political, and ritual landscapes causing certain developmental divergences. This will be the subject of the remainder of this chapter.

INSTITUTIONAL DIVERGENCES BETWEEN THE TEPANGO AND CATEMACO VALLEYS

I highlight here institutional differences between the Tepango and Catemaco valleys for the Middle Classic. Where appropriate, I draw upon earlier and later patterns. The significance of this institutional analysis is to observe the degree and extent of disruption caused by Matacapan's appropriation of aspects of Teotihuacan culture. A superficial appropriation of foreign styles should not significantly alter the regional organization of the Matacapan polity from neighboring polities. I argue, to the contrary, that the Matacapan polity was organized differently from the Totocapan polity, which would indicate a deeper level of disruption in the Catemaco Valley.

Polity Boundaries

Matacapan controlled settlements through the entire Catemaco River corridor and neighboring locations to the west. This argument is based on relative settlement size and rank, the distribution of Teotihuacan-related materials, and the absence of either Standard Plan or Plaza Group architectural programs (Santley 1991, 2007, Arnold and Santley 2008, Santley and Arnold 1996). For the opposite reasons Teotepec may never have fallen under Matacapan political control. Teotepec was as architecturally complex as Matacapan, displayed elements of broader Gulf Coast architectural plans not present at Matacapan, and did not possess any Teotihuacan-like materials. Furthermore, most of the Coarse Orange ceramics sampled from this lake center did not resemble Matacapan paste recipes (Stoner 2003, Stoner et al. 2008). They may have negotiated an ambassadorial relationship thus avoiding subjugation by Matacapan. If they were politically incorporated, it was likely for a brief time only. The southern boundary of the Matacapan polity is relatively unknown. The cluster of tertiary centers located at the southern end of the Catemaco Valley Transect of the TRS may mark the polity boundary. Any further south and they would likely encroach on the territory controlled by Laguna de los Cerros. The settlements documented by Killion and Urcid (2001) are about midway between the two primary centers, and Matacapan may have been influential in the northern areas of their survey area. I postpone discussion of Matacapan's western polity boundary until later.

Totocapan controlled a polity of comparable size. The location of the northern boundary is unknown due to a lack of research. However, the mound center at Tapalapan may have been a secondary center within Totocapan's territory. Totocapan could have had some influence up to the western toe of the Tuxtlas Massif. The western border of Totocapan's polity remained relatively consistent over time. Even in the Middle Classic, geospatial models only place Tres Zapotes as a Totocapan subordinate if site area is highly over weighted. Furthermore, no architectural similarities exist and archaeological work at Tres Zapotes has not produced any Cipactli Cult materials (Drucker 1943, Weiant 1943, Pool 2003). Cerro el Vigía and Cerro Azul would have been convenient political markers. To the south, Totocapan likely controlled settlements along the entire Tepango Valley up to Xiguipilincan and perhaps as far as La Mechuda (Valenzuela 1945b). Xiguipilincan and Cruz de Vidaña possessed ball courts. Architectural plans are unknown for the former, but the latter has other architectural elements in common with Totocapan. Additionally, both of these centers display material culture affinities with Totocapan. In fact, the general style analysis in the summary of Chapter 6 suggests that the greatest degree of material culture style-sharing in the TVAS occurred along the Tepango River. The Xoteapan River settlements also displayed material culture similarities with Totocapan, but to a lesser degree.

Data regarding the relation between Tilzapote and Totocapan is ambiguous. On one hand they share architectural similarities. Cipactli Cult ceramics are also found at the two centers in the southeast corner of the TVAS, as well as several rural sites in their hinterlands. On the other hand, Tilzapote also displays interaction with the Catemaco Valley. Tilzapote either interacted with both polities simultaneously or its allegiances fluctuated within the duration of the Middle Classic on a time scale not detectable using coarse-grained survey data. The boundary predicted by the Xtent model MC3 is probably most accurate. Tilzapote sat on the political boundary between Totocapan and Matacapan. Tilzapote displays several features that suggest it was a border center controlling interactions between polities. Regime officials there may have used their position between polities to fend off subjugation from either one. Tilzapote has more in common with Totocapan, though, and may have been loosely incorporated into Totocapan's political umbrella for a short time. The lands north of Tilzapote were very rugged and largely uninhabited. This represents a buffer zone between polities.

As a point of general comparison I calculated minimum and maximum territories for both polities. I omit steep vertical flanks of the surrounding volcanoes in this calculation. They were important ritual foci and may have been sparsely inhabited, but they did not likely add much to the total polity populations. The maximum size of the Totocapan polity is 320 km^2, with a minimum of 188 km^2. For the maximum value I included all territory along the transportation corridor north of Totocapan to the edge of the western Tuxtla foothills and the southern boundary extends to incorporate La Mechuda. The western boundary goes through Tilzapote. The minimum territory differs in that I removed an autonomous polygon for Tilzapote and its hinterland, I ended the southern boundary at Xiguipilincan, and I truncated Totocapan's northern influence at Tapalapan. Matacapan's maximum territory of 538 km^2 includes Teotepec and the Monte Pio transect of the TRAS. It also includes the territories up to Tilzapote, but the boundary ends just beyond the TRAS southern survey boundary. The minimum size of 227 km^2 excludes an area for an autonomous Tilzapote polity and it excludes Teotepec and the Monte Pio Transect of the TRAS. In both the minimum and maximum estimates, Matacapan controlled more territory than Totocapan. Matacapan was probably able to control a larger territory because the polity displayed a more centralized pattern than its peer to the west. Of course, the political boundaries were probably not discreet. If Tilzapote was a border community, the authority of both political capitals likely graded together at the border, creating an interpenetrating boundary. That is, Matacapan projected a weak influence into the Xoteapan Valley partially through the assistance of Tilzapote. Likewise, Totocapan likely projected weak influence into the Catemaco Valley. It is probable that the this boundary fluctuated through time as each polity gained or lost influence in the Tilzapote area.

Political Centralization

Rank size plots for the Middle Classic show Matacapan as the more centralized of the two polities investigated here, but the difference is not great. A few caveats must qualify this statement. First, the rank-size calculation includes Teotepec. The only data that suggest Teotepec was subordinate to Matacapan is proximity. Secondly, the difference in monumentality between Matacapan and Teotepec is not great. If Teotepec is removed from the Matacapan polity, it appears even more centralized, but it loses a considerable amount of territory. If Teotepec is included, the Matacapan polity is less centralized than the Totocapan polity due to the relatively equal levels of monumentality between Matacapan and Teotepec.

Perhaps more informative than quantitative calculations is the inferred patterning of political interaction among centers. The Totocapan polity conforms more to Daneels segmentary model of interaction. Tertiary centers are located on the interior of the polity, but they are each closely paired with a secondary center. This suggests a pattern of interaction from tertiary to secondary centers and then to the primary center. Tilzapote would have had owed allegiance to Totocapan, but it enjoyed relative autonomy within its own hinterland. Francisco Madero interacted directly with Tilzapote, but not Totocapan. The same could be said for Xiguipilincan and Cruz de Vidaña, but Totocapan likely had greater control in this segment of the TVAS for reasons discussed above.

Contrasting the Totocapan pattern, Matacapan likely interacted directly with all its subordinate centers, secondary and tertiary. Regional centers within the Matacapan polity generally decrease in size and inferred importance with distance from the capital. Tertiary centers are not closely situated to secondary centers with the exception of the island centers of Agaltepec and Tenagre. Furthermore, the most direct route of travel from tertiary centers to Matacapan does not pass through any secondary centers. Again the exception is the island centers on Lake Catemaco, but as discussed above they may not have been part of the polity in question. Patterns of interaction among centers in the Matacapan polity are therefore assumed to be direct and centralized. I stress here that my general application of Daneels model is to understand patterns of political interaction only. It is not a good overall measure of political centralization because it does not consider the relative size and monumentality of centers within a polity.

My reconstruction of the patterns of interaction in the Catemaco Valley differs from Santley's. Initially, Santley argued that Matacapan headed a dendritic economy (1994). In a dendritic central-place system, patterns of interaction flow from rural settlements, to low-ranked centers, to high-ranked centers, and finally to a single primate center. Dendritic economies are designed to extract resources from a region for export, but the hinterland tends to be underserviced economically (C. Smith 1976). More recently, Santley has revised his interpretation of a dendritic central-place system for the Catemaco Valley (2007). He suggests that the Middle Classic economy headed by

Matacapan never developed into a dendritic central-place system because the region was cut off its expanded market by the decline of Teotihuacan, “the principal conveyor of Matacapan’s ceramic goods (Santley 2007:187)”. Most recently, Santley suggests that the Middle Classic marketing system was organized as a solar economy (2007:182). It must be stressed that I am referring to political interaction here, whereas Santley spoke mainly of the regional market system. In either case, for tertiary centers to interact with Matacapan through Ranchoapan, as dictated by the dendritic central-place model, would produce a very circuitous pattern of interaction. The one case that Santley believes may conform to a dendritic pattern is the production and distribution of Coarse Orange jars involving the Comoapan workshop. In Chapter 9, I presented evidence to support this assertion.

In summary, I suggest that the Matacapan polity was more centralized than the Totocapan polity. Patterns of interaction among centers in each valley, in particular, indicate that the two polities may have been organized very differently.

Regimes, Political Strategies, and Factionalism at Totocapan and Matacapan

The arrangement of architecture and space between Totocapan and Matacapan tells of rather different political strategies employed by each regime. At Matacapan, emphasis was placed on a collective strategy where subjects were invited into the monumental heart of the city to experience public ritual, the marketplace, and other civic services. At the same time, the common Matacapeño was invited to peer into the plazas of the city’s elite. The Main Plaza was intended to create a perception of inclusivity. It was the largest central plaza in the Classic Tuxtlas and perhaps the entire Gulf Coast. Totocapan, and every other center in the Tuxtlas and surrounding lowlands, employed a comparatively less collective strategy. The Acropolis ranges on the other end of the continuum toward exclusivity. Very few people residing in Totocapan or the Tepango Valley experienced the space on top of this palace. The only formal entrance leads up the southern exposure from Plaza Group 1. However, there are elements of space at Totocapan that are less exclusionary. All plaza groups at Totocapan were left open along one edge, as if to create a window through which the common folk could witness formalized rituals. Of course, whether this signifies relatively collective or exclusionary political strategy depends on what took place there. I argue that the use of these relatively small plazas within elite delineated space was designed to reproduce contrasts between subject and regime. The space is highly formal, and altars are found within or next to the majority of plaza groups at the site. Small and low mounds situated within or adjacent to the plazas are inferred to be altars. Valenzuela (1945b) recovered Cipactli Cult vessels, *palmas, hachas*, carved naturalistic stone figures, and complex carved ceramic vessels in one of these altars. These are not only prestige goods, each object displays imagery that tells a religious story used by Totocapan leaders to maintain social order and legitimate their authority. Although no personal or individualized art has yet been recovered at Totocapan, it is safe to say that Totocapan employed a more exclusionary political strategy than Matacapan.

Playing into the collective/network distinction is potential factionalism. Competing factions will employ tactics to advance their own group, such as modifications to the architectural layouts and symbols used by the ruling regime. At Matacapan, different groups of elites were concentrated very closely together near the architectural core of Matacapan, but they all respected the open space delineated by the Main Plaza. Furthermore, there are indications that different groups of elite may have served different functions within the site. The only ball court is directly associated with a temple mound and a massive platform that probably housed elites. However, these buildings are outside the "Teotihuacan Barrio" where the ruling regime was situated. Elite groups may have avoided direct competition by functional differentiation. A similar argument may be raised for Totocapan with the Acropolis and the smaller massive platforms in Plaza Group 2. They could have housed elites that served secular and ritual functions respectively. However, Totocapan was separated into districts with each one possessing its own elite. Each district plaza group possesses repetitive architectural elements that are also seen in the Totocapan Core. Ball courts were employed at the Pollinapan and El Picayo districts, which may have been in direct competition with the Totocapan Core regime. Every district employed Cipactli Cult images, though. Deploying a common state ideology that all district elite utilize may have been a way to dissolve factional competition. While it is not currently known if the Cipactli Cult functioned as a state ideology, its recovery in an altar associated with monumental architecture in the Pollinapan District leaders is a positive indication.

Ideologies of Control

Totocapan and Matacapan employed different strategies of control throughout their hinterlands. Totocapan distributed its ideologies in the form of the ball game and Cipactli Cult materials. All subordinate centers possessed Cipactli Cult materials in small percentages, but the majority of these decorated ceramic vessels were concentrated at Totocapan and surrounding settlements. This set of material culture is not restricted to elite contexts or regional centers, which indicates that the Cipactli Cult was not exclusively employed by state officials. It may be associated with folk ritual, which does not rule out creation, employment, or manipulation by the state. At Totocapan, this ideology appears to be correlated with the ball game rituals, but what purpose it serves is not currently known. The combination of ball game paraphernalia and Cipactli Cult ceramics in Altar 3 in the Pollinapan District raises the possibility that Totocapan may have employed a distinctive ball game ritual not common elsewhere on the Gulf Coast. However, strong similarities can be found between the cipactli images seen on Valenzuela's finds (1945b) and the Papaloapan Stela (Sanchez 1999)(see Figure 8.5). Although this stela was not found in its original context, it is thought to come from Classic period Cerro de las Mesas (Sanchez 1999:21). It depicts a decapitation ritual, which is typically associated with the ball game in the Western Lower Papaloapan Basin. The figures depicted in this scene appear to be ball game players, evident from their dress and the figure to the left of the central figure is carrying a ball game yoke in his right hand. Beneath these human figures one complete and one partial crocodile lie as if waiting for their sacrificial offering. The position of the saurian figure below the human actors could commonly be inferred to represent their position in the underworld. It actually appears to be a human dressed as cipactli. While there are many stylized differences between the cipactli images found in the TVAS and that depicted on the

Papaloapan Stela, the similarities are numerous. This comparison exemplifies yet another connection between the Western Lower Papaloapan Basin and the TVAS, added to the presence of ceramics similar to Acula Red-Orange, Escolleras Chalk, and the bi-slipped and double-slipped ceramics discussed in Chapter 8. It is not coincidence that all of the bi-slipped and double-slipped ceramics found in the TVAS belong to the Cipactli Cult.

The presence of ball courts at secondary and tertiary centers in the TVAS suggests that control over ball game ritual was decentralized. That is, Cruz de Vidaña, Xiguipilincan, and Tilzapote were ritual centers that also had the authority to conduct ball game rituals. That Cipactli Cult ceramics are also found at these centers indicates that their ritual authority may have been legitimized through association with Totocapan. The distribution of Cipactli Cult materials is strongly centered on Totocapan and its frequency falls off with distance. These distributional patterns suggest that Totocapan was the source of the ideas, or the actual materials, that defined the Cult and its ritual within the TVAS. However, control over this religious knowledge in the event of dispersed practice cannot by itself produce a centralized political system. Totocapan also likely employed different political tactics in its hinterland. The plate found by Valenzuela (1945b) depicting a warrior is one of very few militaristic symbols found to date in the Tuxtlas. The use or threat of force may have been a tool of political expansion and control within the Tepango Valley. This plate was likely produced during the Late Classic, so it could also indicate a growing concern with militarism after the collapse of Totocapan..

It is clear that Teotihuacan symbols fit into Matacapan's strategy of maintaining control in its hinterland. Like Cipactli Cult ceramics, Teotihuacan identity was not restricted to the elite strata of society. It was widely spread, and internalized within the identities of Catemaco Valley residents. However, only two centers aside from Matacapan display this set of symbols. They must have employed another strategy of control as well. The ball game is a possibility, but the small size of the ball court at Matacapan does not speak of a ritual that Matacapan wanted to expose to the region. Instead, Matacapan probably depended on different rituals that were enacted in the "Teotihuacan Barrio" plaza and the Main Plaza. The prevalence of Teotihuacan materials in the architectural core of Matacapan must point to a central-Mexican-themed ideology that was appropriated and used by the state. Residents of Matacapan and a few other sites in the region took these rituals home, where they used their *candeleros* and Teotihuacan-inspired figurines in private practice. Pool argues based on the timing and spread of Teotihuacan symbol use that Matacapan's rulers actively promoted the ideology of Teotihuacan through domestic rituals (1992a). This would have functioned to legitimate the regime's political authority.

Levels of Commercialization and Economic Centralization

Matacapan was among the most commercialized center on the Gulf Coast during the Middle Classic. Most Gulf Centers experienced some increase in commercialization after the collapse of large states like Monte Alban and Teotihuacan, but Matacapan developed intensive ceramic production workshops (Arnold et al. 1993; Pool 1990; Santley et al. 1989; Santley 1994, 2007) and a regional market place coincident with the Teotihuacan presence. Ceramics production at Comoapan and Area 199 were organized into intensive production workshops. They were independent producers that specialized in the production of pottery to be exchanged over a broad regional territory (Stoner et al. 2008). Ranchoapan was influential in distributing obsidian blades to a large segment of its hinterland, but it was not a central node in an interregional exchange network (Barrett 2003, Santley 2006).

At the same time, almost all production detected at Totocapan was attached to elite residences. Outside this regional center, production took place in relatively small workshops at low to moderate intensities of production. Intersite exchange probably took place, but no ceramic production workshop identified for the Middle Classic in the TVAS could have provisioned consumers on a regional level. The same can be said about obsidian blade production, but Tilzapote probably exchanged blades throughout the southeastern segment of the TVAS. It is interesting that Tilzapote seems to have been the most active economic node in the TVAS settlement system. Its position between valleys likely helped it develop into a center for exchange, as goods flowed into the TVAS through the corridor east of Cerro Amarillo. This also could indicate that commercial activity taking place in the Catemaco Valley spread only as far as the southeastern corner of the TVAS, which I argue below.

Both valleys experienced an increase in commercialization during the Late Classic as seen by levels of independent craft specialization. In the Catemaco Valley, pottery production at the Southeast Locality actually increased in intensity (Pool 1990). In the Tepango Valley, two specialized industries developed. Oteapan produced a relatively high number of blade production by-products, but relatively few blades were found at the site. El Nopal produced Fine Gray ceramics *en masse*. Both of these industries were positioned within 3-4 km of Totocapan, which itself displayed very low levels of craft production by the Late Classic. I suggest that Totocapan became a large consumer that did not produce much except ideology by the Late Classic. High populations fostered high levels of consumption which spurred intensive craft production industries in its hinterland. The pattern of interaction was therefore gravitational or centripetal. This stands in contrast to the centrifugal or outward-directed patterns of interaction at Matacapan and the Catemaco Valley.

INTERVALLEY RELATIONSHIPS DURING THE CLASSIC PERIOD

Data for direct interaction between valleys are few, but some clear patterns do exist. I begin with the general and proceed to the specific.

Material culture of the Tepango and Catemaco valleys share much in common. Paste recipes are very similar for almost all ceramic types with some subtle variations. Vessel forms for each paste variety follow the same conventions. This is perhaps best seen on relatively rare ceramic types like Irregularly-Fired Red-Slipped on Coarse Brown jars with horizontal channels on the exterior of the neck. This is perhaps the most distinctive paste and vessel form combination in the Tuxtlas, but it is common to the entire region at least from Tres Zapotes to Matacapan. My point for raising this specific comparison is that symbolic and political disruptions that occurred in the Tuxtlas took place over a substrate of shared symbols that unite the Tuxtlas as a coherent cultural style zone.

Stylistic interactions that do not display isomorphic distributions over space include Matacapan style painted motifs on bichrome Fine Orange, Teotihuacan-style materials, Cipactli Cult vessels, and Standard Plan architectural layouts. I suggest that the limited Matacapan-style motifs, Teotihuacan-style materials, and much of the green obsidian present in the TVAS were either traded directly from the Catemaco Valley or inspired through more symbolic interaction with Matacapan. As a whole, this set of materials and symbols are most prevalent in the southeast quadrant of the TVAS area from Texcochapan to Tilzapote. Though each one of these indicators is found only in minor percentages at individual sites, the co-occurrence of all three in this spatially restricted zone of the TVAS is fairly strong evidence of interaction with sites in the Catemaco Valley. Black obsidian may have came from Ranchoapan through the Cerro Amarillo corridor. Matacapan probably controlled the flow of green obsidian traded into Tilzapote. It was probably a byproduct of economic interaction that brought Catemaco Valley stylistic traits into the TVAS. However, Matacapan and Teotihuacan material styles and green obsidian are found in much greater quantities in the Catemaco Valley, suggesting that they fall off in frequency with distance from Matacapan. Cipactli Cult ceramics probably show a similar fall off in frequency into the Catemaco Valley. Through inspection of all literature available for the Classic period Catemaco Valley, not a single potential example of Cipactli Cult ceramics was identified. Additionally, Arnold, who co-directed the TRS with Santley and also excavated at Matacapan, La Joya, Agaltepec, and Teotepec, has not observed materials similar to the Cipactli Cult as described in this research (personal communication 2010). While this absence of the Cipactli Cult supports the fall-off pattern from Totocapan, their absence cannot be ruled out without a systematic reexamination of the TRS materials.

Coarse Orange jars, like those produced at Comoapan, were made into highly standardized forms that are specific to the paste recipe. This combination of form and paste recipe, and decoration, alone is enough to suggest symbolic interaction with Matacapan. In fact, the proportion of this type is much higher at sites in the eastern TVAS than at sites within the western TVAS (see Figure 9.7). Compositional sourcing data were collected as part of the current project that strongly indicate that Coarse Orange jars were also traded into the TVAS area from Matacapan, the Comoapan production facility specifically. It appears that Totocapan was the principal recipient of these jars, indicating a second trade route that passes north of Cerro Amarillo directly to Totocapan. A disjuncture between economic networks appears here. Totocapan consumed the highest percentage of Comoapan-produced Coarse Orange in the TVAS, but only 0.4 percent of the obsidian found there was green. Totocapan and Tilzapote were therefore participating in different economic networks. By extension, I infer that any Teotihuacan-style artifacts found at Totocapan, or other settlements within the TVAS, were imitations of those seen at Matacapan, rather than the result of any direct interaction with the central Mexican city.

SUMMARY: CLASSIC MESOAMERICAN DISJUNCTURE AS SEEN THROUGH THE TUXTLA REGION

Figure 10.2 is an attempt to synthesize the most important data presented by this dissertation. Not all evidence for interactions is depicted on the map, but it embodies the major points that are summarized here.

The Tuxtla Mountains experienced a Teotihuacan-related disruption during the Early Classic that differentially influenced the course of evolution among neighboring groups in the region. This disruption originated at Matacapan and spread south along the Catemaco River and west through Ranchoapan, into the upper Xoteapan River valley. Matacapan leaders promoted a local adoption of Teotihuacan behaviors and rituals in both public and private contexts within the center. It was not restricted to the elite levels of society, but was adopted by people of all statuses across the site. Whether the leaders of Matacapan were central Mexican immigrants or locals who promoted a connection to Teotihuacan, the resulting disruption affected the cultural identities of the majority of its. The disruption began around the "Teotihuacan Barrio" during the Early Classic and spread to cover most of the site by the Middle Classic (Pool 1992a).

Beyond this core zone of disruption, the Teotihuacan-related disruption affected several other groups in small discreet spatial clusters. The disruption was not a homogenous or pervasive event. It spread to cover a large portion of the upper Catemaco Valley by the Middle Classic. The spread of these beliefs took place too rapidly to be

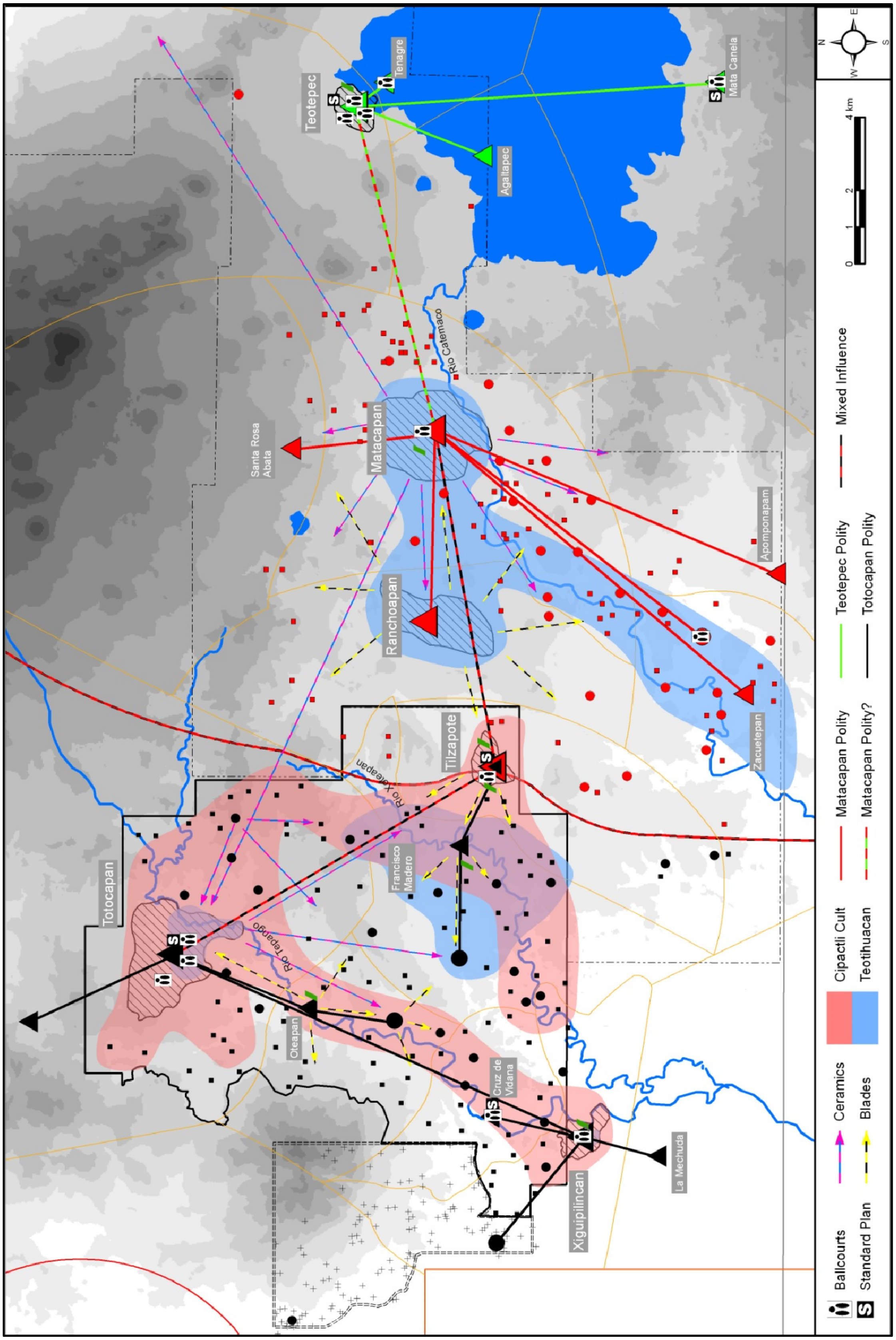


Figure 10.2. Major patterns of interaction among Classic period groups in the Tuxtla Mountains.

explained by biological reproduction alone, so it can be inferred that the central Mexican ideas were actively promoted by influential agents in the region. The regime at Matacapan advanced an agenda centered on Teotihuacan-inspired political strategies, economic goods, material cultural styles, and ritual, some of which percolated down to its subjects in the upper Catemaco Valley. In short, all of the core institutions of the Matacapan polity were in some way affected by the Teotihuacan identity that its regime professed.

Expanding out from Matacapan, disruption took different forms. Some regional centers completely rejected all Teotihuacan-related stylistic influence. Research at Teotepec, for example, has not created any evidence for a social, ideological, or political relationship with Teotihuacan, but it was the second largest consumer of green obsidian in the region. Groups at other centers, like Tilzapote, apparently were not concerned with employing central Mexican symbols, but they benefitted indirectly from the exotic green obsidian that came their way. Still others, like Totocapan, appropriated a few Teotihuacan symbols without participating in the Teotihuacan-controlled economic network. While Totocapan did not consume green obsidian, they *did* enjoy economic access to Matacapan-produced goods (Coarse Orange jars). Teotepec displays the opposite pattern, no Teotihuacan symbols were found but 12 percent of all obsidian was of the green, Teotihuacan-controlled Pachuca source (Santley 2007:167). While central Mexican symbols and green obsidian were scattered in minor quantities to isolated areas of the TVAS, there is almost no indication that localized rituals, which developed at Totocapan and Cruz de Vidaña since the Formative period, were disrupted in any way. Teotihuacan-related symbols, goods, and ritual therefore traveled through the Tuxtlas via disjoint landscapes of interaction. These landscapes intersected completely only at Matacapan, other places on the Tuxtla landscape display a more selective and partial adoption of this set of central Mexican culture. Many of these decisions were probably tied more to the prestige of association with Matacapan than with Teotihuacan itself.

While Teotihuacan-related symbols, materials, and beliefs were adopted by a subset of sites in the region, several alternatives overlapped at the same places. The Cipactli Cult promoted by Totocapan's regime displays a fall-off pattern similar to that for Teotihuacan-related materials with respect to Matacapan. In fact, the distributions of the two overlap along the Xoteapan River. Tilzapote and surrounding settlements tied into multiple different interaction networks that remain separate elsewhere in the Tuxtlas. The cultural forms developed there display a syncretism of beliefs, identity, materials, and ideas not seen at any other center in the study area.

A different kind of syncretism characterizes Matacapan. Perhaps the most pervasive ritual practice on the Gulf Coast, the ball game, was muted by the Matacapan regime. They presented a small ball court on the northern margin of the Main Plaza, and produced/acquired ball game paraphernalia on stone media. The central Mexican founders of Matacapan likely drew upon the institutional memory preserved by the Chuniapan de Abajo ball court, which was constructed as early as the Late Formative, and equivalent ritual practiced at Teotepec, Totocapan, and Cruz de Vidaña. However, there may be many additional sources of inspiration for Matacapan's use of the ball game including central Mexico. The ball court at Matacapan was one of the contexts that produced substantial quantities of Teotihuacan-related objects (Santley 2007:157). Teotihuacan itself did not present architecture characteristic of a ball court, though a ball court marker identical to one found at Tikál was identified there (Uriarte 2006) and recent analyses suggest that Teotihuacan may have employed open ball courts that would be difficult to identify archaeologically (Gomez Chavez et al. 2004). A possible ball court marker carved in a Teotihuacan style also was found at Piedra Labrada on the Gulf shores of the eastern Tuxtlas (Blom and La Farge 1927). If the Matacapan regime was ethnically Teotihuacano, as Arnold and Santley (2008) suggest, it displays a degree of assimilation to local cultural currents by employing more Gulf Coast-like versions of the ball game. Pool's (1992a) examination of the diachronic spread of Teotihuacan ideas through Matacapan and the broader region suggests that the Matacapan regime promoted these traditional Gulf Coast cultural elements concurrently with a central Mexican ideology.

The majority of the region outside the Catemaco River corridor also displays architectural affinities with Gulf Coast groups to the south, west, and east. The Standard Plan and Long Plaza Group architectural layouts were linked to the processes of political legitimization from central through southern Veracruz. Matacapan officials rejected this locally-developed architectural institution, which had profound implications for the style of sociopolitical organization at Matacapan compared to other polities on the Gulf Coast. Two parallel long mounds flank the "Teotihuacan Barrio" plaza, but the similarities with the Long Plaza Group configuration end there. These architectural configurations, and the political ideologies build into them, may have been incompatible with Matacapan's political strategy. These redundant architectural layouts present a very closed use of space. The closed configuration of Standard Plan and Long Plaza Group architectural layouts creates the perception of exclusivity, partitioning regime from subject in space. The playing of the ball game would have been the exception to this exclusionary use of space, as ball game rituals probably targeted a broad audience. Rather than use small closed spaces, Matacapan elites enforced the preservation of a wide-open space at the heart of the city. The rejection of Standard Plan architecture was seen everywhere in the Catemaco Valley except Teotepec and possibly Mata Canela. This is perhaps the strongest clue suggesting that the Catemaco Valley evolved according to principals that were not set within the Gulf Coast. It also provides support for an argument that sees Teotepec as a separate political entity.

Divergent cultural evolution is also seen by the political and economic organization of the two polities. Patterns of interaction among centers are very different between valleys. Matacapan was more direct in dealings with its hinterland, while Totocapan delegated administrative responsibilities down to its secondary centers. With respect to economic institutions, Matacapan was among the most commercialized cities on the Gulf Coast during the Middle Classic. While Matacapan exchanged goods to a large segment of the regional population, investigations at Totocapan identified only attached specialists that produced primarily for local elite consumption[1]. In the Late Classic, Totocapan largely became a consumer of goods produced in its hinterland, while Matacapan increased its role as a regional supplier of basic crafts[2]. The cultural divergences observed between the Tepango and Catemaco Valleys therefore did not seem to increase competition between the two polities. In fact, the diversification of economic exchange networks and political strategies may have allowed Matacapan and

[1] As discussed previously, methods of survey may have led to an underrepresentation of household production.
[2] These patterns may be biases of targeted analysis, though.

Totocapan to cooperate and coexist within the same environment without direct competition. Patterns of Coarse Orange jar production and exchange support this reconstruction of economic cooperation between valleys, as at least one product was exchanged between the two political capitals.

A direct, causal link between Teotihuacan and the institutional anomalies observed at Matacapan and the Catemaco Valley still evades archaeological detection, but the correlation is too strong to ignore. Ideologies brought over from Teotihuacan became infused into the political and economic strategies employed by regimes in the Catemaco Valley. The sponsorship of a large regional marketplace, for example, could encourage increased commercial activity (Hirth 1998). Marketplaces have been proposed for both Teotihuacan and Matacapan (Santley 2007, Hirth 1998, Widmer 1996), but do not commonly appear in the archaeological literature for most Gulf Coast subregions during the Classic period. This is perhaps due to the difficulty in identifying marketplaces archaeologically (Hirth 1998), but no Classic period site on the Gulf Coast displays evidence of economic production at a scale as large as the ceramic production industries at Matacapan.

All data considered, the current study supports a conclusion that Matacapan was the central node of a Teotihuacan-related disruption during the Classic period. Following this initial disruption, groups throughout the Tuxtlas differently experienced the symbolic, political, economic, and ritual landscapes that centered on Matacapan. While social contrasts demarcate many different Tuxtla groups, the region as a whole shares certain cultural characteristics. The blend of foreign, local, and regional cultures created disjunctures among the landscapes of interaction that characterize the Tuxtlas, so that each group must be understood through its position within overlapping networks of interaction in the region and in the broader Mesoamerican world-system.

IMPLICATIONS FOR UNDERSTANDING TEOTIHUACAN'S ROLE IN THE CLASSIC MESOAMERICAN WORLD-SYSTEM

Matacapan was an important node in the Teotihuacan-centered network of interaction during the Classic period. While this is a long-recognized fact, I have attempted to demonstrate that understanding the implications of this interaction for the development Tuxtla groups is a complex and multifaceted task. Matacapan regime officials promoted certain cultural traits derived from central Mexico, though the Tuxtla region is best conceived as a multicultural landscape that comprised interactions from many different groups. The result blended multiple sources of cultural influence across the Tuxtla landscape. In particular, Matacapan and Totocapan shaped the Classic Tuxtla landscape to very different results. The effect of space on the spread of these influences is most apparent along the boundary zone between polities where Tilzapote displays a syncretism of multiple cultural, political, and economic influences.

The complex relationships revealed in this dissertation between Matacapan and Totocapan are representative of most, if not all nodes, within the Classic Mesoamerican world-system. While the evidence for Teotihuacan interaction appears in many places of Mesoamerica, how that interaction articulates with preexisting regional cultural landscapes is a question rarely asked. Tikál, Morgadal Grande, Copán, Kaminaljuyú, and Montana are but a few of the better-known cases to show a strong relationship with the central Mexican city. Examinations of how Teotihuacan affected the regional cultural landscapes have not spread beyond the points of contact for most cases. It is time to examine these interactive nodes in their broader regional contexts to identify institutional, temporal, and spatial disjunctures among groups related through the regional networks of interaction. The Tuxtla case may serve as a proxy to understand others. Matacapan fostered an ideology partially based on the central Mexican city that spread to large segments of the Catemaco Valley population (Pool 1992a, Santley 2007:Figure 6.4). However, they did so in a foreign land with its own long-established local institutions and traditions. In no case, even in the most hegemonic imperial expansion, will such a foreign influence be homogeneously adopted by all groups in a region. 'Core' influences are reinterpreted and combined with local institutions or rejected completely. Social contrasts develop from the different decisions made among closely situated groups, who interact in other ways not directly related to the core network. A better understanding of Teotihuacan's role in Classic period Mesoamerica can be had through an investigation of interplay among three categories of place: where the Teotihuacan-related network overlaps with local and regional cultural landscapes; where it supplants existing regional institutions; and where regional networks remain discreet from central Mexican influences.

DEVELOPING AN ARCHAEOLOGY OF DISJUNCTURE

In this dissertation, the beginnings of an archaeology of disjuncture are laid out (Table 10.1). This mode of analysis emphasizes the diversification of cultural forms caused by expanding world-systems linkages that complements the already well-documented process of cultural homogenization. Such an approach highlights different levels of incorporation into broad-scale cultural flows over space and time. Research on frontiers (e.g., Venter 2008, Wells 2005) comes close to achieving these goals, but not all world-systems develop through imperial expansion. The edges of conquest will look very different from the case study I have presented here, but the general result may be similar in all cases. Cultural flows spread through disjoint landscapes of interaction, differently negotiated at the local, regional, and macroregional levels. Every place on the landscape participates in multiple complex networks of interaction. Rather than understand human groups as holistic cultural expressions, I attempt to understand them as nodes where overlapping political, symbolic, economic, and ritual networks differently intersect in time and space. There is no set methodology for examining the archaeology of disjuncture. To the contrary, any approach to disjuncture holds analytical flexibility as its first priority. There are, however, certain guidelines useful to examine the temporal, spatial, and institutional dimensions of disjuncture.

First, the instant two or more groups with different histories forge a relationship, a disruption to the timeline of localized development takes place. These temporal disjunctures can counter the process of local sociocultural reproduction or the process of endogenous change, which most often moves at a slower pace that exogenous change. Long-standing local traditions may alter rapidly when non-local forces are involved. Key to understanding these temporal disjunctures is the characterization of the timing, nature, and spread of disruption. Disruption can take place instantaneously or over a period of

Table 10.1. Summary of different types of disjuncture and variables for measuring them.

Type				
Temporal Disjuncture	Timing of Initial Disruption - Rapid ↔ Gradual	Nature of Disruption - Conquest (Assymetrical) ↔ Mutual Benefit	Degree of Disruption	Timing of Spread - Rapid ↔ Gradual
Spatial Disjuncture	Position of Disruption within Local Network - Central ↔ Dispersed	Extent of Disruption - Localized ↔ Pervasive	Consistency of Disruption within Maximal Extent - Continuous ↔ Spotty	Sociocultural Contrasts (Divergences) over Space - Uniform ↔ Multicultural - Boundaries among groups ○ Rigid ↔ Gradational
Institutional Disjuncture	Macroregional Scale - Divergent flows of political, economic, symbolis, ritual interaction	Regional Scale - Differential use of non-local ideas, goods, and behaviors among groups that share a substrate of local cultural institutions - Neighboring groups participating in disjoint but overlapping social networks	Local Scale - Negotiation between local and non-local inputs and how changes articulate with traditional institutions	

time. It can involve violent conquests or mutually beneficial interactions. Finally, these influences spread outward from the point(s) of initial disruption at variable rates.

Matacapan was the clear origin of the local disruption following its establishment during the Early Classic period. The nature of disruption was likely peaceful as a group of Teotihuacanos settled an abandoned segment of the upper Catemaco Valley. The disruption then spread to neighboring settlements over the course of 200 years.

Second, the closely related spatial dimension of disjuncture describes the source, extent, boundedness, and sociocultural contrasts that develop as a result of disruption. The source of disruption is the place or places on the landscape that first change(s) to reflect some foreign idea or behavior. This place, or these places, can be beneficially characterized through their position in the regional network. In ancient states, disruption often first takes place at central nodes within the regional network. In modern situations, these disruptions tend to be more decentralized. The location of disruption varies on a continuum between these two extremes. As the initial disruption spreads out from the source, all groups exposed to novel ideas, goods, and behaviors are presented with a scenario where they can decide to accept, reject, or modify the incoming influences according to their own perspectives. Different decisions made by neighboring groups have the potential to create social contrasts or boundaries. The edges of these contrasts can be sharply defined – as represented by rigid partitions among groups in space such as walls, buffer zones, or natural physiographic boundaries that divide groups displaying different identities, market territories, political boundaries, or other social groupings. Alternatively, social contrasts may grade together over space so that recognizing a hard-line division is difficult. The internal spatial consistency of these social contrasts can be continuous or spotty. Within the major distribution of a style zone, for example, a continuous spatial consistency implies that all groups within that geographic space displays that style. Where a number of groups within that zone depart from the majority in the symbols that they display, a spotty consistency is presented.

As the central Mexican-inspired beliefs and symbols fostered at Matacapan spread through the region, resistance was met near the political boundary with the Totocapan polity. The boundaries where the ideologies promoted by Matacapan and Totocapan intersect, however, graded together as influences from each political center likely interpenetrated somewhat into the other valley. Tilzapote, and other settlements in the Xoteapan Valley displayed a blend of influences from both centers. Within the Catemaco Valley, the appearance of Teotihuacan materials was widely spread but spotty. In the Tepango Valley, Teotihuacan materials were rare, spatially restricted, and spotty.

Finally, the institutional dimension of disjuncture refers to the degree to which foreign influence affects interinstitutional linkages. Political, economic, ritual, and symbolic institutions are thoroughly interconnected in a way particular to their local histories of development. With novel information comes alterations to the ways in which local institutions relate to each other. If a change to one institution takes place, but others remain relatively intact, an institutional disjuncture has taken place. The institutions that take root at any network node are analogous to a combination lock where each tumbler represents a different institution and the numbers mark alternatives given a multiscalar realm of possibilities. Agents in different groups dial up institutions through complex negotiation processes, resulting in a broad diversity of institutional configurations over the regional landscape. This diversity creates disjoint and non-isomorphous flows of the different landscapes referred to by Appadurai (1996). That is, the variable combination of different people, ideas, goods, and behaviors at each place on the landscape creates the spatial and temporal disjunctures among broad-scale cultural flows as described above. While Polanyi (1957) is correct to highlight the embeddedness of economy within other social institutions, archaeologists have mistakenly applied this concept to whole regions, effectively locking those institutions into a single configuration.

Totocapan and Teotepec were major centers in the Tuxtlas that participated closely in political, ritual, and social institutions common to the broader Gulf Coast region – like the Gulf Coast version of the ball game and certain redundant architectural patterns. Matacapan utilized these institutions to a much lesser degree, advancing instead alternatives infused with a central Mexican flavor. While these mark significant political, ritual, and symbolic divergences from the local course of development, other Matacapan institutions drew upon broader Tuxtleco traditions that were identical to those found at neighboring political centers. Most telling of the connections among Matacapan and other groups on the Gulf Coast, particularly within the Tuxtla region, were the common set of basic material culture styles shared throughout the region and the participation in similar networks of obsidian source procurement.

Actively searching for temporal, spatial, and institutional disjunctures in ancient world-systems facilitates the recognition of diversity that is simply not achievable by coarse-grained analysis of cores, peripheries, semi-peripheries, and margins. Most of these studies emphasize the spread of a common set of goods, symbols, and ideas that gives the world-system internal coherence. This leads to a certain degree of cultural homogenization. Without this wide-spread dissemination of materials expressing similar styles, archaeologists would be hard pressed to identify world-systems. Concurrent with cultural homogenization, however, local and regional systems experience an increasing cultural diversification that is a poorly understood feature of ancient world-systems. This diversification results from the different choices that local agents make within broad-scale realms of interaction, which create disjunctures among political, economic, symbolic, and ritual networks across the thousands of places that make up the cultural landscape. The emerging sociocultural contrasts that develop from disjunctures in the world-system drive cultural evolution to new and more complex forms.

APPENDIX A

T.V.A.S 2007: Site Form (Front)

SITE FORM/
REGISTRO DEL SITIO

Site #/
 # Del Sitio

Name/ *Nombre*:

Date/ *Fecha*:

Time/ *Hora*:

Landform/ *Forma de Tierra*:

Landowner/ *Dueño*:

Vegetation/*Vegetación*:

%Visibility/ *% Visibilidad:*

Site Condition/ *Condición del Sitio*:

How was site found?/ *Como se encontró el sitio?*

Mounds (Y/N)/ *Monticulos (Si/No)*

Shovel Probes #/ *# Pruebas de Pala*

Site Size/N-S
Tamaño del Sitio E-W

Soil Description/ *Descripción de Suelo*

Materials/ *Materiales*

Perfile

(Color, Texture, Inclusions)
(*Colór, Textura, Incluciones*)

Site Description/ *Descripción del Sitio*

Escriba más atras

Map/*Carta:* Photos/*Fotos*: Bags/*Bolsas*:

T.V.A.S 2007: Site Form (Back)

Description/
Descripción

	UTM N: *Norte* E:	
UTM N: *Occidente* E:	UTM N: *Centro* E:	UTM N: *Oriente* E:
	UTM N: *Sur* E:	

APPENDIX B

T.V.A.S. CERAMIC TYPOLOGY
(based on the Proyecto Arqueológico de Tres Zapotes [PATZ],
Pool Personal Communucation 2003)

TVAS#	MATACAPAN#	
1000	CERAMICAS SIN DESGRASANTE (UNTEMPERED WARES)	
1100	CERAMICA GRIS FINA (FINE GRAY WARE)	
Monocromo de Gris Fino Sencillo (Fine Gray Plain Monochrome)		
1111.	1.	Gris Fino Sencillo (Fine Gray Plain)
1112.	19.	Engobado Negro Naranja Fino (Black-Slipped Fine Orange)
1113.	81.	Gris Brunido (Burnished Gray)
1114.	85.	Cafe Claro Brunido Lechoso (Burnished Milky Light Brown)
1115.	89.	Cafe Claro Manchado Mate (Mottled Light Brown with Matte Finish)
Monocromo de Gris Fino Inciso (Fine Gray Incised Monochrome)		
1121.	2.	Gris Fino con Incision Simple (Fine Gray with Simple Incision)
1122.	3.	Gris Fino con Incision Compleja (Fine Gray with Complex Incision)
1123.	81.1	Gris Brunido Inciso (Burnished Gray Incised)
1124.	91.	Gris Fino Inciso con hematita especular (Fine Gray with specular hematite in incisions)
1125	xx.	Engobado Negro Naranja Fino con Incision
Monocromo de Gris Fino con Engobe (Slipped Fine Gray Monochrome)		
1131.	58.	Blanco Engobado Gris Fino (White-slipped Fine Gray)
1132.	57.	Cafe Engobado Gris Fino (Brown-slipped Fine Gray)
1133.	5.	Bano Negro Sobre Gris Fino (Black Wash on Fine Gray)
1134.	59.	Negro Engobado Gris Fino (Black-slipped Fine Gray)
1135.	61.	Negro Engobado Gris Fino con Incision Compleja (Black-slipped Fine Gray with Complex Incision)
Bicromo de Gris Fino Pintado (Painted Bichrome)		
1141.	4.	Negro sobre Gris Fino (Black on Fine Gray)
1142.	27.	Blanco sobre Gris Fino (White on Fine Gray)
1143.	52.	Rojo sobre Gris Fino (Red on Fine Gray)
1200	CERAMICA NARANJA FINA (FINE ORANGE WARE)	
Monocromo de Naranjo Fino Sencillo (Plain Monochrome)		
1211.	6.	Naranja Fino Sencillo (Fine Orange Plain)
1212.	6.1	Naranja Fino Arenoso (Sandy Fine Orange)
1213.	30.	Bayo Fino (Fine Buff)
1214	xx.	Naranja Fino con Sonido Metálico (Fine Orange with Metallic Sound)
1215	xx.	Naranja Fino con Nucleo Obscuro sin Sonido Metalico
Monocromo de Naranja Fino Inciso sin Engobe (Incised Unslipped Fine Orange Monochrome)		
1221.	7.	Naranja Fino con Incision Simple (Fine Orange with Simple Incision)

1222.	8.	Naranja Fino con Incision Compleja (Fine Orange with Complex Incision)
1223.	30.	Bayo Fino Inciso (Incised Fine Buff)
1224.	87.	Cafe Brunido Inciso Esculpido (Burnished Brown with Sculptured Incision)

Monocromo de Naranja Fino Engobado (Slipped Fine Orange Monochrome)

1231.	53.	Bano Rojo sobre Naranja Fino (Red Wash on Fine Orange)
1232.	18.	Cafe Engobado Naranja Fino (Brown-slipped Fine Orange)
1233.	54.	Cafe Pulido Engobado Naranja Fino (Polished Brown-slipped Fine Orange)
1234.	16.	Naranja Engobado Naranja Fino (Orange-Slipped Fine Orange)
1235.	76.	Naranja Brunido (Burnished Orange [Protoclassic])
1236.	77.	Blanco Engobado Naranja Fina (White-slipped Fine Orange)
1237.	75.	Blanco Pulido (Polished White)
1238.	78.	Amarillo sobre Bayo Amarillo (Yellow on Yellowish Buff)
1239.	72.	Plata Metalico (Metallic Silver)
1240.	xx.	Blanco Engobado Naranja Fina Arenosa

"Monocromo" de Naranja Fino Engobado y Inciso (Slipped and Incised "Monochrome")

1251.	86.	Engobe Rojo sobre Naranja Fino con Incision Compleja (Red-Slipped with Complex Incision)
1252.	63.	Negro Engobado Naranja Fino con Incision (Black-slipped Incised Fine Orange)
1253.	33.	Engobado Blanco Esculpido [Tajin Blanco] (Carved White Slip ["Tajin White"])
1254	xx.	Engobe Naranja Sobre Naranja Fina con Incision

Bicromo Pintado sin Engobe (Painted Unslipped Bichromes)

1261.	9.	Rojo Sobre Naranja Fino (Red on Fine Orange)
1262.	9.1	Rojo Sobre Naranja Fino Inciso (Incised Red on Fine Orange)
1263.	10.	Negro Sobre Naranja Fino (Black on Fine Orange)
1264.	14.	Blanco Sobre Naranja Fino (White on Fine Orange)
1265.	30.1	Rojo Sobre Bayo Fino (Red on Fine Buff)
1266.	205.	Naranja Fino Arenoso con restos de pintura roja (Sandy Fine Orange with remnant red paint)
1267.	xx.	Naranja Negativa sobre Naranja Fina

Bicromo Pintado sobre Engobe (Painted Slipped Bichromes)

1271.	9.2	Rojo Sobre Engobado Blanco Naranja Fino (Red on White-slipped Fine Orange)
1272.	13.	Naranjo sobre Engobado Blanco Naranja Fino (Orange on White-slipped Fine Orange)
1273.	13.1	Naranjo Sobre Engobado Blanco Naranja Fino Inciso (Incised Orange on White-slipped Fine Orange)
1274.	17.	Blanco Sobre Engobado Cafe Naranja Fino (White on Brown-Slipped Fine Orange)
1275	xx.	Negro Sobre Blanco Engobado Narano Fino (Black on white-slipped Fine Orange).
1276.	xx.	Negro sobre Rojo Engobado Naranja Fina

Policromos sin Engobe (Unslipped Polychromes)

1281. 11. Policromo sobre Naranja Fino sin Engobe (Polychrome on Unslipped Fine Orange)

Policromos sobre Engobe (Slipped Polychromes)

1291. 12. Policromo sobre Naranja Fino con Engobe Blanco (Polychrome on White-slipped Fine Orange ["Tuxtlas Polychrome"])
1292. 12.1 Policromo sobre Naranja Fino con Engobe Blanco con pintura negativa. (Polychrome on White-slipped Fine Orange with Negative Resist)

2000. CERAMICAS CON DESGRASANTE (TEMPERED WARES)

2100 CERAMICA GRIS A NEGRO (GRAY TO BLACK WARE)

2111. 31. Gris Burdo con desgrasante blanco (Coarse Gray)
2111.1 xx. Gris Burdo Inciso con desgrasante blanco
2112. 55. Blanco Engobado Gris (White-slipped Gray)
2113. 46. Gris Burdo con desgrasante de ceniza volcánica (Coarse Gray)
2114 xx. Gris Arenoso con Engobe Blanco (White-slipped Sandy Gray)
2114.1 xx. Gris Arenoso con Engobe Blanco Inciso (Incised White-slipped Sandy Gray)
2115 xx. Gris Pasta media pulido (Polished Gray with medium paste)
2115.1 xx. Gris Pasta media pulido inciso (Incised Polished Gray with medium paste)
2120. xx. Tipos Negros Formativos (Formative Black Types)-- If heavily eroded the following may be coded as 2120.
2121. 34. Engobado Negro Inciso (Black-slipped Incised)
2122. 41. Negro Pulido (de pasta fina) (Polished Black [fine paste])
2122.1 41.2 Negro Pulido Inciso (de pasta fina) (Polished Black Incised [fine paste])
  2122.11 <u>Inciso</u>
  2122.12 <u>Esgrafiado</u>
2122.2 41.3 Negro Pulido (de pasta fina) con hematita especular (Polished Black [fine paste] with specular hematite)
2122.3 41.4 Negro Pulido (de pasta fina) Inciso con hematita especular (Polished Black [fine paste] Incised with specular hematite)
  2122.31 <u>Inciso</u> con hematita especular
  2122.32 <u>Esgrafiado</u> con hematite especular

2122.4 41.1 Negro Pulido (de pasta fina) Delgado con pasta naranja a gris (Thin walled polished black [fine paste] with orange to gray paste)
2123. 28. Negro Pulido Mediano (desgrasante de cuarzo) (Polished Medium Black [quartz temper])
2123.1 xx. Negro Pulido Mediano Inciso (desgrasante de cuarzo) (Incised Polished Medium Black [quartz temper]).
2123.11 <u>Inciso</u>
2123.12 <u>Esgrafiado</u>

2200 CERAMICA DE COCCION DIFERENCIAL (DIFFERENTIALLY FIRED WARE)

2212 xx. Blanco y Negro de pasta fina (Fine Paste Black and White)
2212.1 xx. Blanco y Negro de pasta fina Sencillo (Plain Fine Paste Black and White)

2212.2	xx.	Blanco y Negro de pasta fina Inciso (Incised Fine Paste Black and White)
2212.21 <u>Inciso</u>		
2212.22 <u>Esgrafiado</u>		
2212.3	xx.	Blanco y Negro de pasta fina Engobado Blanco (White Slipped Fine Paste Black and White)
2212.4	xx.	Blanco y Negro de pasta fina Engobado e Inciso (Incised White Slipped Fine Paste Black and White).
2212.41 Engobado e <u>Inciso</u>		
2212.42 Engobado e <u>Esgrafiado</u>		
2213	xx.	Blanco y Negro de pasta burda (Coarse Black and White)
2213.1	xx.	Blanco y Negro de pasta burda Sencillo (Plain Coarse Black and White)
2213.2	xx.	Blanco y Negro de pasta burda Inciso (Incised Coarse Black and White)
2213.21 <u>Inciso</u>		
2213.22 <u>Esgrafiado</u>		
2213.3	xx.	Blanco y Negro de pasta burda Engobado (White Slipped Coarse Paste Black and White)
2213.4	xx.	Blanco y Negro de pasta burda Engobado e Inciso (Incised White Slipped Coarse Black and White)
2213.41 Engobado e <u>Inciso</u>		
2213.42 Engobado e <u>Esgrafiado</u>		
2214	xx.	Blanco y Negro de pasta mediana (Medium Black and White)
2214.1	xx.	Blanco y Negro de pasta mediana Sencillo (Plain Medium Black and White)
2214.2	xx.	Blanco y Negro de pasta mediana Inciso (Incised Medium Black and White
2214.21 <u>Inciso</u>		
2214.22 <u>Esgrafiado</u>		
2214.3	xx.	Blanco y Negro de pasta mediana Engobado (White Slipped Medium Black and White)
2214.4	xx.	Blanco y Negro de pasta mediana Engobado e Inciso (White Slipped and Incised Medium Black and White).
2214.41 Engobado e <u>Inciso</u>		
2214.42 Engobado e <u>Esgrafiado</u>		
2223	38.3	Blanco y Negro con pasta gris fina (White-rimmed black with Fine Gray Paste).
2224	xx.	Negro y Bayo de pasta fina (Fine Paste Black and Tan)
2224.1	xx.	Negro y Bayo de pasta fina Sencillo (Plain Fine Paste Black and Tan)
2224.2	xx.	Negro y Bayo de pasta fina Inciso (Incised Fine Paste Black and Tan)
2224.21 <u>Inciso</u>		
2224.22 <u>Esgrafiado</u>		
2224.3	xx.	Negro y Bayo de pasta fina Engobado Blanco (White Slipped Fine Paste Black and Tan)
2224.4	xx.	Negro y Bayo de pasta fina Engobado e Inciso (Incised White Slipped Fine Paste Black and Tan).
2224.41 Engobado e <u>Inciso</u>		
2224.42 Engobado e <u>Esgrafiado</u>		
2225	xx.	Negro y Bayo de pasta burda (Coarse Black and Tan).
2225.1	xx.	Negro y Bayo de pasta burda Sencillo (Plain Coarse Black and Tan).
2225.2	xx.	Negro y Bayo de pasta burda Inciso (Incised Coarse Black and Tan).
2225.21 <u>Inciso</u>		

2225.22 <u>Esgrafiado</u>

2225.3	xx.	Negro y Bayo de pasta burda Engobado (White Slipped Coarse Paste Black and Tan).
2225.4	xx.	Negro y Bayo de pasta burda Engobado e Inciso (Incised White Slipped Coarse Black and Tan).
2225.41 Engobado e <u>Inciso</u>		
2225.42 Engobado e <u>Esgrafiado</u>		
2226	xx.	Negro y Bayo de pasta mediana (Medium Black and Tan)
2226.1	xx.	Negro y Bayo de pasta mediana Sencillo (Plain Medium Black and Tan)
2226.2	xx.	Negro y Bayo de pasta mediana Inciso (Incised Medium Black and Tan)
2226.21 <u>Inciso</u>		
2226.22 <u>Esgrafiado</u>		
2226.3	xx.	Negro y Bayo de pasta mediana Engobado (White Slipped Medium Black and Tan)
2226.4	xx.	Negro y Bayo de pasta mediana Engobado e Inciso (White Slipped and Incised Medium Black and Tan).
2226.41 Engobado e <u>Inciso</u>		
2226.42 Engobado e <u>Esgrafiado</u>		

2300 CERAMICA BLANCA (WHITE WARE)

2301	35.	Blanco Kaolin (Kaolin White)
2301.1	xx.	Blanco Kaoin con engobe naranja (Orange-slipped Kaolin White)
2302	43.	Blanco Cremoso con Desgrasante Burdo (Cream-slipped with Coarse Paste)
2303	xx.	Blanco Medio (White with Medium Paste).

2400 CERAMICA BLANCO ENGOBADO CAFE BURDO (WHITE-SLIPPED COARSE BROWN WARE)

2401.	83.	Cafe Burdo con Engobe Blanco Fino (Fine White-slipped Coarse Brown)
2402.	45.	Crema Engobado Burdo Inciso (Cream-slipped Coarse Incised)
2403.	37.	Blanco Engobado Inciso (White-slipped Incised)
2403.1	xx.	Blanco y Rojo Inciso (Red on White-slipped Incised)
2405.	36.	Engobado Blanco con Acabado Mate (White-slipped with Matte Finish)

2500 CERAMICA CAFE BURDO BRUNIDO (BURNISHED COARSE BROWN WARE)

2512.	40.	Negro Pulido Burdo (Coarse Polished Black (antes Negro de Pasta Burda (Black-slipped with Coarse Paste))
2512.1	xx.	Negro Pulido Burdo Inciso (Incised Coarse Polished Black).
2512.11 <u>Inciso</u>		
2512.12 <u>Esgrafiado</u>		
2515.	48.	Rojo Burdo (Red on Coarse Brown)
2516.	49.	Rojo Engobado con Superficie Texturada (Red-Slipped with Textured Surface)
2517.	203.	Cafe Burdo Brunido (Burnished Coarse Brown)
2517.1	xx.	Café Burdo Brunido Inciso (Burnished and Incised Coarse Brown)
2518	xx.	Calzadas Excavado (Calzadas Carved)
2519	xx.	Café Mediano Pulido (Polished Brown with medium paste)
2519.1	xx.	Café Mediano Pulido con decoración plástica en general (Polished Brown with plastic decoration)

2519.11	xx.	Café Mediano Pulido Inciso (Incised Polished Brown with medium paste)
2519.12	xx.	Café Mediano Pulido Esgrafiado
2519.13	xx.	Café Mediano Pulido Acanalado
2519.2	xx.	Café Mediano Pulido con hematita en incisión (Incised Polished Brown with hematite in incisions).

2519.21 Inciso
2519.22 Esgrafiado

Coarse Brown to Black, half-smoothed, half-striated ware.

2521	xx.	Café Delgado Bruñido Granular (Burnished Thin Coarse Brown)
2521.1	201.	Negro Delgado Burdo Bruñido (Burnished Thin Coarse Black)
2521.2	202.	Negro Delgado Burdo Rastreado (Brushed Thin Coarse Black)
2522.	93.	Ollas Mitad Lisa, Mitad Rastreada (Half-smoothed, Half-striated Coarse Brown Ollas)
2522.1	93.1	Tipo 93, parte lisa (Type 93 smooth portion)
2522.2	93.2	Tipo 93 con pintura Roja (Red Paint on type 93)

2600 CAFE BURDO CON DESGRASANTE FINA DE CUARZO Y FELDESPATO (COARSE BROWN WITH MAINLY FINE QUARTZ AND FELDSPAR TEMPER)

2611.	22.	Engobado Café Café Burdo (Brown-slipped Coarse Brown)
2612.	88.	Tipo 22 con Enobe Blanco (White-slipped Type 22)
2612.11	xx.	Engobado blanco sobre la pasta 2611 inciso
2612.12	xx.	Engobado blanco sobre la pasta 2611 esgrafiado
2612.2	xx.	Doble engobe al interior naranjo sobre blanco, engobe blanco al exterior
2612.21	xx.	Doble engobe al interior naranjo sobre blanco, engobe blanco al exterior Inciso
2612.22	xx.	Doble engobe al interior naranjo sobre blanco, engobe blanco al exterior Esgrafiado
2612.3	xx.	Pintura negra sobre la pasta de 2611 con engobe blanco (engobe normalmente al fondo exterior y interior con la pintura en la parte superior al exterior)
2612.31	xx.	Pintura negra sobre la pasta de 2611 con engobe blanco Inciso
2612.32	xx.	Pintura negra sobre la pasta de 2611 con engobe blanco Esgrafiado
2613.	21.	Engobado Rojo Café Burdo (Red-slipped Coarse Brown)
2613.1	xx.	Negra sobre engobe rojo de pasta 2611
2613.11	xx.	Negra sobre engobe rojo de pasta 2611 Inciso
2613.12	xx.	Negra sobre engobe rojo de pasta 2611 Esgrafiado
2613.2	xx.	Mitad Engobado Rojo (parte superior al exterior) mitad engobado blanco (al interior y al fondo exterior)
2613.21	xx.	Mitad Engobado Rojo (parte superior al exterior) mitad engobado blanco (al interior y al fondo exterior) Inciso
2613.22	xx.	Mitad Engobado Rojo (parte superior al exterior) mitad engobado blanco (al interior y al fondo exterior) Esgrafiado
2613.3	xx.	Negra sobre engobe rojo (normalmente al parte superior al exterior) y engobado blanco (normalmente al fondo exterior y al interior)
2614.	66.	Café Engobado Burdo con pasta con inclusiones blancas (Brown-slipped Coarse with a Paste with White Inclusions)
2614.1	xx.	Café Engobado Burdo Inciso con pasta con inclusiones blancas (Incised Brown Slipped coarse with a Paste with White Inclusions)

2615.	71.	Rosa Burdo (Pink Coarse)
2616.	68.	Café Burdo con Rastrillado Suave (Coarse Brown with Soft Rastreado)
2617.	80.	Café Bruñido (Burnished Brown)
2618.2	xx.	Café Burdo Rayado Engobe Rojo

2620 *Nucleos Oscuros (Dark Cores)*

2620.1	xx.	Cafe burdo con desgrasante blanco fino y nucleo obscuro Inciso
2621.	64.	Café Engobado Burdo (Brown-Slipped Coarse)
2623.	90.1	Rojo Sobre Naranjo Pulido con Desgrasante de Cuarzo (Red on Polished Coarse Orange) (ahora manejado bajo Naranjo Pulido Zonal (2904.3)
2624.	204.	Engobado rojo de Pasta Burda (Red-slipped Coarse Orange)
2624.1	xx.	Pintura negra sobre engobe rojo de pasta con desgrante blanco fino y nucleo obscuro

2650. TIPOS BURDOS CON DESGRASANTE BLANCO BURDO.

2651	xx.	Rojo Burdo con Desgrasante Blanco Burdo (Coarse Red with Coarse White Temper)
2651.1	xx.	Rojo Burdo con Desgrasante Blanco Burdo Bruñido (Burnished Coarse Red with Coarse White Temper).
2651.2	xx.	Rojo Burdo con Desgrasante Blanco Burdo con Rastraedo (Burnished Coarse Red with Coarse White Temper).
2652	xx.	Rojo Burdo Inciso con Desgrasante Blanco Burdo (Incised Coarse Red with Coarse White Temper)
2652.1	xx.	Rojo burdo Inciso con Desgrasante Blanco Burdo Bruñido (Incised Burnished Coarse Red with Coarse White Temper).
2653	xx.	Naranjo Burdo con Desgrasante Blanco [Nucleo Oscuro] (Coarse Orange with white temper [Dark Core]).
2654	xx.	Café Burdo con Desgrasante Blanco Burdo (Coarse Brown with Coarse White Temper).
2654.1	xx.	Café Burdo con Desgrasante Blanco Burdo con Rastraedo (Coarse Brown with Coarse White Temper).
2654.2	xx.	Engobado Blanco Café Burdo con Desgrasante Blanco Burdo (Coarse Brown with Coarse White Temper).
2655	xx.	Naranja Burdo con Desgrasante Blanco Fino (Coarse Orange with Fine White Temper)
2656	xx.	Rojo Burdo con Desgrasante Blanco Burdo y Engobe Blanco (White Slipped Coarse Red with Coarse White Temper).
2657	xx.	Rojo Burdo Inciso con Desgrasante Blanco Burdo Inciso y Engobe Blanco (Incised White Slipped Coarse Red with Coarse White Temper).

2700 CERAMICA CAFE BURDO CON DESGRASANTE DE CENIZA VOLCANICA (CAFÉ BURDO CON COARSE BROWN WITH VOLCANIC ASH TEMPER)

2701.	20.	Café Burdo (Coarse Brown)
2701.1	20.2	Café Burdo Inciso (Coarse Brown Incised)
2701.2	20.3	Café Burdo Punteado (Coarse Brown Punctated)
2701.3	20.1	Café Burdo Inciso y Punteado (Coarse Brown Incised and punctated)

2701.4	93.2	Rojo sobre Café Burdo tipo 2701 (Red Paint on Coarse Brown type 2701)
2701.5	20	Café Burdo Rastreado (Brushed Coarse Brown).
2701.6	xx	Café Burdo Alisado (probablemente = 2704 Ollas lisas)
2701.7	xx.	Café Burdo con Engobe Blanco
2701.71	xx.	Café Burdo con Engobe Blanco Inciso
2701.8	xx.	Café burdo con Engobe Café
2702	20.4	Café Muy Burdo (Very Coarse Brown)
2703	xx	Café Burdo Rallado
2704	xx	Ollas Lisas

2800 CERAMICA NARANJA BURDO CON DESGRASANTE DE CENIZA VOLCANICA (COARSE ORANGE WARE WITH VOLCANIC ASH TEMPER)

2811.	23.	Naranja Burdo de Matacapan (Matacapan Coarse Orange)
2812	xx.	Naranja Burdo Inciso (Coarse Orange Incised)
2812.1	xx.	Naranja Burdo Inciso-Tecomates (Coarse Orange Incised: Tecomates).
2813	xx.	Naranja Burdo con desgrasante fino de ceniza volcanica e inclusiones blancos (parecido a 2811, pero no es “Matacapan Coarse Orange”)
2821	xx.	Engobado Rojo Burdo Borde Acanalado Erosionado (antes Engobado Rojo Burdo con Coccion Irregular Sin Engobe (Red-slipped Coarse Brown [irregularly fired] without slip)
2821.11	25.	Engobado Rojo con Cocción Irregular Bordes Acanalados Rojos (antes 2821.1 Engobado Rojo Burdo con Coccion Irregular (Red-slipped Coarse Brown [irregularly fired])
2821.12	xx.	Engobado Rojo con Cocción Irregular no Acanalado (Red-Slipped Coarse Brown without channeling)
2821.2	xx.	Engobado Rojo Burdo cuerpo rastrillado pasta gris (Red-Slipped Brushed Coarse Brown with Gray Paste).
2822.	60.	Naranja Burdo con Engobe Fino (Coarse Orange with Fine Slip)
2823.	69.	Rojo sobre Café Burdo: Platos Profundos (Red on Coarse Brown: Deep Basins)
2824.	73.	Bayo Pulido Burdo (Polished Coarse Buff)
2825.	84.	Café Claro con Pasta Burda (Light Brown Coarse)
2826.	67.	Crema Burdo Suave con Testura Yesosa (Soft Coarse Cream with Chalky Texture)

2900 OTROS TIPOS BURDOS (OTHER COARSE WARE TYPES)

2901.	65.	Café Engobado Burdo Inciso (Brown-slipped Incised Coarse)
2902.	92.	Fondo Sellado (Fondo Sellado)
2903.	26.	Engobado Blanco Burdo (White-slipped Coarse)
2904.0	xx.	Naranja Pulido Sencillo (Plain Polished Orange)
2904.01	xx.	Naranja Pulido Inciso (Incised Polished Orange)
2904.1	76?	Naranja Pulido Nebuloso (Cloudy Polished Orange)
2904.11	xx.	Naranja Pulido Nebuloso Inciso (Incised Cloudy Polished Orange)
2904.2	xx.	Naranja Pulido Nebuloso con nucleo obscuro (Cloudy Polished Orange with dark core
2904.21	xx.	Naranja Pulido Nebuloso con núcleo obscuro inciso (Incised Cloudy Polished Orange with dark core
2904.3	xx.	Naranja Pulido Zonal (Pintado por zonas) (Zoned Polished Orange)

2904.31	xx.	Naranja Pulido Zonal Inciso (Pintado por zonas) (Incised Zoned Polished Orange
2904.4	xx.	Naranja Pulido Pasta Fina (Fine Paste Polished Orange)
2904.41	xx.	Naranja Pulido Pasta Fina Inciso (Incised Fine Paste Polished Orange)
2904.5	xx.	Naranja Pulido Macetas (Polished Orange Macetas)
2904.51	xx.	Naranja Pulido Macetas inciso (Incised Polished Orange Macetas)
2904.6	xx.	Naranja Pulido Café Interior/Exterior (Polished Orange with brown interior or exterior surface)
2904.61	xx.	Naranja Pulido Café Interior/Exterior inciso (Incised Polished Orange with brown interior or exterior surface)
2904.7	xx.	Naranja Pulido exterior alisado interior (Polished Orange with smoothed interior)
2904.8	xx.	Naranja Pulido macetas no estriado y encalado (Lime-coated Polished Orange Macetas, without scraping).
2904.9	xx.	Naranja Alisado (Smoothed Orange)
2905	xx.	Rojo Especular (Specular Red)
2906	xx.	Tecomate Rojo Sencillo Pulido (Plain Polished Red Tecomates)
2906.1	xx.	Tecomate Rojo Pulido Inciso (Incised Polished Red Tecomates)
2906.2	xx.	Rojo Pulido (Polished Red)
2906.3	xx.	Rojo Pulido paredes gruesas (Thick Polished Red)
2906.4	xx.	Rojo Alisado (Smoothed Red)
2907.1	xx.	Rayado de Pasta Roja Burda con desgrasante ceniza volcánica (Scored Coarse Red with volcanic ash temper)

3000 OTRAS CERAMICAS (OTHER WARES)

3001.	70.	Tres Picos Esgrafiado (Tres Picos Esgrafiado)
3002.	79.	Naranja Delgado (Thin Orange)
3003.	56.	Plomiso (Plumbate)
3004.	82.	Plomiso Original ("Original Plumbate")
3005.	62.	Plomiso Falso (False Plumbate)

7000 CERAMICAS HISTORICAS (HISTORIC WARES)

100.		Historic

8000. CERAMICAS NO IDENTIFICADAS (UNIDENTIFIED WARES)

8001	200.	Unidentified
8002	xx.	Pequeño para analisar

9xxxx TIESTOS SOBRECOCIDOS (WASTERS)

APPENDIX C

TVAS 2007: Flaked Stone Typology (based on Barrett 2003 and Knight 1999)

Prismatic Reduction Strategy

Subclass	Artifact	Type #	Description
P-1	Percussion Blades: Whole	1	Macrocore Reduction
"	Percussion Blades: Proximal	2	Macrocore Reduction
"	Percussion Blades: Medial	3	Macrocore Reduction
"	Percussion Blades: Distal	4	Macrocore Reduction
"	Macrocore Platform Flake	5	Macrocore Reduction
"	Macroflake	6	Macrocore Reduction
"	Macrocore	7	Macrocore Reduction
"	Macroblade	8	Macrocore Reduction
P-2	Ridge Blade	9	Polyhedral Reduction
"	Platform Trimming/ Faceting Flake	10	Polyhedral Reduction
"	Probable Platform Flake	11	Polyhedral Reduction
"	Core Trimming Flake (face of core)	12	Polyhedral Reduction
"	Core Rim (transversely struck)	13	Polyhedral Reduction
"	Core Face Flake (transversely struck)	14	Polyhedral Reduction
"	Initial Series Blade	15	Polyhedral Reduction
"	Percussion Microblade	16	Polyhedral Reduction
"	Core Rim (from distal)	17	Polyhedral Reduction
P-3	Manufacturing Error Flake	18	Pressure Core Error
"	Distal Core Truncation Flake	19	Pressure Core Error
"	Plunging Blade	20	Pressure Core Error
"	Platforms Removed (prod. error)	21	Pressure Core Error
"	Longitudinal Blade Core Fragment	22	Pressure Core Error
P-4	Pressure Blade Core: Whole	23	Core/ Exhausted Core
"	Pressure Blade Core: Proximal	24	Core/ Exhausted Core
"	Pressure Blade Core: Medial	25	Core/ Exhausted Core
"	Pressure Blade Core: Distal	26	Core/ Exhausted Core
"	Microblade Core	27	Core/ Exhausted Core
P-5	Irregular Pressure Blade: Whole	28	Secondary Blade
"	Irregular Pressure Blade: Proximal	29	Secondary Blade
"	Irregular Pressure Blade: Medial	30	Secondary Blade
"	Irregular Pressure Blade: Distal	31	Secondary Blade
"	Unidentified Blade	32	Secondary Blade
"	Blade Shatter	33	Secondary Blade
P-6	Prismatic Pressure Blade: Whole	34	Tertiary Blade
"	Prismatic Pressure Blade: Proximal	35	Tertiary Blade
"	Prismatic Pressure Blade: Medial	36	Tertiary Blade
"	Prismatic Pressure Blade: Distal	37	Tertiary Blade
"	Ribbon Blades (small thin and delicate)	38	Tertiary Blade
P-7	Stemmed Blade	39	Blade Tool
"	Retouched Blade: ("Tula" Point)	40	Blade Tool
"	Notched Blade	41	Blade Tool
"	Needle Blade: Bifacially retouched	42	Blade Tool
P-8	Eccentrics	43	Blade Eccentric
"	Bilobal and Trilobal Blades	44	Blade Eccentric

TVAS 2007: Flaked Stone Typology
Prismatic Reduction Strategy

Subclass	Artifact	Type #	Description
F-1	Decortication Flake: primary	45	Cortical Debris
“	Decortication Flake: secondary	46	Cortical Debris
F-2	Bipolar Flake	47	Percussion Debris
“	Indirect Percussion Flake	48	Percussion Debris
F-3	Thinning Flake	49	Pressure Debris
“	Eraillure Flake	50	Pressure Debris
“	Pressure Flake	51	Pressure Debris
“	Notching/Retouching Flake	52	Pressure Debris
“	Biface Hinge Removal	53	Pressure Debris
“	Alternate Flake	54	Pressure Debris
F-4	Chunk	55	Core Debris
“	Flake Core	56	Core Debris
F-5	Unidentified Flake w/ Platform	57	Simple Flake
“	Unidentified Flake w/o Platform	58	Simple Flake
“	Percussion Flake	59	Simple Flake
F-6	Large Flake w/ Lateral Uni-Flaking	60	Specialized Flake
“	Bifacially Flaked Flakes	61	Specialized Flake
F-7	Biface (large simple)	62	General Tool
“	Uniface	63	General Tool
F-8	Projectile Point	64	Formal Tool
“	Stemmed Point	65	Formal Tool

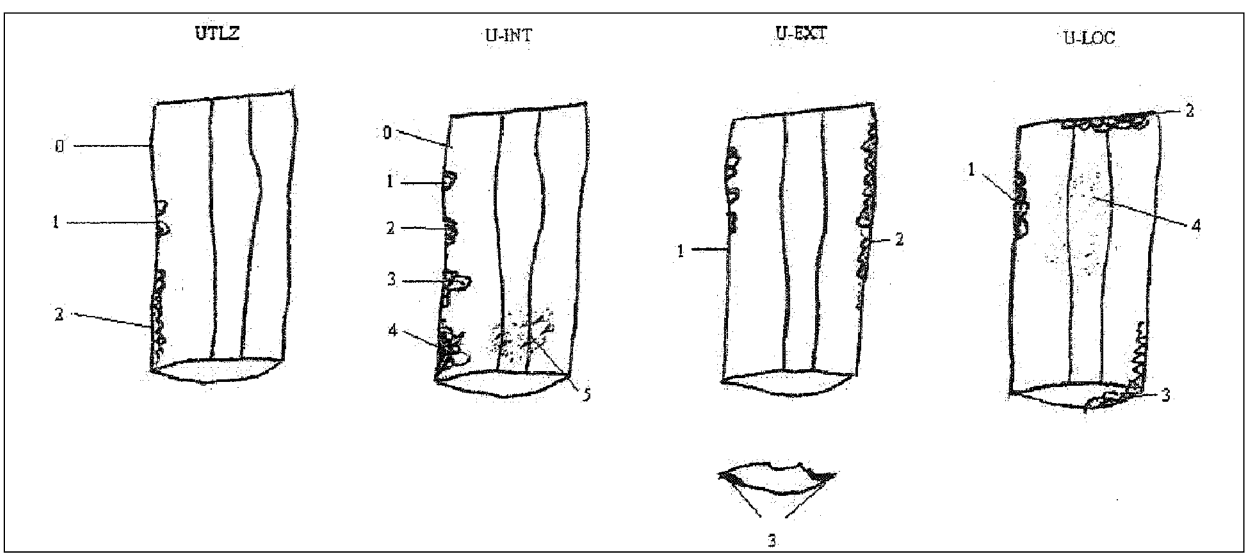
TVAS 2007:Obsidian Atribute Code Sheet

Color	Sub-Color	Type
1) Black	1) Black	See List
2) Green	2) Grey	
3) Clear	3) Green	
4) Pool Grey	4) Bottle Clear	
	5) Bottle Clear with Clouds	
	6) Cloudy	
	7) Banded	
	8) Smokey (translucent)	
	8.1) Pulvadera = Basically #8 with many little specks	
	9) Grey, Green/Bluish	
	10) Brown	
	11) Mottled Black/Grey	
	12) Pale Bluish, with irregular or banded bluish cloudy lumps, with inclusions	
	13) Light grey with specks in a Translucent to Transparent matrix	
	14) Black, almost banded, jagged streaks in a clear matrix	

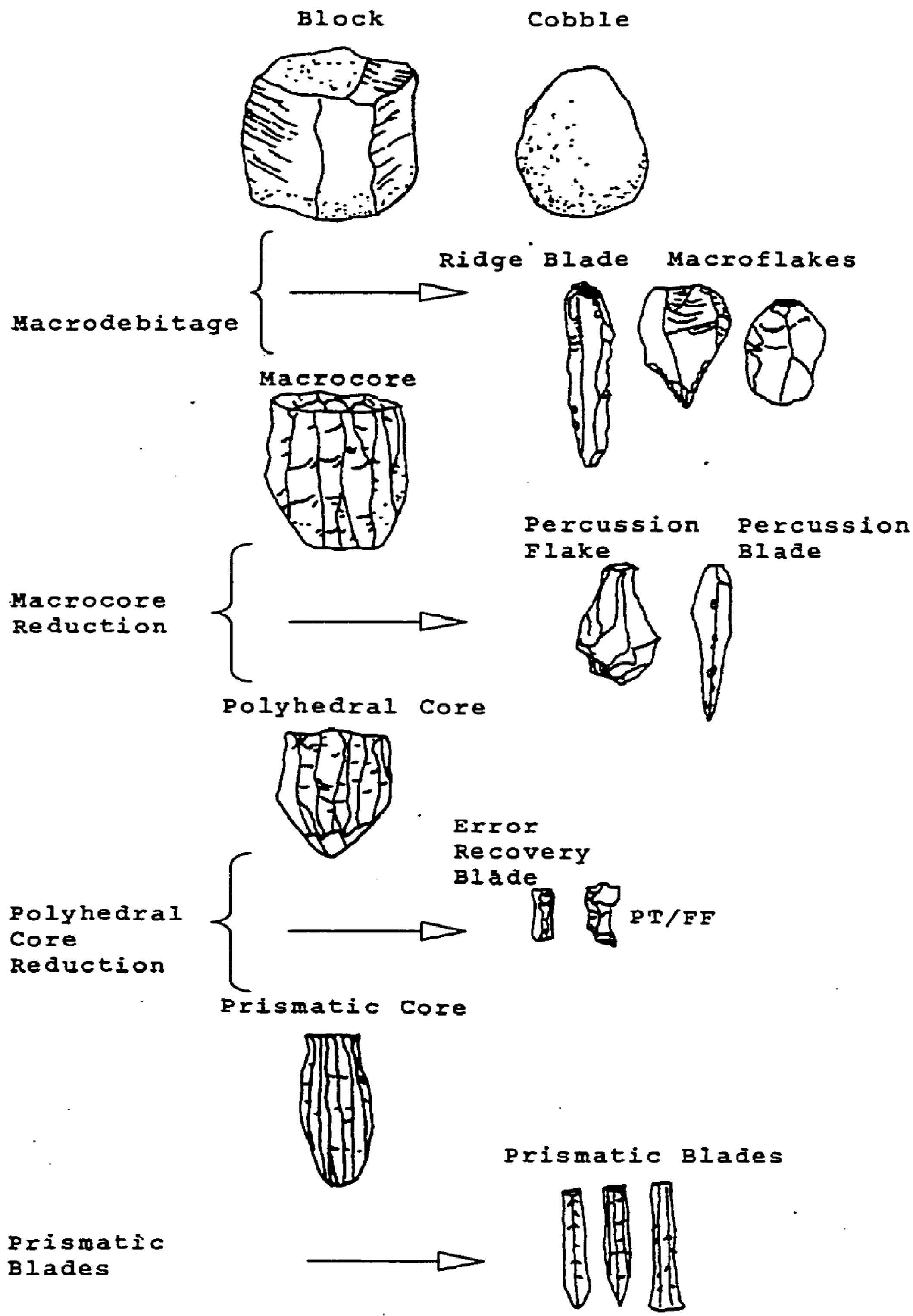
Platform	Section	Termination
1) Single Facet	1) Whole	1) Step
2) Multi-Facet	2) Proximal	2) Hinge
3) Ground	3) Medial	3) Feather
4) Scratched	4) Distal	4) Other
5) Other		
6) Crushed		
7) Cortex		

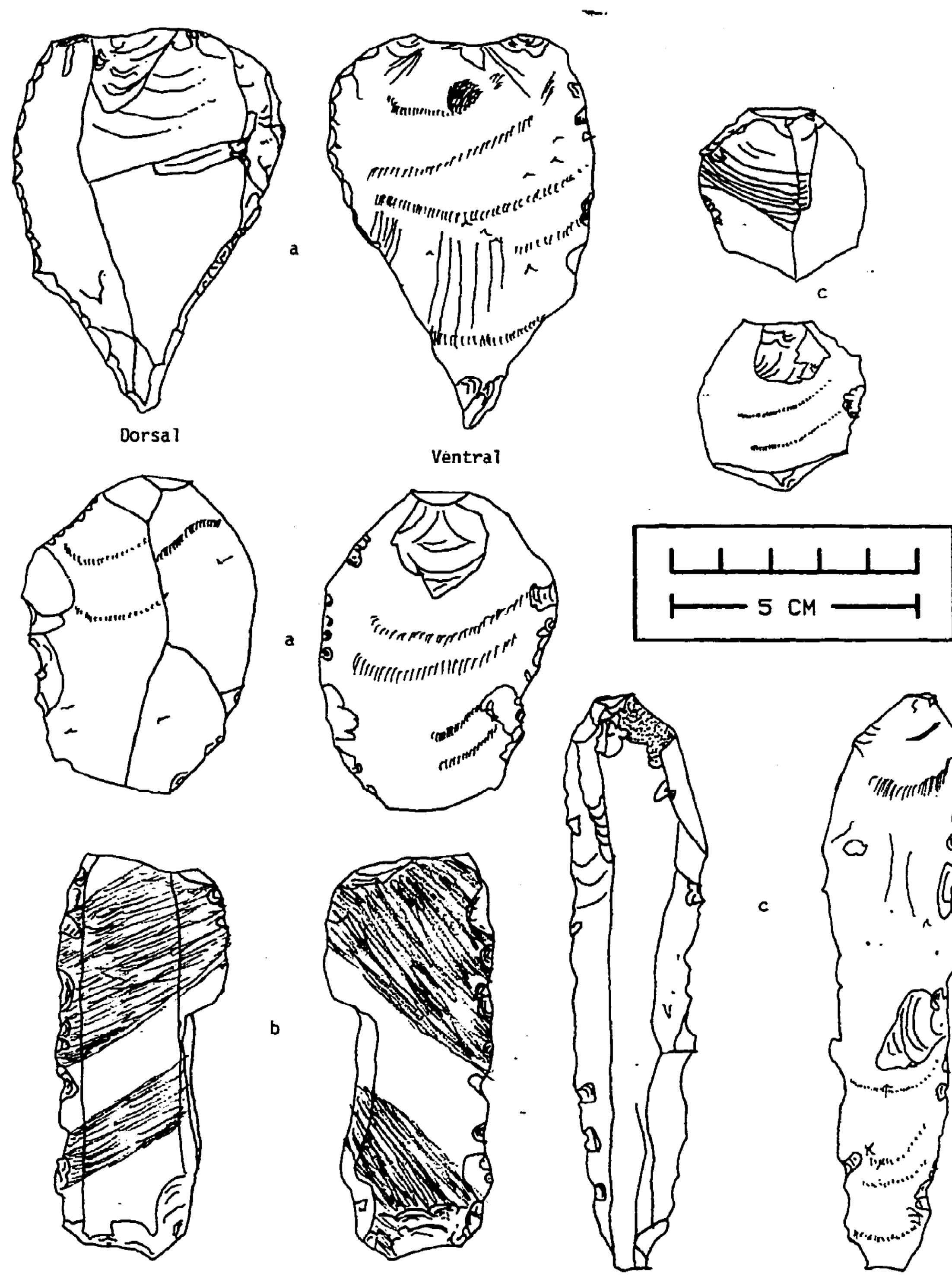
Use Ware Patterns

Intensity	Extent	Location	Utilization
1) Light	1) Isolated (spotty)	1) Lateral	1) Unifacially Used
2) Moderate	2) General (evenly distributed)	2) Distal	2) Bifacially Used
3) Heavy	3) Alternate (illustration)	3) Multiple	
4) Extreme		4) Facial	

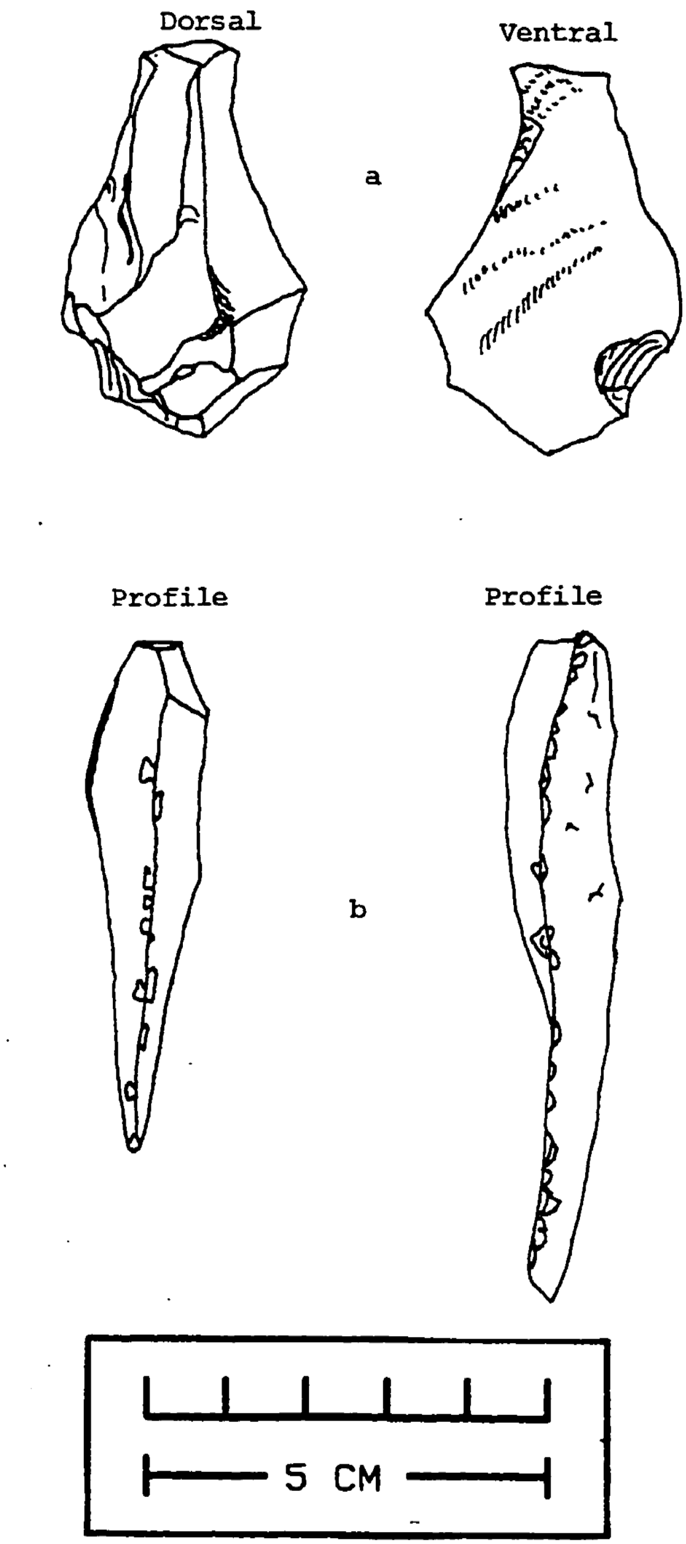


TVAS 2007: Visual Representation of Obsidian Typology
Prismatic Core-Blade Reduction Sequence

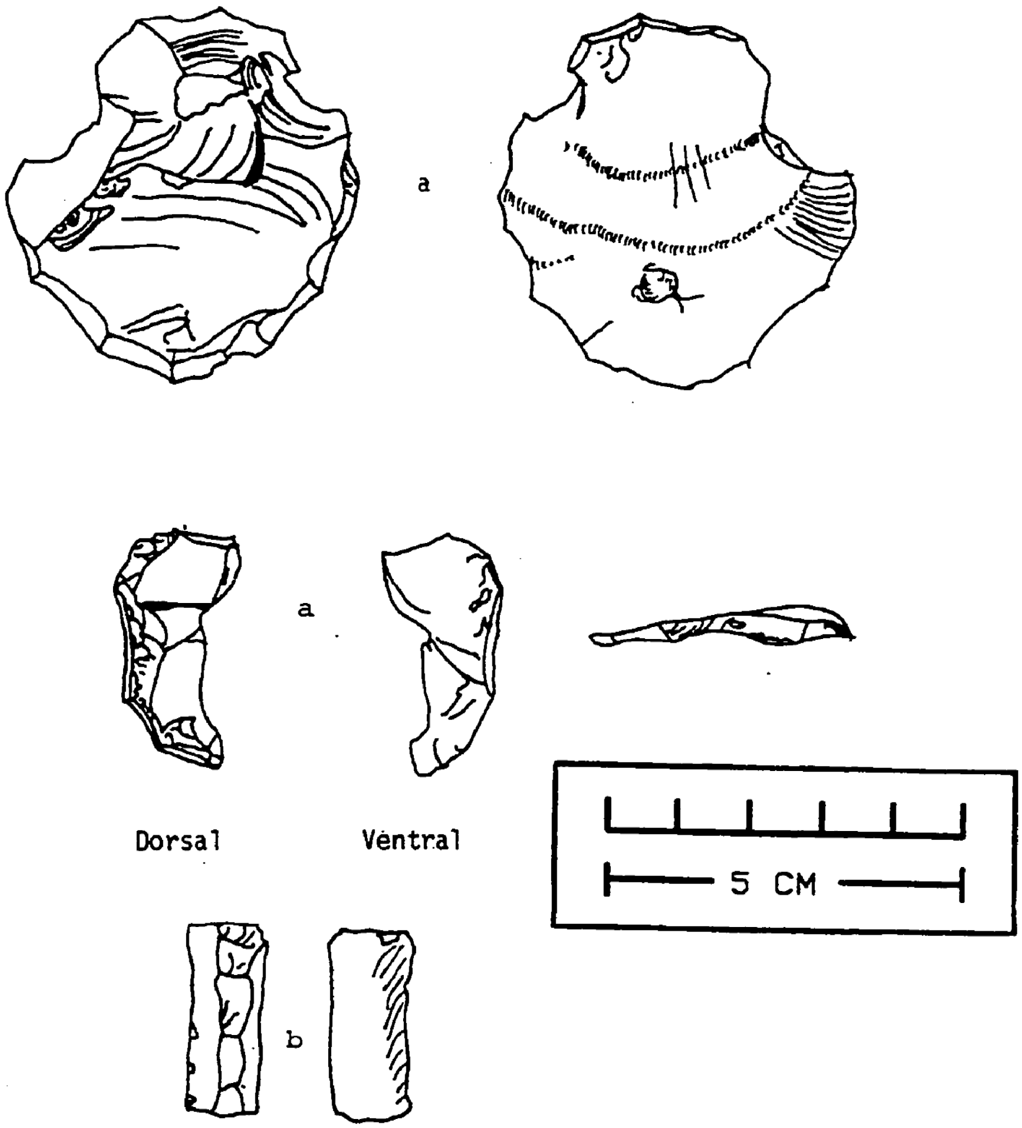




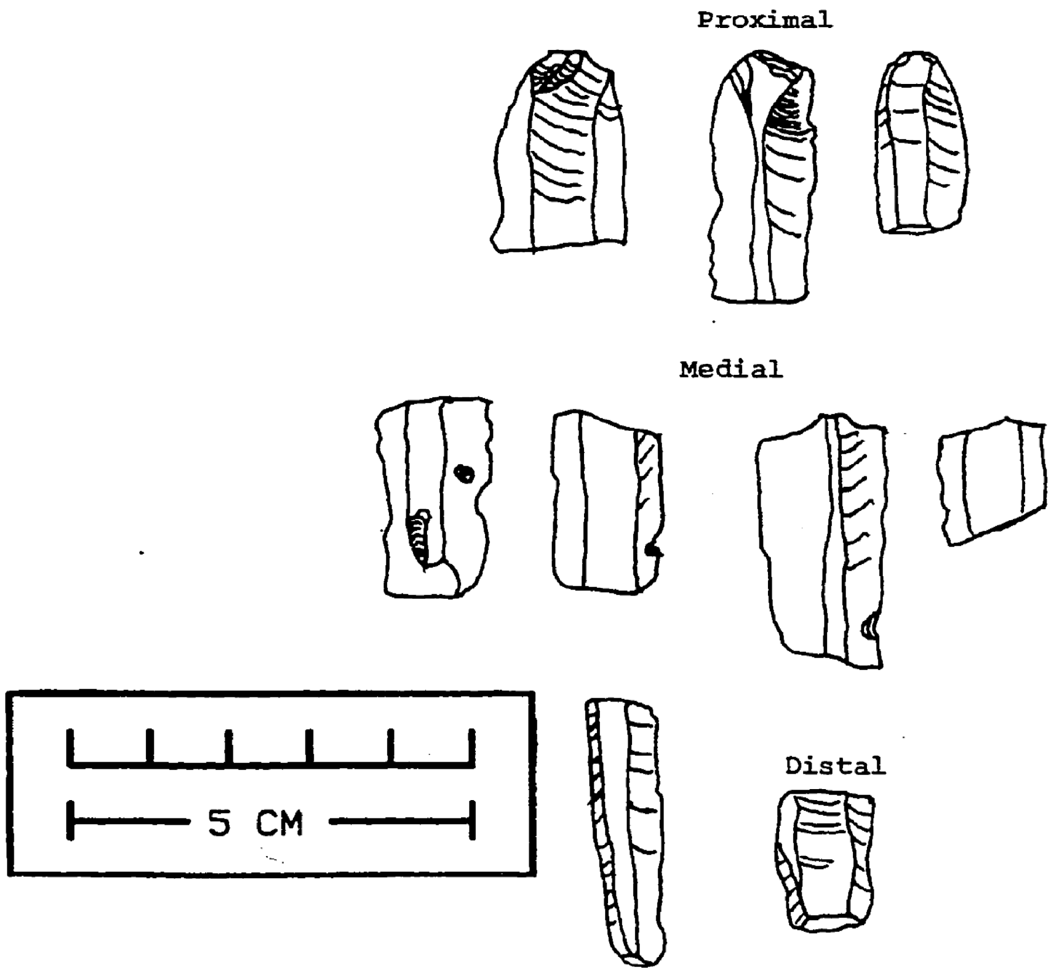
Macrodebitage: a) macroflakes, b) macroblade, c) ridge blade



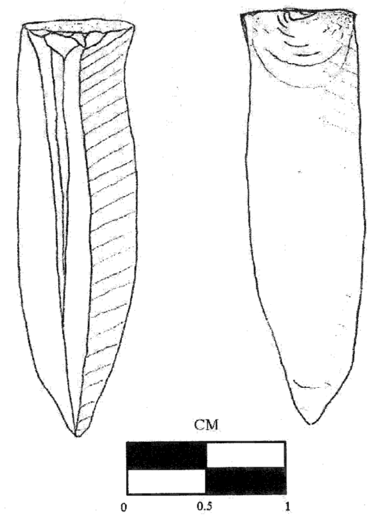
Macrocore Reduction Debitage: a) percussion flakes, b) percussion blades



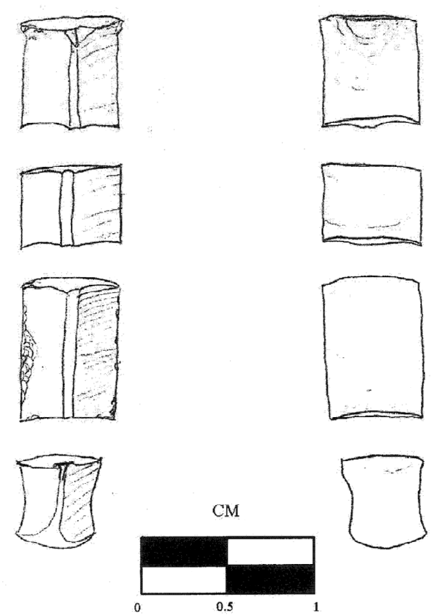
Polyhedral Core Reduction Debitage: a) PF/TF, b) error recovery blade



Prismatic Blades



Secondary Prismatic Blade



Tertiary Prismatic Blade

APPENDIX D

T.V.A.S. 2007 Ground Stone Materials (R.A.T.Z typology, Pool personal communication)

VARIABLE LIST

Artifact Type:	**Code:**	
Metate (Miscellaneous)	1.00	
Unfinished Metate	44.	
Metate Preform	45.	
Natural Metate Preform	46.	
For metates the following convention is used:		
Planar/Slab footing	1.11	
Planar/Conical footing	1.12	
Planar/Cylindrical footing	1.13	
Planar/Nubin footing	1.14	
Planar/No footing	1.15	
Planar/Indeterminate footing	1.16	
Convex/Slab footing	1.21	
Convex/Conical footing	1.22	
Convex/Cylindrical footing	1.23	
Convex/Nubin footing	1.24	
Convex/No footing	1.25	
Convex/Indeterminate footing	1.26	
Angular/Slab footing	1.31	
Angular/Conical footing	1.32	
Angular/Cylindrical footing	1.33	
Angular/Nubin footing	1.34	
Angular/No footing	1.35	
Angular/Indeterminate footing	1.36	
Indeterminate/Slab footing	1.41	
Indeterminate/Conical footing	1.42	
Indeterminate/Cylind. footing	1.43	
Indeterminate/Nubin footing	1.44	
Indeterminate/No footing	1.45	
Indeterm./Indeterm. footing	1.46	
Mano (Miscellaneous)	2.00	
Dogbone mano	2.20	
short long. axis w/ large diam.	2.40	
bulging center	2.60	
Unfinished Manos	2.80	
Mano Preforms	2.85	
Mortars (mortero)	3.00	
Stone Vessel	4.00	
Polishing stones (piedra para lustrar)	5.00	
Miscellaneous objects	6.00	
Pestles (piedra de moler)	7.00	Elongated pulverizing stone
Molcajetes	8.00	Bowl-like object similar to mortar, but is footed

Nutting stones	9.00	(See Coe & Diehl 1980:Fig.223)
Celt (hacha)	10.1	For cutting, chopping
Axes	10.2	Mas grande que hachas
Adze	10.3	Smoothing,planing. One edge has sharper angle than other
Miscellaneous. grinding stones	11.0	
Abraiders	12.0	Flat slab w/1 edge (See Coe & Diehl 1980:Fig.226)
Donut stones (dona)	13.0	
Fluted donut stones	13.1	
Unidentified worked stones	15.0	
Unworked stones (piedra sin trabajar)	19.0	
Flakes (lasca)	20.0	
Flake w percussion platform	20.01	
Flake w/ bulb of percussion	20.02	
Flake w/ radiating lines of force	20.03	
Flake w/ feathered edge(s)	20.04	
Possible Flakes (lasca posible)	20.5	
Poss. Flake w percussion platform	20.51	
Poss. Flake w/ bulb of percussion	20.52	
Poss. Flake w/ radiating lines of force	20.53	
Poss. Flake w/ feathered edge(s)	20.54	

* Note, that for the flakes and possible flakes it is possible to find more than one of the above attributes. In such cases, the code will include all of the relevant codes (i.e.. a possible flake w/ a percussion platform and a feathered edge would be coded 20.514)

Natural quartz pebbles	21.0	
Modified raw materials	24.0	
Unmodified raw materials	25.0	
Pics (martillo grande de piedra)	26.0	Stone w/ percussion use-wear, could be used w/ one hand
Hammerstones (martillo pequeno)	27.0	Stone w/ percussion use-wear, fist-sized or smaller
Mauls (martillos muy grandes)	31.0	Stone w/ percussion use-wear, used w/ 2 hands
Yokes (yugos)	28.0	
Barkbeaters (pulidores)	29.0	(See Grove 1987:Fig.20.4)
Carved stone/monuments	30.0	
Zoomorphic objects (formas animales)	30.2	
Anthropmorphic obj. (formas humanas)	30.4	
Unifacial Ovate grinding stone	33.0	
Bifacial ovate grinding stone	34.0	
Flat("iron") stones	35.0	L-shaped, iron-like (See Grove 1987: Fig.20.5)
Reamer-polisher	36.0	(See Coe & Diehl 1980:Fig.229)
Material of Not Cultural Significance	50.0	
Stone balls	61.0	(See Grove 1987:340)
Awls/Incising Stones	62.0	Usually thin tapering to a small point
Hammerstones	63.0	
Disks	64.0	(See Grove 1987:Fig.20.11j)
Beads	65.0	
Petrographic Sample	70.0	

Cross-Section/peril (of longitudinal axis):

biplanar	10,	cuboid	11
quadrilateral	12,	parallelogram	13
trapezoidal	14,	ovoid	20
lenticular	21,	plano-convex	30
concave	31,	Unknown/deconocido	99
polygonal	36		

For metates and mortars:

circular	15,	convex-concave	33
plano-concave	34,	triangular	50
planar	32,	convex	35

Artifact Completeness (Fragmentation):

Whole 0, Fragment 1

Use-wear:

Present (presente)	1.0	Está liza porque fue utilizada
Absent (ausente)	0.0	
Unknown	3.0	

Weight (peso) :

Average Phenocryst Size (for basalts):

This is an estimate of the average size (in cm) of phenocrysts in a specimen based on a measurement of a single phenocryst subjectively (that is visually) deemed to be most representative of all the phenocrysts present in the specimen. For "fine grained" specimens (see above), the measurement of 0.001 cm will be used.

Material Type:
For the basalts, the first distinction made was whether the specimen was massive (had no vessicles), or vesicular. The second distinction involved whether the specimen was fine-grained (and had no phenocrysts), or was porphyritic (and had phenocrysts). A third distinction was made among the porphryitic specimens, namely whether they had olivine or pyroxine phenocrysts.

Massive pyroxene porphyritic basalts	10.1	Basalto solido con minerales de pyroxene
Massive olivine porphyritic basalts	10.2	Basalto solido con minerales de olivine
Massive fine-grained basalts	10.3	No tiene minerales grandes
Vesicular pyroxene porphryitic basalts	11.1	
Vesicular olivine porphyrytic basalts	11.2	
Vesicular fine-grained basalts	11.3	No tiene minerales grandes
Trachyte (?)	12.0 (?)	
Andesite (?)	13.0 (?)	
Basanite (?)	14.0 (?)	
Granite	21.0	
Iron Geode	22.0	
Iron Ore	29.0	
Unknown Igneous Rock	50.0	
Jade	23.0	
Quartzite	24.0	
Schist	25.0	
Greenstones (piedras verdes)	40.0	
Serpentine	42.0	
Unknown Metamorphic Rock	60.0	
Siltstone	26.0	
Chert (perdernal)	28.0	
Laja	35.0	
Sandstone	36.0	
Unknown Sedimentary Rock	70.0	
Red ochre	31.0	
Yellow ochre	32.0	
Chapapote	33.0	
Unknown material (mater. desconocido)	30.0	
Miscellaneous (not on varlist)	41.0	

APPENDIX E

NEUTRON ACTIVATION RESULTS (ppm)

Long Count Elements

anid	bag	site	subgroup	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr
WDS001	1130	139	CO1B	15.330	30.12	0.3001	28.86	5.979	2.480	2.122	65.17	69.623	290.9	1.061	1.408	72937.6	4.432	217.6	38.18	0.6063	19.46	415.3	1.066	0.701	9.163	99.9	103.9
WDS002	1131	139	CO1B	2.635	29.84	0.3189	29.65	6.053	2.601	2.385	61.69	31.410	421.7	5.425	1.455	58729.3	4.875	133.6	68.38	0.5335	20.29	401.1	0.925	0.765	8.011	114.5	105.4
WDS003	1131	139	CO1B	3.476	29.69	0.4078	27.65	6.039	2.662	2.140	61.84	28.524	377.4	5.160	1.449	57548.4	4.691	95.1	72.32	0.6445	20.22	439.2	0.917	0.712	8.097	102.8	134.1
WDS004	1140	139	CO1A	2.148	28.05	0.2742	26.41	5.593	3.316	1.989	59.63	35.527	423.0	5.451	1.336	57942.2	4.183	194.9	77.25	0.6513	18.65	452.1	0.881	0.585	8.549	108.1	104.5
WDS005	1108	139	CO1B	2.874	32.73	0.3938	31.60	6.421	2.677	2.348	66.73	28.988	321.8	3.900	1.700	58872.5	5.496	88.2	62.23	0.5825	22.04	447.0	1.103	0.793	8.219	101.8	147.7
WDS006	162	31	CO2	4.367	32.97	0.4132	34.98	7.632	2.048	2.697	66.62	39.627	597.1	4.099	1.872	51577.8	5.983	242.7	68.76	0.5425	23.92	109.6	0.909	0.829	7.370	107.2	154.6
WDS007	193	33	CO1A	2.354	29.40	0.3062	29.49	6.072	3.003	2.119	60.10	29.009	572.8	3.714	1.517	62489.7	4.670	112.7	65.27	0.4266	22.77	499.2	0.995	0.705	7.843	91.4	133.7
WDS008	165	31	U	1.691	24.84	0.3106	24.17	4.878	1.447	1.763	91.84	48.139	101.9	1.055	1.659	40369.8	7.540	16.2	20.53	0.1580	11.13	533.7	0.604	0.572	6.043	46.5	194.1
WDS009	151	10	CO1A	2.075	25.90	0.2531	25.28	5.217	2.040	1.846	55.65	32.125	429.5	5.394	1.286	58495.9	4.177	153.6	68.28	0.5510	20.77	450.6	0.893	0.661	8.103	97.5	121.8
WDS010	128	9	U	3.974	33.06	0.4606	28.56	6.827	3.259	2.523	64.43	26.154	336.2	5.837	1.619	57570.6	5.012	86.8	84.83	0.6724	20.27	293.6	0.989	0.938	8.810	109.0	124.2
WDS011	1181	147	CO1A	3.061	28.11	0.3495	27.21	5.759	2.121	1.948	59.13	34.698	557.4	3.084	1.469	63336.6	5.014	166.8	54.86	0.3996	22.48	384.3	0.986	0.647	7.523	100.0	139.9
WDS012	1181	147	CO1B	1.966	32.37	0.3451	31.12	6.449	2.568	2.445	64.71	29.147	339.4	4.293	1.598	58730.2	5.348	87.9	68.83	0.5058	21.31	327.6	1.094	0.696	8.560	98.5	186.4
WDS013	1180	147	CO1A	1.318	30.93	0.3893	32.61	6.179	3.150	2.095	60.88	29.605	447.5	4.776	1.467	57874.4	4.375	132.5	62.88	0.5611	21.35	504.1	0.923	0.701	8.765	81.9	113.2
WDS014	1191	147	CO1A	1.791	30.61	0.2930	27.69	6.102	2.513	2.032	62.70	30.501	430.7	5.640	1.488	60659.6	4.388	97.0	83.16	0.6024	21.53	532.8	0.935	0.720	8.799	86.7	116.8
WDS015	1191	147	CO1B	2.808	33.43	0.3330	32.60	6.541	4.618	2.374	68.20	29.379	322.2	4.327	1.508	58922.8	4.716	114.5	70.89	0.5511	20.80	461.2	1.124	0.703	9.443	108.3	128.0
WDS016	932	111	CO1A	1.805	27.69	0.3399	28.83	5.795	1.864	2.052	57.67	36.343	523.3	4.500	1.443	62894.6	4.795	134.9	65.35	0.4254	22.43	422.5	0.905	0.618	7.641	100.3	139.3
WDS017	940	110	CO1A	2.145	27.47	0.2834	26.05	5.694	2.150	2.021	58.54	36.561	537.4	2.872	1.441	63757.4	4.036	231.0	47.39	0.7879	22.57	423.3	0.890	0.616	7.643	126.5	97.2
WDS018	925	110	U	5.822	30.85	0.3576	27.78	6.356	2.843	2.478	62.86	25.067	311.0	4.635	1.504	53346.5	5.302	84.3	72.25	0.7555	19.05	347.5	0.976	0.674	8.662	87.0	135.9
WDS019	940	110	CO1A	1.695	29.41	0.3017	27.77	5.911	2.308	2.191	58.81	33.373	515.6	4.470	1.427	60224.0	4.199	134.8	61.46	0.5573	21.76	586.6	0.884	0.705	7.901	111.2	150.6
WDS020	925	110	U	2.109	29.55	0.3391	27.95	6.122	2.891	2.351	58.91	33.817	514.8	3.474	1.501	59821.4	4.906	132.8	57.76	0.4999	21.12	379.1	0.877	0.701	7.732	90.0	129.8
WDS021	848	97	CO1A	4.384	28.94	0.2996	28.60	5.950	2.880	1.932	60.34	36.363	537.2	4.754	1.481	65142.5	4.487	153.7	75.05	0.4794	22.45	409.1	0.879	0.737	7.866	118.2	114.7
WDS022	848	97	CO1B	3.668	29.76	0.3241	29.01	6.216	3.396	2.077	60.50	34.149	475.5	4.514	1.531	60762.7	4.489	154.2	64.99	0.5918	21.36	388.0	0.877	0.731	7.580	98.4	115.8
WDS023	850	97	CO1B	2.737	30.70	0.3334	29.19	6.105	2.590	2.523	62.87	23.906	299.0	7.010	1.431	53541.6	5.349	87.5	83.99	0.6540	18.17	706.4	1.008	0.716	8.886	84.1	168.8
WDS024	850	97	CO1A	3.622	31.61	0.3428	31.48	6.486	2.875	2.379	60.87	38.368	576.2	4.170	1.632	66179.8	4.275	165.2	60.19	0.4114	23.24	466.8	0.916	0.803	7.657	97.5	94.2
WDS025	850	97	CO1B	5.152	28.90	0.3106	29.27	5.910	3.312	2.108	59.34	24.570	344.4	4.934	1.376	57418.6	4.680	106.6	77.18	0.6326	19.60	416.9	0.986	0.653	8.536	95.1	124.3
WDS026	344	16	CO1B	1.651	29.30	0.3364	28.43	5.940	2.465	2.304	59.94	21.188	238.3	6.591	1.363	51296.7	5.452	109.3	87.24	0.6540	16.86	293.4	1.018	0.623	8.968	84.5	129.5
WDS027	299	16	CO1A	2.764	26.62	0.2895	26.74	5.584	2.142	1.792	55.94	36.761	583.2	3.568	1.443	64090.3	4.533	164.2	52.32	0.3335	22.89	477.8	0.933	0.758	7.456	97.5	115.8
WDS028	302	17	CO1A	2.315	27.45	0.2995	26.01	5.661	2.047	1.980	57.41	37.311	515.9	3.509	1.436	62091.2	4.490	180.8	58.49	0.3474	21.63	401.1	0.871	0.665	7.169	106.3	165.0
WDS029	328	17	CO2	3.324	28.26	0.3071	29.28	5.731	2.414	2.111	58.74	40.846	626.4	3.656	1.344	63938.7	4.665	217.2	52.81	0.4414	20.77	249.8	0.933	0.747	7.866	130.1	101.5
WDS030	327	16	CO1B	2.872	29.02	0.4192	28.48	5.612	3.114	2.280	60.51	22.112	252.6	6.783	1.264	49720.0	4.530	118.9	98.13	0.5710	17.84	435.7	0.992	0.666	9.476	95.5	112.6
WDS031	1493	161	CO1A	1.966	28.10	0.3031	26.72	5.993	3.382	2.013	57.67	38.569	593.6	3.020	1.511	67399.6	4.383	178.3	45.89	0.4710	23.68	396.8	0.934	0.773	7.388	96.9	133.7
WDS032	1438	161	CO1A	0.802	27.69	0.3001	26.71	5.674	2.597	1.848	56.78	33.279	482.2	4.973	1.355	61726.0	4.220	140.8	58.60	0.4090	21.65	472.4	0.883	0.638	8.329	85.3	134.6
WDS033	1610	162	U	3.028	30.57	0.4206	29.38	6.102	2.745	2.452	61.53	18.150	204.0	7.144	1.369	48052.0	5.440	82.1	92.69	0.6854	17.13	300.5	1.003	0.741	9.085	100.9	141.0
WDS034	1424	156	CO3	2.615	35.88	0.4298	34.72	6.947	3.823	2.853	72.75	7.440	106.8	4.924	1.827	25585.6	4.751	0.0	86.72	0.8091	16.44	91.0	0.818	0.772	7.716	67.4	149.4
WDS035	1466	164	U	3.504	29.07	0.3195	28.82	6.097	2.119	2.113	61.59	35.546	534.0	0.962	1.517	66208.1	4.389	164.0	29.35	0.4548	23.46	387.2	0.953	0.705	8.544	123.1	97.6
WDS036	1164	143	CO1B	3.181	28.56	0.3236	28.21	5.932	3.349	2.003	59.53	32.826	451.3	4.959	1.457	58214.1	4.823	129.0	72.62	0.5524	20.76	412.0	0.921	0.872	7.949	83.1	144.8
WDS037	1164	143	CO1B	2.468	30.32	0.3571	29.89	6.328	2.706	2.442	60.68	25.539	224.3	4.910	1.446	55240.4	4.742	98.6	78.66	1.3283	19.15	582.4	1.008	0.701	9.768	91.3	136.2
WDS038	1160	143	CO1B	4.935	28.84	0.3113	29.24	5.990	2.675	2.360	60.03	33.331	476.5	4.903	1.525	63879.6	4.615	100.0	74.14	0.5839	21.68	401.6	0.917	0.637	7.817	91.9	129.2

anid	bag	site	subgroup	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr
WDS039	1160	143	CO1B	4.746	33.05	0.4587	30.95	6.558	4.771	2.408	68.49	24.639	265.8	4.175	1.503	56860.9	4.782	100.1	59.62	0.7957	19.94	433.8	1.068	0.900	9.533	101.9	116.6
WDS040	1160	143	CO1B	4.359	28.25	0.3282	26.96	5.862	2.412	2.113	57.67	28.127	389.4	4.948	1.418	55623.3	4.985	113.6	65.89	0.6703	19.36	374.7	0.954	0.704	7.778	82.8	173.4
WDS041	1207	152	U	1.542	32.24	0.3538	31.24	6.384	3.506	1.936	63.40	49.584	781.6	0.724	1.508	72489.9	4.969	294.9	28.01	0.3484	23.53	230.7	1.024	0.707	8.097	81.2	155.1
WDS042	1207	152	CO2	0.000	31.05	0.3154	31.16	6.438	3.211	2.039	62.69	42.488	554.7	1.350	1.582	71511.3	4.709	185.0	40.93	0.3789	22.28	347.1	1.090	0.672	8.821	121.0	160.2
WDS043	1207	152	CO2	7.480	32.01	0.4071	31.89	6.445	1.998	2.322	62.56	28.214	370.1	3.547	1.605	57981.8	6.400	146.7	58.73	0.6567	19.26	275.1	1.104	0.769	7.954	88.9	152.2
WDS044	1207	152	CO2	3.973	32.03	0.3562	31.24	6.611	1.651	2.356	68.49	35.028	490.0	2.127	1.715	64098.7	6.848	167.1	38.49	0.4887	21.36	318.2	1.195	0.723	8.018	84.9	185.1
WDS045	1207	152	CO1B	3.221	28.50	0.3436	28.19	5.746	3.510	2.088	59.12	30.014	442.8	4.125	1.369	59073.2	4.212	138.9	58.87	0.4832	20.85	500.2	0.824	0.607	8.025	92.2	140.6
WDS046	486	51	U	2.340	33.41	0.3381	34.91	6.957	2.346	2.326	69.55	41.109	495.0	0.718	1.805	69549.8	5.549	173.8	26.06	0.3491	22.36	311.1	1.083	0.830	8.483	112.6	172.9
WDS047	508	51	CO1A	2.180	28.10	0.2954	28.82	5.769	2.427	1.955	57.69	39.411	600.9	3.776	1.429	64664.5	3.997	230.3	58.44	0.4348	22.79	446.6	0.862	0.561	7.506	97.5	105.6
WDS048	487	51	CO1B	4.817	27.12	0.3189	27.48	5.901	2.885	2.328	55.43	30.208	454.3	4.296	1.458	59104.8	4.895	151.4	69.36	0.5193	20.62	388.7	0.926	0.644	8.040	91.2	134.9
WDS049	484	51	U	3.247	38.59	0.4750	36.22	7.679	2.646	3.233	61.82	21.840	293.4	4.228	1.956	48157.6	8.396	71.8	70.52	0.6322	23.06	119.7	1.108	0.880	9.282	93.5	197.9
WDS050	506	51	CO2	3.202	28.83	0.3045	27.71	6.031	2.607	2.047	60.26	32.012	448.4	2.535	1.521	62192.3	4.918	165.9	43.71	0.4717	21.42	318.1	0.941	0.963	8.311	121.8	181.8
WDS051	1577	182	CO1A	1.472	29.10	0.3069	24.93	5.820	2.040	2.027	55.84	35.098	501.9	4.854	1.424	58687.2	4.709	167.7	70.73	0.5004	21.76	416.1	0.905	0.944	7.592	76.9	95.4
WDS052	1558	182	CO1A	2.158	28.99	0.3009	25.16	5.790	2.375	2.058	57.72	35.988	512.9	4.037	1.451	62387.6	4.808	147.6	59.46	0.4484	22.35	503.8	0.928	0.703	7.578	119.3	141.8
WDS053	1552	182	U	2.086	29.27	0.2940	24.05	5.958	2.462	1.966	62.47	40.998	582.0	2.095	1.540	68725.6	4.862	202.1	42.58	0.4675	24.03	330.7	0.991	0.627	7.826	114.2	129.9
WDS054	1552	182	CO1A	0.000	28.19	0.2512	25.21	5.609	2.675	1.958	56.80	40.298	581.0	3.800	1.466	63697.1	4.459	217.1	55.92	0.3628	22.68	523.8	0.868	0.825	6.892	99.8	84.7
WDS055	1571	182	CO1A	2.426	30.24	0.4011	28.13	5.857	3.505	2.084	60.93	29.442	394.4	5.657	1.379	57246.1	4.337	142.2	71.10	0.5789	20.47	598.1	0.941	0.661	8.506	110.0	110.4
WDS056	1238	1	CO1A	2.010	28.64	0.2962	24.75	5.623	2.772	2.308	59.76	31.051	444.0	5.620	1.398	60780.3	4.194	169.9	69.23	0.6441	21.68	490.7	0.827	0.663	7.992	84.6	102.4
WDS057	1331	1	CO1A	2.158	30.12	0.3030	27.81	6.014	2.666	2.331	60.97	34.094	472.9	4.623	1.534	61849.4	5.065	141.5	72.24	0.5121	21.91	405.7	0.947	0.710	8.297	92.0	146.4
WDS058	1332	1	CO1A	2.689	29.54	0.2830	25.00	6.012	2.453	2.221	60.00	37.217	557.1	3.966	1.543	65725.4	4.983	179.3	59.20	0.4931	22.67	404.6	0.916	0.687	8.079	87.6	133.6
WDS059	1235	1	CO1A	1.720	31.03	0.3042	28.10	6.142	2.352	2.225	59.88	33.177	494.0	3.522	1.553	60374.6	5.151	167.4	58.08	0.4013	22.43	402.2	0.984	0.708	8.010	83.9	141.3
WDS060	1414	1	U	0.640	27.57	0.2724	26.91	5.500	2.768	1.863	58.11	35.010	501.7	5.089	1.368	61543.4	4.169	200.0	81.65	0.3700	22.17	611.8	0.868	0.617	7.948	113.5	117.0
WDS061	1376	1	U	1.865	31.72	0.3245	31.05	6.281	2.414	2.430	64.75	25.808	298.8	4.707	1.541	56142.2	5.805	124.1	74.12	0.5527	18.89	281.9	1.020	0.798	8.655	100.1	136.0
WDS062	1243	1	CO1A	2.603	29.45	0.2733	31.28	5.705	2.245	2.106	60.45	35.943	549.2	2.865	1.544	64514.7	5.219	172.8	48.86	0.4637	23.25	430.7	1.030	0.921	8.146	104.0	143.5
WDS063	1360	1	U	3.165	32.27	0.3513	31.55	6.181	3.772	2.480	67.14	20.995	259.0	5.058	1.418	56135.8	4.905	97.0	77.64	0.8537	20.18	384.1	1.043	0.736	10.170	92.2	113.7
WDS064	1374	1	CO1A	1.153	28.50	0.2725	28.64	5.717	2.974	1.929	60.24	35.636	541.5	4.136	1.481	66793.6	4.570	144.9	57.31	0.4178	22.82	410.7	0.964	0.695	7.933	100.4	127.3
WDS065	1361	1	CO1A	1.536	27.21	0.2502	26.34	5.525	2.096	1.930	55.53	35.996	591.5	1.964	1.458	62772.8	5.097	173.0	43.78	0.3011	22.92	429.9	0.909	0.619	7.102	97.7	130.2
WDS066	621	63	CO1A	0.000	28.07	0.2491	29.00	5.644	2.161	1.784	57.56	35.015	519.6	4.718	1.447	62249.2	4.244	149.6	65.40	0.4275	22.65	453.1	0.844	0.908	7.364	90.2	125.9
WDS067	613	63	U	2.386	29.62	0.3320	29.84	5.802	2.829	2.246	60.33	27.164	370.6	6.392	1.377	56689.2	4.424	130.8	87.39	0.6580	20.72	627.8	0.893	0.708	8.312	98.7	116.4
WDS068	614	63	CO1B	3.515	28.78	0.2984	31.78	5.744	2.864	2.167	61.25	33.025	447.4	4.842	1.442	60984.2	4.578	137.3	64.75	0.5662	21.36	390.7	0.919	0.696	8.070	107.0	118.2
WDS069	615	63	CO1A	1.160	27.26	0.2595	22.61	5.543	2.357	1.878	55.83	41.028	601.3	3.859	1.438	64033.7	4.572	225.8	56.32	0.4567	22.60	407.1	0.849	0.723	6.800	101.3	121.7
WDS070	621	63	U	2.737	29.82	0.3501	29.31	5.613	3.548	2.128	62.96	18.790	210.4	8.589	1.250	49706.7	4.661	116.3	113.29	0.7442	17.61	531.5	0.968	0.648	9.483	92.6	120.5
WDS071	1590	2	CO1A	1.216	29.85	0.3270	25.34	6.039	3.188	2.132	60.80	31.750	473.6	4.726	1.547	62322.9	4.696	142.3	69.33	0.4783	21.83	748.0	0.879	0.733	7.545	94.6	126.9
WDS072	1587	2	CO1B	2.420	28.69	0.3002	27.78	5.650	2.176	2.249	58.75	30.202	417.2	5.374	1.415	56395.6	4.842	121.0	66.83	0.5238	20.00	427.2	0.931	0.677	7.371	92.7	118.2
WDS073	1588	2	CO1A	1.269	30.94	0.3575	28.95	6.025	3.331	2.379	61.42	31.217	488.5	4.282	1.468	60756.6	4.287	177.2	57.28	0.4895	21.42	584.2	0.858	0.986	8.002	79.2	109.6
WDS074	1588	2	CO1B	2.228	30.29	0.3491	26.66	6.025	2.210	2.186	62.13	31.268	451.7	4.515	1.495	58670.7	5.179	126.5	70.07	0.5932	20.63	377.7	0.923	0.785	8.237	95.7	156.8
WDS075	1588	2	CO2	2.694	31.43	0.3597	31.68	6.324	2.782	2.513	65.89	25.445	360.9	4.201	1.464	56327.4	5.551	133.0	64.40	0.5290	19.51	247.5	0.958	0.756	8.992	109.5	142.0
WDS076	724	82	CO1A	2.964	31.17	0.2862	29.58	6.191	2.061	2.257	64.06	32.097	366.0	5.766	1.543	60971.0	4.483	180.1	66.82	0.5594	20.64	637.9	0.995	0.729	8.501	118.6	96.3
WDS077	736	82	CO1B	5.059	28.80	0.3464	31.63	6.590	2.750	2.485	61.12	29.285	419.3	3.975	1.605	62303.0	4.891	125.7	63.31	0.5230	21.00	382.6	0.968	0.735	8.713	96.6	146.2
WDS078	726	82	CO1A	2.039	27.95	0.2544	28.64	5.640	2.013	2.007	58.85	36.372	524.1	4.195	1.442	63225.5	4.567	184.1	64.61	0.4102	21.83	452.4	0.920	0.700	7.248	91.4	106.4
WDS079	737	82	CO1B	2.540	30.63	0.3551	26.52	6.039	3.469	2.208	63.62	23.824	286.8	4.728	1.369	53233.1	4.466	103.0	71.09	0.5920	18.73	627.5	0.946	0.699	8.871	111.4	107.2
WDS080	725	82	U	3.544	28.88	0.3350	32.15	5.981	2.579	2.252	59.33	26.617	360.2	3.437	1.427	55982.1	5.582	144.9	55.96	0.4950	19.19	306.4	0.946	0.741	8.007	99.0	114.3
WDS081	527	54	U	3.379	24.32	0.2947	25.65	5.158	2.464	1.901	49.12	26.681	226.9	3.695	1.245	52438.5	4.770	81.5	47.27	0.5275	23.45	616.9	0.755	0.604	6.989	83.4	107.3

anid	bag	site	subgroup	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr
WDS082	468	50	CO1A	3.955	28.22	0.3092	27.96	5.677	2.319	1.942	58.15	37.632	518.4	2.967	1.404	61258.8	4.755	236.4	38.11	0.5126	20.64	415.6	0.934	0.710	7.470	111.5	123.6
WDS083	566	56	CO1A	1.967	25.94	0.2357	22.72	5.242	2.508	1.711	55.24	36.761	554.4	4.281	1.323	61205.2	4.020	209.3	61.70	0.4478	22.49	564.9	0.845	0.625	7.803	131.3	131.4
WDS084	528	54	CO2	2.568	34.74	0.3946	34.39	6.991	2.105	2.855	73.02	29.625	328.5	3.837	1.748	51481.1	7.369	90.2	62.19	0.6127	21.48	177.6	1.067	0.927	8.501	100.0	181.6
WDS085	566	56	CO1A	2.424	29.04	0.2792	27.91	5.947	2.426	2.075	60.19	37.360	502.7	4.027	1.506	62004.9	4.646	214.0	61.44	0.5262	21.44	486.0	0.855	0.688	7.861	93.5	147.1
WDS086	1030	124	CO1B	2.335	30.25	0.3327	33.90	6.119	2.887	2.077	64.33	29.073	431.5	5.255	1.507	62055.5	4.626	137.3	73.58	0.7235	21.50	503.2	0.959	0.779	9.414	100.4	111.9
WDS087	1030	124	CO1B	0.000	30.16	0.3530	30.36	5.937	2.763	2.233	61.47	24.895	368.9	5.689	1.480	56750.5	4.524	110.2	79.91	0.5901	21.18	579.3	0.960	0.726	9.116	85.6	127.4
WDS088	1049	124	CO1B	2.860	32.46	0.3501	35.00	6.567	3.244	2.150	64.61	26.151	382.2	6.217	1.620	58552.4	4.580	122.1	82.24	0.5728	21.58	532.8	0.941	0.795	9.136	79.4	120.3
WDS089	1049	124	U	2.231	25.55	0.2251	25.63	5.105	1.965	1.757	52.89	53.877	923.2	4.050	1.270	68247.9	3.778	350.1	55.58	0.4420	20.39	382.1	0.939	0.805	6.940	89.8	112.8
WDS090	1030	124	CO1B	1.906	29.47	0.3678	28.45	6.100	1.978	2.312	59.60	33.500	444.7	4.934	1.532	61312.1	4.686	123.9	69.76	0.5685	22.03	350.4	0.920	0.737	7.914	94.1	127.5
WDS091	814	24	CO1A	0.000	27.70	0.2411	28.27	5.478	2.096	1.730	55.93	42.549	675.0	4.466	1.373	64397.8	4.040	260.6	60.62	0.3712	21.56	428.9	0.839	0.738	7.275	91.3	100.7
WDS092	365	24	CO1B	3.877	28.69	0.3334	26.52	5.847	3.576	2.159	61.03	27.084	355.2	5.913	1.341	54302.5	5.305	141.9	78.74	0.6464	18.75	377.0	0.956	0.753	8.627	93.4	143.1
WDS093	276	24	CO1B	3.409	26.84	0.2997	28.39	5.632	2.646	2.143	56.74	28.860	443.2	4.806	1.373	59035.3	4.705	116.5	71.07	0.6058	19.98	344.6	0.900	0.699	7.831	102.0	123.8
WDS094	262	24	CO1A	2.202	28.43	0.3047	29.66	5.752	2.665	2.117	60.16	30.039	450.4	4.777	1.409	61618.4	4.553	137.5	69.93	0.5365	21.38	511.7	0.913	0.781	8.297	91.8	136.7
WDS095	288	24	CO2	1.742	31.32	0.2684	26.26	5.366	2.902	1.912	63.52	42.670	516.5	2.776	1.461	69060.7	7.114	199.0	40.93	0.4905	24.23	287.8	1.207	0.602	8.833	82.0	188.0
WDS096	788	89	U	4.015	29.13	0.3140	25.17	5.795	3.190	1.988	61.26	22.429	245.2	6.709	1.319	53008.9	5.171	97.7	82.98	0.7021	18.83	530.5	1.034	0.660	8.951	107.4	134.8
WDS097	800	89	CO1A	0.000	30.33	0.2948	32.78	5.914	3.096	2.217	60.28	31.045	472.9	3.687	1.487	59775.3	4.406	214.1	56.36	0.5782	20.59	557.9	0.936	0.717	8.651	125.1	102.9
WDS098	784	89	CO1A	1.968	28.19	0.2921	33.20	5.629	2.055	2.054	58.91	32.775	526.8	4.493	1.414	61727.0	4.141	174.8	61.43	0.4907	21.88	467.5	0.866	0.653	8.172	84.7	132.5
WDS099	799	89	CO2	2.611	32.26	0.3841	33.41	6.786	1.905	2.801	57.97	38.293	472.6	3.794	1.744	63911.5	5.830	209.3	68.85	0.6932	22.99	151.9	0.962	0.809	8.173	102.6	145.2
WDS100	799	89	CO1A	1.174	28.96	0.2766	25.88	5.805	2.801	2.001	59.33	30.915	448.0	4.747	1.412	58240.4	4.137	152.0	61.27	0.5781	20.97	635.4	0.811	0.667	8.205	105.4	95.7
WDS101	1140	139	U	3.312	29.17	0.2902	30.50	6.110	3.238	1.912	61.54	41.327	539.9	3.283	1.457	64505.8	4.612	306.8	60.40	0.3846	19.65	374.3	0.959	0.715	8.026	117.2	114.8
WDS102	1135	139	CO1A	1.449	29.70	0.3386	28.00	6.039	2.602	2.111	60.43	30.835	415.2	5.434	1.406	58075.2	4.300	194.9	72.92	0.5557	20.66	512.1	0.983	0.775	8.560	115.2	126.0
WDS103	1135	139	CO1A	2.069	28.56	0.3426	27.26	5.905	2.645	2.048	64.96	32.196	447.0	3.684	1.557	60649.6	5.150	179.9	54.26	0.4946	21.59	480.4	0.964	0.657	8.260	107.4	129.0
WDS104	1131	139	CO1A	2.961	28.23	0.2834	25.12	5.683	2.523	1.955	60.61	37.851	547.2	4.739	1.405	60609.0	4.709	262.2	74.06	0.5761	20.13	406.8	0.935	0.723	8.275	96.6	129.4
WDS105	1108	139	U	4.915	32.06	0.3115	31.60	6.421	2.424	2.412	68.74	39.611	463.0	2.033	1.744	65776.0	4.829	215.3	41.78	0.6688	24.62	458.3	0.978	0.787	8.706	101.7	139.1
WDS106	165	31	CO1B	4.167	29.99	0.2723	26.93	6.044	2.300	2.112	68.09	33.014	424.3	3.404	1.571	63396.2	5.389	155.3	56.76	0.5903	21.62	422.1	1.093	0.726	8.971	108.5	136.9
WDS107	194	23	CO1A	1.122	29.11	0.3021	25.04	5.939	3.001	2.049	63.82	33.726	499.5	4.185	1.570	65602.2	4.517	169.7	68.62	0.5253	22.88	525.1	0.906	0.752	8.239	104.2	160.0
WDS108	128	9	CO1A	2.052	31.18	0.3249	27.21	6.297	3.057	2.150	64.80	38.509	627.9	3.709	1.745	68119.6	4.672	207.6	57.03	0.4182	24.49	503.9	0.978	0.733	8.143	108.9	115.2
WDS109	162	31	CO2	2.131	30.57	0.3294	30.62	6.561	1.732	2.345	70.60	27.895	437.0	3.080	1.751	46364.7	5.972	110.0	52.01	0.5428	29.21	102.5	0.845	0.805	7.036	107.0	135.9
WDS110	182	23	CO1A	1.406	29.86	0.3406	28.43	5.875	3.941	2.153	64.01	26.531	365.5	5.700	1.378	56149.7	4.539	159.5	82.42	0.6387	20.08	589.3	0.928	0.735	9.284	89.0	140.8
WDS111	1191	147	CO1B	3.854	28.83	0.2760	23.46	5.806	2.964	2.118	64.10	32.593	418.7	4.780	1.517	61683.4	4.906	164.3	78.05	0.5916	22.11	413.2	0.908	0.687	8.308	100.2	125.6
WDS112	1180	147	CO1A	1.154	28.68	0.2898	25.42	5.859	2.656	1.905	62.40	40.844	552.8	3.938	1.566	65099.0	4.647	185.0	68.48	0.3046	23.12	542.4	0.907	0.696	7.713	99.5	131.8
WDS113	1181	147	CO1B	3.189	31.33	0.3513	24.43	6.047	2.620	2.335	68.30	30.200	422.1	5.137	1.544	57387.0	5.341	158.3	79.50	0.6199	20.54	379.4	0.981	0.705	8.747	102.4	130.9
WDS114	1181	147	CO1B	3.070	32.43	0.3684	30.37	6.354	3.299	2.370	70.26	23.876	239.8	5.789	1.558	57129.5	5.520	87.4	87.50	0.6861	20.12	383.8	1.103	0.897	9.552	99.2	138.4
WDS115	1181	147	CO1A	2.318	28.82	0.2842	24.74	5.628	2.856	1.953	61.78	40.215	608.8	4.719	1.444	64785.7	4.235	236.4	82.07	0.5537	22.32	492.5	0.885	0.646	8.146	87.5	128.6
WDS116	295	110	CO1B	4.785	31.19	0.3428	25.94	6.267	2.894	2.158	67.15	31.650	466.9	5.158	1.605	61386.9	5.275	183.3	71.27	0.6805	22.13	743.2	1.055	0.769	8.823	98.9	177.1
WDS117	295	110	CO1B	3.519	28.72	0.2849	30.75	5.918	2.544	2.211	62.87	29.924	404.9	3.429	1.507	58683.9	5.115	181.6	55.17	0.5517	20.57	463.9	0.933	0.674	7.918	115.6	163.8
WDS118	940	110	U	1.418	30.43	0.2846	26.02	5.949	2.599	1.803	57.12	32.751	462.7	5.059	1.462	58624.1	4.161	171.3	72.25	0.5935	21.43	947.3	0.833	0.662	7.739	95.9	97.8
WDS119	940	110	CO1B	3.591	28.62	0.3033	25.41	5.864	2.817	2.133	55.04	28.791	420.8	4.359	1.413	55391.5	5.115	140.1	65.02	0.5927	19.64	384.9	0.874	0.657	7.325	109.9	154.3
WDS120	932	111	CO1A	3.617	30.13	0.3133	24.50	6.287	2.623	2.453	54.80	32.543	463.2	3.841	1.539	62127.4	4.396	184.8	54.15	0.4588	21.74	432.0	0.889	0.700	7.265	100.8	125.9
WDS121	848	97	CO1A	2.639	30.32	0.2529	32.11	6.080	2.582	1.892	55.24	36.729	562.1	4.274	1.524	63512.0	4.069	214.2	62.87	0.4831	22.05	768.8	0.813	0.624	6.943	92.9	115.0
WDS122	848	97	CO1B	5.698	29.86	0.3311	30.68	6.102	2.612	2.218	59.04	26.612	328.6	5.107	1.451	55826.8	4.976	115.5	75.44	0.6486	19.61	338.5	0.974	0.902	8.279	98.4	149.3
WDS123	850	97	CO2	2.041	33.75	0.3871	28.40	6.895	2.822	2.603	64.41	34.288	430.1	3.928	1.753	52312.2	5.942	136.3	67.92	0.5983	23.64	209.5	1.055	0.813	7.933	99.5	146.9
WDS124	850	97	CO1A	3.186	28.77	0.2582	26.16	5.719	2.401	1.739	54.77	36.414	533.5	3.697	1.474	62197.4	4.216	214.2	57.22	0.4072	22.18	496.7	0.891	0.603	7.023	94.4	88.2

anid	bag	site	subgroup	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr
WDS125	850	97	CO1A	2.482	28.28	0.3031	23.89	5.845	2.030	1.864	55.89	34.752	493.1	3.471	1.460	63580.4	4.349	172.4	50.19	0.4696	21.97	395.7	0.882	0.639	7.526	101.1	99.1
WDS126	302	17	CO1B	3.095	28.96	0.3189	26.02	5.618	2.990	2.029	57.54	26.360	334.9	6.936	1.283	55556.3	4.291	139.2	95.48	0.6575	19.53	520.0	0.878	0.577	8.294	92.2	115.3
WDS127	302	17	CO1A	3.365	29.73	0.2586	32.25	5.916	2.988	1.853	56.62	30.619	467.0	3.461	1.447	59924.4	4.419	154.7	56.65	0.3676	21.42	530.5	0.896	0.617	7.540	93.7	114.1
WDS128	331	17	CO1B	2.790	30.50	0.3262	26.86	6.010	3.156	2.260	57.01	24.813	287.9	2.978	1.346	52913.1	4.413	114.1	55.30	0.6614	18.05	390.7	0.932	0.687	8.690	97.3	120.2
WDS129	331	17	CO1A	1.700	29.93	0.2960	30.00	5.924	2.884	1.980	56.85	30.548	444.7	5.426	1.427	57199.4	4.543	155.9	65.16	0.5578	20.92	495.2	0.929	0.660	7.704	78.5	118.4
WDS130	312	17	CO1A	1.232	27.82	0.2646	25.37	5.766	2.426	1.871	53.31	36.450	510.5	3.709	1.427	62898.7	4.294	169.7	62.62	0.4215	22.55	470.4	0.882	0.656	7.010	93.0	123.9
WDS131	1438	161	CO1B	3.481	29.98	0.3805	26.34	5.976	4.529	2.174	60.20	23.390	292.5	3.095	1.298	55542.4	4.804	125.8	61.33	0.8377	19.45	449.3	0.997	0.637	9.301	103.1	133.7
WDS132	1438	161	CO1A	3.212	27.36	0.3249	26.94	5.666	2.533	1.840	55.74	41.106	711.0	3.426	1.489	69128.2	4.194	198.1	49.33	0.4674	24.21	390.9	0.837	0.663	7.179	102.6	117.3
WDS133	1493	161	CO1A	1.200	28.98	0.2563	30.40	6.013	2.717	2.138	58.16	38.611	551.1	3.401	1.543	65344.4	4.727	189.5	62.63	0.3529	23.14	427.4	0.899	0.690	7.674	88.9	156.4
WDS134	1466	164	CO1B	2.853	32.82	0.3838	30.28	6.528	3.136	2.344	66.14	28.143	375.5	3.026	1.584	59670.0	4.919	161.0	57.39	0.6570	22.11	478.4	1.017	0.752	9.785	108.6	135.9
WDS135	1610	162	CO1A	6.609	30.11	0.3411	26.94	6.325	2.194	2.127	57.06	37.829	573.2	3.276	1.572	63541.9	4.583	209.6	52.06	0.4806	22.15	484.9	0.839	0.729	7.404	107.9	98.3
WDS136	1164	143	CO1A	2.877	31.69	0.3058	29.71	6.268	2.639	2.191	60.19	34.350	459.1	3.323	1.496	58769.3	4.290	164.1	52.56	0.5493	21.40	456.3	0.903	0.745	8.520	93.9	98.1
WDS137	1164	143	U	5.074	29.64	0.3723	33.97	6.397	2.585	2.342	56.95	25.476	346.0	2.139	1.503	55468.9	5.096	176.6	51.60	0.6529	19.10	333.5	0.986	0.721	8.834	85.2	126.0
WDS138	1160	143	CO1A	0.000	29.75	0.2786	32.70	6.063	2.249	2.103	56.61	35.881	557.6	3.690	1.527	61796.4	4.696	183.6	53.06	0.3650	22.00	414.4	0.925	0.661	7.540	88.3	130.0
WDS139	1160	143	CO1B	2.111	30.76	0.3257	29.55	6.146	2.523	2.310	60.18	24.823	330.5	5.437	1.399	52445.4	5.218	118.9	78.76	0.6020	18.85	375.4	0.950	0.869	8.239	95.9	149.7
WDS140	1160	143	CO1A	2.710	30.35	0.2920	29.41	5.995	2.577	2.042	59.08	31.923	424.0	2.180	1.452	59782.6	4.282	186.9	44.45	0.6019	21.40	555.3	0.893	0.675	8.424	98.1	143.3
WDS141	1207	152	CO1B	1.382	29.08	0.3315	25.01	5.751	3.400	2.011	55.92	27.805	331.9	2.307	1.353	51253.0	4.376	135.3	58.64	0.4190	16.57	548.9	0.891	0.666	7.696	68.3	142.8
WDS142	1207	152	CO2	4.037	32.73	0.3246	29.83	6.497	2.490	2.502	58.92	34.633	420.8	3.075	1.581	60755.6	5.835	143.6	54.26	0.5013	21.54	267.0	0.991	0.818	7.849	102.7	161.3
WDS143	1207	152	U	1.876	29.73	0.3273	27.06	6.013	3.710	1.827	57.42	40.254	642.9	1.740	1.484	65577.0	4.377	206.4	36.52	0.4571	22.53	429.9	0.939	0.694	7.712	68.7	106.7
WDS144	506	51	CO1A	2.704	28.51	0.2637	26.47	5.745	1.858	1.992	55.87	31.835	459.0	3.775	1.363	58010.2	4.061	195.3	55.16	0.5221	20.90	561.4	0.812	0.645	7.710	108.8	115.4
WDS145	484	51	U	3.367	26.31	0.2990	27.95	5.341	3.027	1.759	53.25	26.018	364.8	5.624	1.230	52943.0	4.008	129.4	76.91	0.6522	18.65	605.5	0.836	0.565	7.748	88.1	119.0
WDS146	484	51	CO1A	2.737	29.73	0.2914	27.93	5.972	3.308	2.050	58.73	28.657	422.3	5.085	1.377	57597.7	4.375	128.8	62.81	0.6077	20.37	557.0	0.889	0.606	8.208	80.1	106.3
WDS147	487	51	CO1A	0.000	29.10	0.3345	24.96	6.026	3.642	1.997	56.93	34.823	517.0	3.124	1.473	60716.6	4.514	167.2	50.89	0.3903	22.51	457.5	0.850	0.670	7.102	90.8	133.2
WDS148	487	51	CO1A	2.306	28.59	0.2994	29.04	5.670	2.923	2.023	59.54	31.673	432.1	5.022	1.382	60225.9	4.311	149.4	74.22	0.5927	21.40	456.0	0.903	0.584	8.466	117.1	103.6
WDS149	1558	182	CO1B	3.440	31.81	0.2795	25.60	6.134	2.575	1.979	63.24	32.001	423.0	4.193	1.482	59096.3	4.626	158.7	64.97	0.5879	20.42	505.6	1.087	0.695	8.979	113.1	125.7
WDS150	1612	182	CO1A	2.419	28.61	0.2712	26.27	5.777	2.395	2.010	57.23	36.782	550.4	3.757	1.465	64752.5	4.464	178.1	60.94	0.4068	22.77	424.8	0.918	0.673	7.610	96.2	105.4
WDS151	1552	182	CO1B	3.211	31.04	0.3418	26.30	6.145	4.133	2.119	60.35	26.599	347.1	5.604	1.401	55135.1	4.549	124.0	92.05	0.5966	20.30	499.4	0.921	0.644	8.903	80.9	134.2
WDS152	1552	182	CO1A	0.000	28.51	0.3099	30.46	5.858	3.429	1.789	54.48	34.624	494.8	4.262	1.405	59261.5	4.519	195.6	64.84	0.3502	21.08	509.8	0.876	0.706	7.281	98.6	116.0
WDS153	1571	182	CO2	2.988	26.95	0.3947	27.11	5.543	2.859	2.193	59.87	28.707	378.5	3.012	1.372	60571.9	4.705	145.7	68.55	0.6368	21.13	351.5	0.999	0.733	9.435	148.5	132.0
WDS154	1414	1	CO1A	1.573	30.67	0.3180	30.47	6.086	3.117	2.226	60.79	34.849	492.7	4.370	1.548	61047.0	5.092	165.2	72.55	0.3293	22.25	458.1	0.966	0.749	8.031	73.4	162.6
WDS155	1243	1	CO1A	2.375	30.18	0.3473	28.07	6.110	2.847	2.116	61.99	34.734	525.9	3.374	1.579	64611.4	4.908	156.6	59.79	0.3870	23.14	413.0	0.948	0.736	7.943	88.5	128.4
WDS156	1238	1	U	1.414	33.19	0.3556	27.21	6.989	6.854	2.276	69.04	39.704	556.6	1.402	1.788	69314.7	4.855	176.1	36.21	0.3433	24.48	629.4	1.066	0.812	8.768	116.0	177.3
WDS157	1332	1	CO1A	1.966	31.38	0.3593	26.64	6.092	2.942	2.167	65.79	36.498	517.2	3.872	1.559	64453.9	4.445	173.7	59.84	0.4812	23.18	449.8	0.973	0.818	8.866	103.1	128.4
WDS158	1374	1	CO1A	2.514	28.78	0.2548	26.47	5.778	3.046	2.046	61.38	38.176	567.8	3.240	1.548	65972.0	4.951	162.5	54.69	0.4637	23.26	876.0	0.977	0.807	7.790	97.4	124.2
WDS159	1428	1	CO1B	2.909	28.90	0.3403	23.40	5.731	2.378	2.056	61.37	30.123	401.7	5.403	1.429	60043.8	4.916	119.6	78.19	0.5730	21.05	290.9	0.971	0.695	8.574	97.2	125.3
WDS160	1376	1	CO1A	2.725	29.24	0.3102	24.16	5.967	2.632	2.185	64.19	33.593	512.7	3.516	1.567	67031.3	5.118	143.4	63.51	0.5580	23.63	632.0	0.993	0.809	8.686	98.8	127.7
WDS161	1271	1	CO1A	2.352	28.79	0.3590	27.86	5.902	2.645	2.129	61.52	35.506	559.8	2.856	1.533	65947.8	5.067	160.7	47.84	0.3333	23.09	349.5	0.958	0.717	8.037	90.0	144.1
WDS162	1361	1	CO2	2.608	29.19	0.3090	27.96	5.841	1.734	2.176	56.69	44.236	765.1	3.117	1.535	61512.6	5.362	219.7	54.80	0.5028	25.37	155.7	0.856	0.749	7.194	97.1	120.6
WDS163	1271	1	U	3.984	32.73	0.4287	28.26	6.566	3.349	2.699	68.78	20.687	271.4	2.041	1.501	56800.2	5.884	74.9	54.38	0.6810	19.74	205.8	1.156	0.929	10.591	88.3	163.0
WDS164	614	63	U	2.575	29.24	0.3527	26.13	5.684	2.956	1.989	62.21	30.863	408.3	5.993	1.399	58916.1	4.438	141.1	82.14	0.6441	21.41	511.1	0.932	0.697	8.734	113.3	118.7
WDS165	621	63	CO1B	2.321	30.54	0.3659	24.96	5.826	3.192	2.278	63.07	26.726	336.5	5.151	1.404	57112.6	4.489	117.9	78.22	0.6100	20.01	526.4	0.973	0.789	8.697	92.1	120.3
WDS166	615	63	CO1B	2.363	30.28	0.3622	27.08	5.850	2.606	2.110	63.03	27.997	380.1	5.296	1.423	57931.0	4.375	141.4	75.92	0.6880	20.39	528.9	0.913	0.825	8.847	106.2	142.1
WDS167	613	63	CO1A	1.726	29.18	0.2826	27.12	5.829	2.802	2.310	60.63	34.061	484.2	4.126	1.484	61842.5	4.261	163.5	80.52	0.5008	22.52	486.5	0.912	0.752	8.139	73.9	115.5

anid	bag	site	subgroup	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr
WDS168	621	63	U	14.463	49.53	0.5581	45.07	8.856	3.333	4.515	112.07	22.230	89.0	9.938	1.750	50292.5	7.142	52.2	175.57	1.0763	18.09	45.9	1.491	1.260	14.693	90.0	177.4
WDS169	1587	2	CO1B	3.040	30.69	0.3640	29.65	6.098	2.922	2.363	63.27	28.942	404.8	3.595	1.492	58712.1	4.863	127.5	57.44	0.3989	21.18	412.6	0.943	0.805	8.343	89.2	157.1
WDS170	1587	2	CO1A	1.861	30.49	0.3603	27.66	5.977	3.837	2.123	60.83	29.440	437.5	5.271	1.471	59598.4	4.294	152.4	72.04	0.6271	21.56	465.0	0.895	0.783	8.538	70.6	113.8
WDS171	1590	2	CO1A	1.288	28.91	0.2933	26.36	5.780	2.878	1.970	61.01	35.025	520.4	4.010	1.466	62828.9	4.448	157.9	64.61	0.4582	22.68	457.4	0.936	0.783	7.942	107.0	113.3
WDS172	1588	2	CO1A	2.134	29.59	0.3019	29.50	5.927	2.872	2.164	61.31	34.589	500.9	4.526	1.468	65058.5	4.390	148.0	67.66	0.5202	22.76	488.3	0.931	0.738	7.883	95.2	102.4
WDS173	1588	2	CO2	1.920	34.77	0.3515	33.75	6.847	3.029	2.599	71.70	44.368	599.7	4.004	1.815	68641.8	5.829	235.2	71.79	0.6412	26.25	231.1	1.075	0.926	9.076	103.0	167.2
WDS174	737	82	CO1A	2.610	27.77	0.2739	29.73	6.103	2.495	2.274	58.71	35.885	564.9	3.893	1.597	63884.9	4.778	167.8	55.21	0.4708	22.93	441.7	0.918	0.814	7.407	89.1	162.9
WDS175	724	82	CO1B	4.098	29.46	0.3284	30.27	6.415	2.778	2.238	60.99	31.344	457.3	5.175	1.571	62061.4	4.519	163.1	75.37	0.5814	21.61	387.7	0.958	0.813	8.402	83.3	130.3
WDS176	736	82	CO1A	2.424	29.04	0.3082	25.97	5.779	3.832	2.233	60.36	31.082	415.7	4.354	1.439	59904.6	4.207	134.0	51.55	0.6313	21.46	640.9	0.844	0.737	8.181	104.4	105.7
WDS177	726	82	CO1A	4.006	28.78	0.3091	28.64	5.876	2.339	1.915	59.97	33.432	514.8	4.979	1.488	61911.5	4.652	151.4	72.63	0.5572	22.12	452.5	0.942	0.743	7.930	91.7	136.9
WDS178	731	82	CO1B	3.765	27.32	0.3179	28.11	5.717	3.148	2.117	58.81	25.357	352.9	6.446	1.364	54202.3	5.324	112.6	89.79	0.6032	18.61	401.1	0.986	0.763	8.424	90.8	159.7
WDS179	528	54	CO1A	0.000	32.00	0.3528	27.87	6.501	3.440	2.075	65.30	36.224	421.0	4.961	1.617	62359.8	4.708	170.2	42.62	0.4971	20.25	566.5	0.957	0.834	8.580	88.6	116.9
WDS180	566	56	CO1A	1.881	28.97	0.3332	24.64	5.780	2.633	2.365	62.53	34.931	491.9	5.008	1.403	60757.2	4.358	177.6	45.92	0.5461	21.59	546.8	0.981	0.755	8.854	90.9	143.3
WDS181	468	50	U	3.520	29.88	0.3080	31.26	6.150	2.330	2.251	61.06	34.261	488.8	3.740	1.588	67366.6	4.694	158.6	53.03	0.5586	23.74	304.2	0.977	0.817	8.324	118.5	105.6
WDS182	468	50	U	1.813	27.69	0.2798	25.44	5.484	2.841	2.035	56.83	47.192	718.0	1.767	1.400	66890.7	3.994	284.6	35.14	0.3870	21.58	371.4	0.892	0.687	7.616	88.1	94.2
WDS183	527	54	CO1B	2.348	31.51	0.3924	32.35	6.282	3.555	2.327	64.58	30.782	401.1	2.465	1.550	60751.3	4.950	149.6	54.24	0.5457	20.87	501.9	0.949	0.702	8.751	64.8	156.8
WDS184	1030	124	CO3	3.024	40.87	0.4878	39.45	7.765	3.273	3.466	74.90	19.455	147.6	5.253	1.910	39689.8	7.192	39.0	90.50	0.6755	21.27	135.7	1.041	1.078	8.967	137.6	203.4
WDS185	1030	124	CO3	5.351	40.37	0.4884	35.00	7.621	2.375	3.429	74.94	21.583	157.7	5.046	1.905	40423.5	6.938	50.2	89.15	0.6599	22.34	123.9	0.972	1.005	8.507	112.2	192.6
WDS186	1030	124	CO1B	1.813	32.39	0.3728	33.08	6.672	3.436	2.415	64.68	25.765	328.1	4.663	1.595	57946.3	4.632	111.8	72.21	0.7217	20.94	562.8	0.976	0.795	9.485	94.0	115.8
WDS187	1030	124	CO1B	2.243	30.45	0.3409	29.82	6.099	3.202	2.364	62.78	28.971	396.5	5.225	1.500	61933.1	4.576	130.9	77.81	0.6873	21.29	473.8	0.970	0.786	9.020	103.9	117.9
WDS188	1049	124	CO1A	1.664	29.09	0.3408	24.96	5.978	3.311	2.134	61.42	33.402	441.5	4.890	1.430	60627.1	4.371	161.1	66.84	0.6125	21.10	493.8	0.983	0.797	8.726	79.6	130.9
WDS189	365	24	CO2	3.221	31.22	0.4206	31.55	6.243	1.857	2.665	60.38	37.539	487.3	3.348	1.594	54776.9	7.586	202.0	62.37	0.4934	21.25	152.3	0.971	0.835	7.388	96.6	189.6
WDS190	276	24	CO1A	1.749	27.38	0.2562	23.76	5.505	2.135	1.814	56.39	38.826	575.4	4.199	1.448	66807.9	4.153	222.1	61.13	0.4332	23.08	497.6	0.922	0.739	7.311	85.4	112.6
WDS191	276	24	CO1B	1.767	29.36	0.3088	27.64	5.983	3.792	2.187	61.23	25.936	343.4	6.112	1.379	55763.3	5.444	101.0	83.03	0.5879	19.16	371.5	0.977	0.742	8.676	86.9	165.9
WDS192	286	24	CO2	3.225	29.51	0.3226	28.13	5.390	3.124	2.176	64.31	25.079	350.2	4.056	1.347	52683.6	7.291	110.3	74.21	0.4422	20.78	280.6	1.010	0.618	8.562	89.4	203.7
WDS193	258	24	CO1A	1.939	29.82	0.2965	29.89	6.038	2.360	2.013	59.68	34.320	499.6	5.411	1.528	64457.6	4.496	166.7	72.92	0.5592	21.93	411.5	0.936	0.787	7.896	91.6	110.7
WDS194	799	89	CO1A	0.000	28.83	0.2817	30.23	6.072	3.125	2.075	57.48	35.782	498.9	5.201	1.560	60756.1	4.067	182.3	65.92	0.4753	22.10	558.9	0.874	0.824	7.730	105.6	125.6
WDS195	799	89	U	1.975	32.74	0.4458	33.11	6.858	3.989	2.637	92.06	28.075	326.7	4.459	1.692	55636.0	5.753	122.8	70.00	0.5283	22.84	283.7	1.073	0.836	9.369	83.7	135.9
WDS196	799	89	CO1A	2.081	30.06	0.3037	30.98	6.070	1.729	2.122	60.67	33.861	508.5	4.824	1.531	62201.1	4.427	193.2	61.77	0.4704	22.41	446.3	0.903	0.816	8.061	90.4	102.8
WDS197	799	89	CO2	0.000	35.32	0.3319	38.38	6.502	2.120	2.505	67.38	41.069	548.7	3.647	1.667	58483.4	6.147	235.1	60.58	0.4524	22.08	220.1	0.957	0.859	7.996	98.9	168.4
WDS198	799	89	U	2.465	28.71	0.3649	28.72	6.021	2.646	2.309	60.41	26.841	376.2	3.546	1.417	55879.8	5.065	111.9	56.17	0.4796	19.60	360.3	0.962	0.792	8.343	110.5	131.1
WDS199			GROUP S	1.511	40.67	0.5533	42.69	8.153	3.095	4.308	85.30	19.803	126.8	5.283	1.899	43344.2	9.672	30.0	102.25	1.0745	18.29	77.2	1.303	1.141	10.024	97.3	260.8
WDS200			GROUP S	3.103	33.03	0.4209	33.17	6.429	2.400	2.787	67.52	21.969	63.4	3.926	1.477	30322.7	7.743	29.5	79.19	0.7002	12.21	76.5	0.901	0.828	7.142	80.2	186.4
WDS201			GROUP S	2.364	32.81	0.3717	34.13	6.471	2.829	2.559	67.38	15.523	62.5	3.907	1.414	21517.0	9.311	19.0	85.09	0.6318	12.22	64.6	1.020	0.831	7.310	71.3	241.8
WDS202			GROUP C	4.453	26.81	0.3766	23.13	5.276	3.061	2.255	54.04	11.174	76.1	8.970	1.030	35325.1	4.015	33.1	105.97	0.9895	13.21	511.9	0.768	0.714	7.974	96.6	106.7

NEUTRON ACTIVATION RESULTS (ppm)

Short Count Elements

anid	bag	site	subgroup	Al	Ba	Ca	Dy	K	Mn	Na	Ti	V
WDS001	1130	139	CO1A	82377.6	589.3	72955.6	3.253	12867.9	2388.1	5147.2	3935.6	199.9
WDS002	1131	139	CO1A	77321.6	353.9	60012.6	4.161	14457.4	929.7	8228.7	5358.0	182.4
WDS003	1131	139	CO1A	79028.2	436.2	66866.3	4.249	16391.4	843.6	7414.6	5070.6	188.5
WDS004	1140	139	CO1	73584.8	378.3	63084.1	3.342	16877.0	727.3	8458.2	5495.0	193.2
WDS005	1108	139	CO1A	78048.5	509.7	50407.2	4.300	16602.8	904.0	11166.4	6653.9	173.5
WDS006	162	31	CO2	86824.3	402.5	22925.7	5.054	15442.1	620.0	3600.4	5957.1	155.2
WDS007	193	33	CO1	83776.4	555.2	61947.2	3.899	15287.2	827.6	10039.2	6711.1	175.1
WDS008	165	31	U	89898.8	388.4	27064.3	1.186	5379.5	2592.8	17803.0	5513.7	104.4
WDS009	151	10	CO1	79640.6	489.1	70593.8	3.594	15765.3	952.1	7195.2	5508.8	195.8
WDS010	128	9	U	87897.3	765.3	61996.3	4.956	18427.6	828.1	7842.4	5573.7	163.1
WDS011	1181	147	CO1	75589.1	484.6	53146.4	4.133	13479.0	906.1	8772.5	6674.5	191.8
WDS012	1181	147	CO1A	79311.1	444.1	52504.8	4.205	14363.2	937.0	9050.2	5928.6	169.4
WDS013	1180	147	CO1	78982.2	419.9	77060.9	3.820	12595.9	884.7	8922.5	5240.6	204.8
WDS014	1191	147	CO1	78333.0	556.1	83302.5	3.912	16026.5	915.2	8086.9	5250.9	199.8
WDS015	1191	147	CO1A	80346.3	541.0	56044.1	3.995	18945.8	988.0	6561.5	5363.7	166.8
WDS016	932	111	CO1	76358.0	319.2	67514.5	3.718	15042.3	943.9	9413.2	6458.4	221.8
WDS017	940	110	CO1	78387.6	502.0	48167.0	3.534	14056.3	1034.7	7785.0	6157.4	217.0
WDS018	925	110	U	77577.7	545.9	51071.0	4.622	16228.3	762.5	7692.5	5318.8	148.1
WDS019	940	110	CO1	78443.5	650.2	76977.3	3.698	14649.8	887.3	7938.7	6009.3	192.8
WDS020	925	110	U	73123.7	449.2	55201.2	4.433	14949.8	896.8	8515.9	6096.9	174.1
WDS021	848	97	CO1	76433.6	482.4	68814.1	3.727	15959.6	961.2	9319.1	5873.2	208.6
WDS022	848	97	CO1A	77924.7	473.2	64907.3	4.097	15738.6	926.3	8274.3	6671.6	179.6
WDS023	850	97	CO1A	79690.2	385.9	72930.3	4.189	15213.5	734.3	7811.4	5523.9	172.4
WDS024	850	97	CO1	78565.3	294.1	73178.5	4.089	14519.3	952.3	9419.2	5669.9	224.1
WDS025	850	97	CO1A	83106.9	666.3	63670.0	3.954	15982.8	700.9	8500.4	6244.1	174.2
WDS026	344	16	CO1A	80111.2	551.0	69720.3	4.167	18783.6	672.9	7430.5	5116.3	180.1
WDS027	299	16	CO1	76235.1	382.4	68320.6	3.841	12075.8	950.4	10659.7	6052.0	216.5
WDS028	302	17	CO1	76816.4	321.9	54204.7	3.810	14064.5	978.2	9022.5	5844.1	205.8
WDS029	328	17	CO2	74518.4	634.4	35239.7	3.930	15787.0	775.3	7006.5	5456.4	167.0
WDS030	327	16	CO1A	83815.1	510.2	70580.1	4.263	20352.2	574.7	6020.1	4735.9	167.6
WDS031	1493	161	CO1	81631.6	238.4	58803.1	4.133	13481.2	1029.5	8951.5	5774.2	202.5
WDS032	1438	161	CO1	82801.1	340.5	75804.4	3.189	9169.1	834.9	9425.2	4537.9	198.0
WDS033	1610	162	U	75128.3	338.1	79632.0	3.997	19370.0	557.0	7156.9	5526.8	179.3
WDS034	1424	156	CO3	150200.3	533.8	11134.5	5.112	18166.1	191.2	2151.7	4454.5	120.3
WDS035	1466	164	U	86674.5	277.6	56712.0	4.041	7834.2	913.8	6275.6	4899.6	167.8
WDS036	1164	143	CO1A	74804.0	451.6	68912.8	3.705	14591.7	802.3	8983.3	5118.0	169.7
WDS037	1164	143	CO1A	85639.4	885.9	85526.3	4.258	21754.4	742.1	6930.4	5035.8	147.8
WDS038	1160	143	CO1A	79930.5	449.4	58515.4	3.610	16520.1	830.3	9526.9	5651.1	173.1
WDS039	1160	143	CO1A	83489.4	741.7	61985.9	4.452	15519.5	704.0	6896.0	5372.8	139.7
WDS040	1160	143	CO1A	79387.7	515.8	65638.0	3.916	14814.7	792.9	9089.6	5086.5	163.6

anid	bag	site	subgroup	Al	Ba	Ca	Dy	K	Mn	Na	Ti	V
WDS041	1207	152	U	82979.3	358.7	37379.8	3.880	8217.0	928.4	7354.1	6129.1	176.3
WDS042	1207	152	CO2	66700.8	331.6	33615.0	4.158	8980.0	866.5	5339.6	5849.7	187.0
WDS043	1207	152	CO2	73865.6	376.8	29917.2	3.999	10236.3	838.4	9556.5	7155.0	207.1
WDS044	1207	152	CO2	75466.6	436.8	23456.7	4.380	13942.8	697.0	10357.2	6446.3	171.7
WDS045	1207	152	CO1A	82744.0	312.2	44851.1	4.668	7788.2	987.7	6791.2	7074.5	188.2
WDS046	486	51	U	81985.6	327.8	67752.6	4.088	11637.6	793.6	6904.6	5054.6	184.4
WDS047	508	51	CO1	75707.6	443.6	51057.9	4.029	17422.3	750.8	8483.6	5336.6	171.2
WDS048	487	51	CO1A	77181.9	462.5	70068.7	3.839	11731.2	934.4	7332.2	5118.7	193.5
WDS049	484	51	U	81516.4	545.3	53803.1	3.906	10470.1	777.6	7619.2	5428.0	177.8
WDS050	506	51	CO2	93269.6	616.7	11951.6	5.166	17860.5	1337.3	3832.8	7500.3	171.2
WDS051	1577	182	CO1	76082.5	530.9	63936.6	3.201	14181.1	1125.0	8290.1	5478.6	166.0
WDS052	1558	182	CO1	78730.9	355.7	66733.5	3.295	15243.1	933.5	9637.9	6025.9	195.8
WDS053	1552	182	U	81402.6	326.5	39465.9	3.965	10219.5	1021.1	7956.3	6137.8	168.8
WDS054	1552	182	CO1	71218.9	255.9	80113.8	3.965	11440.6	988.9	10301.2	5847.2	215.3
WDS055	1571	182	CO1	80170.2	275.3	94205.3	3.671	12533.4	793.3	9335.7	5212.9	186.5
WDS056	1238	1	CO1	83377.0	342.9	74972.3	3.671	12809.6	850.6	8227.2	6171.9	193.3
WDS057	1331	1	CO1	73023.6	396.1	50699.9	3.900	14253.7	886.0	8773.7	6010.1	173.2
WDS058	1332	1	CO1	81084.1	288.1	51415.7	3.991	14542.8	884.4	8535.6	6520.6	173.6
WDS059	1235	1	CO1	82466.0	373.2	56775.2	3.853	14758.6	866.7	8990.0	5802.6	186.9
WDS060	1414	1	U	79881.9	294.7	89926.2	3.332	10581.8	875.0	9814.5	5871.8	194.7
WDS061	1376	1	U	76957.5	536.3	45503.2	4.718	14480.4	738.3	8929.6	5480.4	145.5
WDS062	1243	1	CO1	80365.4	321.8	48306.7	3.507	11465.2	895.8	8150.3	6481.7	178.2
WDS063	1360	1	U	92226.3	434.2	62166.8	4.460	19266.3	723.7	3811.6	5393.6	136.5
WDS064	1374	1	CO1	84646.6	289.3	53786.0	4.139	14887.4	927.2	9261.2	5883.5	215.9
WDS065	1361	1	CO1	80352.0	386.2	52297.7	3.559	12003.0	908.8	8631.7	7359.6	197.6
WDS066	621	63	CO1	78926.4	431.3	69045.4	3.491	14550.7	974.2	8352.4	5557.4	209.4
WDS067	613	63	U	85594.9	372.3	70170.4	4.220	18992.3	787.0	7627.3	4677.8	168.5
WDS068	614	63	CO1A	81405.8	364.3	58687.3	3.719	14213.5	891.9	8546.6	6131.2	183.5
WDS069	615	63	CO1	78817.9	296.9	59434.7	3.427	13464.7	1025.4	9201.7	6546.3	178.5
WDS070	621	63	U	86037.8	502.5	78416.4	4.354	20629.1	624.2	5920.0	4698.1	171.1
WDS071	1590	2	CO1	76253.0	606.1	66244.7	4.243	15091.7	851.6	8479.4	6150.6	191.1
WDS072	1587	2	CO1A	80320.8	487.4	51674.9	4.043	18457.6	846.8	8630.6	5620.7	165.3
WDS073	1588	2	CO1	86330.1	610.6	69815.7	4.279	13645.1	906.1	7769.5	6029.3	195.7
WDS074	1588	2	CO1A	78789.7	358.9	47754.7	4.277	16218.6	821.3	8362.7	5668.6	161.2
WDS075	1588	2	CO2	83274.9	621.4	23715.4	4.914	17343.7	688.6	7119.9	5728.9	155.9
WDS076	724	82	CO1	81951.6	867.9	77976.1	3.908	13734.3	992.7	8949.2	5511.5	191.7
WDS077	736	82	CO1A	87046.6	464.3	55264.1	4.583	14488.2	825.3	8017.1	5832.3	190.1
WDS078	726	82	CO1	76933.1	308.8	56501.7	3.888	16706.5	961.1	9129.1	6565.6	191.2
WDS079	737	82	CO1A	85674.4	1053.8	67945.5	4.613	17383.2	790.2	5226.3	5018.7	151.9
WDS080	725	82	U	83538.3	614.9	39691.9	4.475	17782.4	777.1	8048.0	5833.4	148.8
WDS081	527	54	U	79699.7	481.4	88974.3	3.870	10117.8	797.9	9550.0	4774.7	150.3
WDS082	468	50	CO1	78424.7	326.8	52791.5	3.652	13672.8	781.5	6851.6	5396.5	166.1
WDS083	566	56	CO1	78954.5	534.9	65929.0	3.572	15642.6	990.4	7398.3	6876.3	188.8

anid	bag	site	subgroup	Al	Ba	Ca	Dy	K	Mn	Na	Ti	V
WDS084	528	54	CO2	96453.3	448.4	20042.2	5.116	13446.9	625.6	4858.7	6792.6	158.0
WDS085	566	56	CO1	79669.6	437.2	58367.0	3.918	15294.0	1094.6	9214.0	6425.2	191.7
WDS086	1030	124	CO1A	80502.7	506.5	68270.8	3.747	16569.4	730.6	6151.5	5373.9	155.4
WDS087	1030	124	CO1A	92535.8	637.9	69767.3	4.098	19082.1	731.4	7279.8	5576.2	173.3
WDS088	1049	124	CO1A	83589.9	850.2	72433.2	4.148	12687.8	789.7	8718.6	5145.0	191.8
WDS089	1049	124	U	72900.1	382.3	63294.5	3.142	11878.4	1267.6	6920.1	6295.8	179.2
WDS090	1030	124	CO1A	83515.0	564.5	58523.8	4.251	14813.6	952.3	7903.0	5674.9	194.1
WDS091	814	24	CO1	77808.4	272.5	71059.5	3.953	13480.9	976.1	7879.5	5736.9	187.0
WDS092	365	24	CO1A	78826.9	426.6	49414.5	4.191	18334.1	872.1	8390.9	5890.9	154.4
WDS093	276	24	CO1A	77110.3	630.0	57510.2	4.120	15797.0	822.7	7974.7	5940.9	182.1
WDS094	262	24	CO1	78404.4	379.2	73206.0	3.711	15456.3	809.8	10058.2	5986.2	199.8
WDS095	288	24	CO2	85435.2	561.3	21260.2	3.132	12172.8	806.8	7225.2	7625.1	217.0
WDS096	788	89	U	79663.6	320.4	97014.4	4.170	18263.4	698.8	8733.3	5443.4	173.5
WDS097	800	89	CO1	78140.5	667.3	72156.4	3.759	13005.7	827.1	6093.4	5491.7	186.7
WDS098	784	89	CO1	79280.2	428.7	71052.4	3.991	14881.5	856.8	7982.3	5745.6	218.9
WDS099	799	89	CO2	82015.1	572.5	19140.4	4.766	17808.5	663.0	4152.3	6210.2	153.3
WDS100	799	89	CO1	78469.4	613.8	77872.6	3.473	15606.9	831.1	7807.1	5227.7	185.5
WDS101	1140	139	U	77928.6	491.0	37377.8	3.600	16002.3	1003.8	8735.7	6522.5	177.5
WDS102	1135	139	CO1	79559.0	343.8	91717.3	4.100	19558.1	817.1	6589.7	5617.2	189.7
WDS103	1135	139	CO1	76683.2	572.3	55210.3	3.741	10972.5	893.5	8160.2	5840.1	161.8
WDS104	1131	139	CO1	70233.9	455.4	53723.3	3.966	14523.1	688.0	7894.6	5026.1	150.5
WDS105	1108	139	U	76245.9	386.9	61887.2	4.397	12121.6	1152.1	8210.7	5632.2	179.7
WDS106	165	31	CO1A	79136.0	637.1	50969.9	4.214	13893.0	873.1	9086.7	6514.4	167.6
WDS107	194	23	CO1	80164.8	345.6	71574.1	3.442	11409.9	898.1	10422.1	5674.3	196.2
WDS108	128	9	CO1	79969.0	563.9	65601.0	4.011	12693.0	975.5	9566.6	5653.0	211.2
WDS109	162	31	CO2	79189.2	378.9	21739.7	4.712	11340.3	386.9	4373.1	5573.8	180.7
WDS110	182	23	CO1	81890.9	474.6	76421.0	3.684	13107.7	657.2	7829.3	5130.8	172.7
WDS111	1191	147	CO1A	84438.5	426.4	58569.8	3.974	16644.7	851.1	9068.0	5978.9	191.1
WDS112	1180	147	CO1	73498.3	424.9	55055.1	3.560	15146.9	1191.0	9155.7	5927.1	165.8
WDS113	1181	147	CO1A	77497.6	394.3	56447.3	4.198	19716.1	873.0	7988.1	5231.2	175.7
WDS114	1181	147	CO1A	81990.9	470.8	56672.4	4.419	17903.7	718.3	7837.6	5444.2	152.1
WDS115	1181	147	CO1	72660.4	479.5	64798.1	3.981	13480.6	954.9	6797.2	5385.7	194.6
WDS116	295	110	CO1A	78233.6	549.7	56115.6	4.038	14129.1	810.0	7809.1	6259.8	164.5
WDS117	295	110	CO1A	76749.3	648.7	55851.2	4.166	11906.2	831.5	8494.2	4869.3	177.2
WDS118	940	110	U	84340.2	453.6	80561.2	4.092	16611.9	980.5	9269.6	5763.0	209.9
WDS119	940	110	CO1A	71363.4	605.7	55647.4	3.802	16281.2	800.1	9543.2	5611.1	154.0
WDS120	932	111	CO1	79133.5	438.3	64822.9	4.189	12312.4	910.0	8006.2	6100.2	202.2
WDS121	848	97	CO1	77150.1	297.0	73583.5	3.751	14566.1	979.1	10005.1	6560.3	213.4
WDS122	848	97	CO1A	83389.7	388.1	53940.5	4.145	15490.3	769.4	7896.9	5447.1	167.2
WDS123	850	97	CO2	95718.8	525.7	23286.4	4.841	14314.7	686.9	4329.7	6588.1	175.4
WDS124	850	97	CO1	76234.3	374.9	67234.1	4.015	15192.2	950.9	9473.7	5915.5	214.0
WDS125	850	97	CO1	82599.6	338.1	56682.5	4.129	10983.2	908.6	8629.3	5965.2	202.9
WDS126	302	17	CO1A	80431.9	325.8	75885.6	3.703	23067.1	796.5	7767.7	5472.3	173.9

anid	bag	site	subgroup	Al	Ba	Ca	Dy	K	Mn	Na	Ti	V
WDS127	302	17	CO1	80451.0	487.9	58187.3	3.422	16130.5	858.4	8854.3	5755.9	171.2
WDS128	331	17	CO1A	82088.0	410.7	67186.1	4.049	15610.9	943.1	4737.0	4525.8	161.5
WDS129	331	17	CO1	77821.8	414.2	75967.2	3.618	14904.4	801.8	8815.5	5725.2	197.6
WDS130	312	17	CO1	76852.7	393.1	65039.9	3.608	15907.2	988.3	9391.7	6102.5	217.4
WDS131	1438	161	CO1A	86221.1	320.1	63090.9	3.828	14751.0	750.6	5424.3	5446.7	138.0
WDS132	1438	161	CO1	82803.5	264.1	66907.1	3.596	10579.3	1070.2	9703.1	6086.9	203.7
WDS133	1493	161	CO1	77024.7	231.2	56589.8	3.821	15451.4	1027.3	9411.3	5251.6	187.0
WDS134	1466	164	CO1A	88793.4	323.8	68576.5	4.086	14358.0	905.9	6122.9	5767.4	159.8
WDS135	1610	162	CO1	77064.2	437.5	52990.0	3.817	12686.6	1012.5	9927.2	6493.1	200.8
WDS136	1164	143	CO1	85172.4	815.0	69386.0	4.494	13281.7	959.6	7120.0	4691.0	163.0
WDS137	1164	143	U	82712.3	920.5	45225.3	4.127	15572.5	762.1	6568.6	5723.0	142.0
WDS138	1160	143	CO1	74989.9	492.5	60647.1	4.236	12107.7	995.0	9288.7	6226.7	194.5
WDS139	1160	143	CO1A	80384.2	521.6	57170.5	4.476	15846.7	672.6	8061.6	5347.4	165.9
WDS140	1160	143	CO1	87950.6	684.6	68993.0	3.715	12380.4	947.7	6307.1	6269.6	169.0
WDS141	1207	152	CO1A	76828.3	863.9	47203.9	4.171	14555.2	699.6	7205.6	5145.8	167.4
WDS142	1207	152	CO2	82411.2	480.6	26100.4	4.647	12575.6	804.8	8274.7	7087.5	194.4
WDS143	1207	152	U	77172.3	693.1	54725.3	4.229	9142.9	827.2	6193.9	6117.3	208.7
WDS144	506	51	CO1	82790.0	689.6	70545.2	3.389	11698.6	951.4	7234.5	5314.6	189.0
WDS145	484	51	U	78743.9	757.9	86020.0	3.492	16972.3	803.1	6997.2	5241.6	188.7
WDS146	484	51	CO1	78526.3	422.2	73687.5	3.985	11011.6	813.8	7459.1	5853.5	196.3
WDS147	487	51	CO1	77748.9	701.7	63773.0	4.054	12640.6	987.9	10702.1	6378.4	194.3
WDS148	487	51	CO1	80131.9	459.5	69230.1	3.806	14753.4	841.2	6795.2	5341.5	159.6
WDS149	1558	182	CO1A	83888.8	567.4	69581.7	4.205	13768.9	861.7	6940.3	6063.9	163.8
WDS150	1612	182	CO1	81706.3	292.9	57845.9	4.066	13496.7	964.2	9719.4	6811.9	210.8
WDS151	1552	182	CO1A	86983.1	528.6	84443.6	4.105	14386.0	799.6	6974.6	5881.2	180.2
WDS152	1552	182	CO1	75918.5	341.2	88468.7	3.607	14056.1	894.8	10031.8	6098.8	195.3
WDS153	1571	182	CO2	92242.5	562.1	30549.5	4.042	15005.0	915.0	5774.2	5635.1	181.4
WDS154	1414	1	CO1	77283.8	555.5	54778.2	4.196	13426.6	886.9	8015.8	5986.4	166.9
WDS155	1243	1	CO1	84609.0	463.9	53890.3	3.611	12266.7	970.4	8353.5	6750.6	210.3
WDS156	1238	1	U	88920.6	1072.4	48606.4	4.697	9809.4	965.6	7517.7	7021.5	196.2
WDS157	1332	1	CO1	85303.3	280.0	63880.4	4.108	15296.0	1052.5	6566.1	5693.8	209.4
WDS158	1374	1	CO1	85690.7	435.5	52495.4	4.159	11818.2	1009.2	8860.9	7305.6	187.0
WDS159	1428	1	CO1A	81589.9	309.3	59047.9	3.805	15652.3	846.0	8427.8	5567.3	187.4
WDS160	1376	1	CO1	86434.6	399.6	45645.6	3.837	14185.7	861.1	8173.6	5904.5	179.3
WDS161	1271	1	CO1	81904.9	274.2	52546.6	3.782	10036.4	953.3	9408.1	5917.7	217.4
WDS162	1361	1	CO2	86491.0	436.0	27930.6	4.033	12787.0	800.0	4427.5	6039.3	175.7
WDS163	1271	1	U	95689.0	366.4	43746.4	4.950	13435.8	633.9	4590.8	5808.5	166.1
WDS164	614	63	U	84243.9	480.2	75592.6	3.527	17434.7	903.0	7335.0	5309.7	166.1
WDS165	621	63	CO1A	86307.4	546.4	72271.8	4.128	18879.3	864.7	6328.8	4993.5	156.6
WDS166	615	63	CO1A	78897.5	625.1	78229.5	4.278	16500.6	773.4	6625.2	5217.2	174.4
WDS167	613	63	CO1	77515.3	495.5	83483.5	4.078	10834.3	983.4	9307.8	5915.5	240.0
WDS168	621	63	U	80419.2	435.5	79142.0	4.078	16021.2	915.9	8213.3	5726.3	198.6
WDS169	1587	2	CO1A	87550.4	534.6	53282.6	4.198	15224.8	680.0	7223.0	5814.3	186.6

anid	bag	site	subgroup	Al	Ba	Ca	Dy	K	Mn	Na	Ti	V
WDS170	1587	2	CO1	80650.8	605.1	72119.8	3.911	13714.8	713.8	7581.8	5349.3	190.6
WDS171	1590	2	CO1	82736.7	462.4	65621.8	4.110	13269.3	869.8	7893.5	5891.8	189.6
WDS172	1588	2	CO1	78618.3	437.7	70017.8	3.443	14289.4	903.0	9309.3	5350.8	185.1
WDS173	1588	2	CO2	89020.6	488.0	23902.3	4.648	11145.7	837.0	6883.2	6800.6	223.4
WDS174	737	82	CO1	80135.1	690.7	68915.3	4.062	15924.0	927.2	9467.0	6044.0	175.3
WDS175	724	82	CO1A	82692.7	409.0	65666.7	4.508	16040.8	839.9	9840.8	5466.8	201.6
WDS176	736	82	CO1	79569.3	366.9	99995.8	3.054	11851.7	857.5	9240.2	5296.9	201.9
WDS177	726	82	CO1	76184.4	393.0	65101.9	3.125	15059.9	830.1	8560.3	5487.0	169.4
WDS178	731	82	CO1A	75967.7	420.1	55262.6	3.813	16943.6	746.9	8771.4	5169.6	158.1
WDS179	528	54	CO1	77757.1	561.1	78218.4	3.738	11866.7	870.6	10186.2	5843.6	203.3
WDS180	566	56	CO1	76681.5	244.6	84761.1	3.480	9258.1	1025.0	8240.6	4603.3	216.3
WDS181	468	50	U	83814.9	327.7	66131.9	4.040	14438.0	897.3	7836.9	5683.9	177.2
WDS182	468	50	U	74164.5	325.4	59927.3	3.285	10046.4	1081.1	5648.4	4944.3	170.5
WDS183	527	54	CO1A	79975.3	707.7	62961.7	3.415	11812.9	782.6	5460.6	5502.6	186.9
WDS184	1030	124	CO3	108674.5	538.2	16864.2	5.938	23435.7	536.9	3838.3	6120.2	130.3
WDS185	1030	124	CO3	105977.3	453.6	16670.7	5.681	20046.0	584.1	4122.0	5775.4	135.8
WDS186	1030	124	CO1A	86565.4	820.8	75041.7	4.118	16950.5	853.8	6906.4	4835.3	162.7
WDS187	1030	124	CO1A	79243.0	528.4	71111.4	3.706	17216.8	759.7	6497.6	5901.5	163.9
WDS188	1049	124	CO1	83530.7	285.0	69836.7	4.109	11515.2	981.2	7729.5	5960.1	193.2
WDS189	365	24	CO2	80546.9	424.8	20934.9	4.223	12463.8	831.0	4227.8	6136.5	141.6
WDS190	276	24	CO1	77565.3	455.1	70425.4	3.626	13779.8	989.6	9985.3	6461.8	210.1
WDS191	276	24	CO1A	77493.8	555.9	51896.9	3.681	18811.0	745.2	8401.6	5154.1	162.5
WDS192	286	24	CO2	95201.7	487.1	24323.1	3.996	22303.6	556.1	6471.8	5972.7	171.5
WDS193	258	24	CO1	80701.4	360.8	76229.5	3.534	14846.0	856.2	9499.8	5620.9	210.8
WDS194	799	89	CO1	77317.9	376.9	84738.4	3.731	13712.2	959.6	8999.1	5195.7	215.7
WDS195	799	89	U	89440.8	579.5	51086.7	4.167	13071.2	652.0	6315.1	6633.0	185.1
WDS196	799	89	CO1	78424.7	554.2	76325.5	3.532	17777.5	888.0	8541.5	5605.7	209.4
WDS197	799	89	CO2	82782.6	363.8	28014.0	4.274	15849.2	1043.8	6457.0	5913.5	158.2
WDS198	799	89	U	82783.3	714.3	46650.3	3.857	14871.4	837.3	8326.5	5496.3	174.4
WDS199			GROUP S	85715.8	684.6	6483.2	6.448	21049.9	468.3	6572.2	7662.6	152.0
WDS200			GROUP S	74451.8	412.7	3956.7	4.137	19118.7	1099.5	6073.1	4294.9	91.8
WDS201			GROUP S	70887.3	551.0	4124.5	3.953	17508.8	239.6	6795.2	5224.7	91.7
WDS202			GROUP C	68034.4	294.2	137207.2	3.360	18747.3	556.6	5076.3	2721.4	128.9

REFERENCES CITED

Algaze, G.

1993 Expansionary Dynamics of Some Early Pristine States. *American Anthropologist* 95(2):304-333.

Anderson, D. G.

1994 *Savanah River Chiefdoms*. University of Alabama Press, Tuscaloosa.

Andrle, R. F.

1964 A Biogeographical Investigation of the Sierra de los Tuxtla in Veracruz, Mexico. Unpublished Ph.D. dissertation, Department of Geography and Anthropology, Lousiana State University.

Angulo, J. V. and K. G. Hirth

1981 Presencia teotihuacana en Morelos. In *Interacción cultural en Mexico central*, pp. 81-97. México, D.F. : Universidad Nacional Autónoma de México.

Ángulo Villaseñor, J.

2004 Discrepancias en la Cronolgía de las Volutas Entrelazadas (Qué Fue Primero, el Huevo o la Gallina?). In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 141-164. Universidad Nacional Autónoma de México, Mexico City.

Anschuetz, K. F., R. H. Wilshusen and C. L. Scheick

2001 An Archaeology of Landscape: Perspectives and Directions. *Journal of Archaeological Research* 9(2):157-211.

Appadurai, A.

1986 *The Social life of things : commodities in cultural perspective*. Cambridge University Press, Cambridge; New York.

1996 *Modernity at large : cultural dimensions of globalization*. Public worlds v. 1. University of Minnesota Press, Minneapolis.

2001 *Globalization*. Duke University Press.

Arnold, J. E.

1993 Labor and the rise of complex hunter-gatherers. *Journal of Anthropological Archaeology* 12:75-119.

Arnold, J. E. and A. Munns

1994 Independent or attached specialization: the organization of shell bead production in California. *Journal of Field Archaeology* 21:473-489.

Arnold, P. J., III

1987 The Household Potters of Los Tuxtlas: An Ethnoarchaeological Study of Ceramic Production and Site Structure, Department of Anthropology, University of New Mexico, Albuquerque.

1988 Household ceramic assemblage attributes in the Sierra de los Tuxtlas, Veracruz, Mexico. *Journal of Anthropological Research* 44(4):357-383.

1991 *Domestic Ceramic Production and Spatial Organization: A Mexican Case Study in Ethnoarchaeology*. Cambridge University Press, Cambridge.

1999 Tecomates, Residential Mobility, and Early Formative Occupation in Coastal Lowland Mesoamerica. In *Pottery and People: A Dynamic Interaction*, edited by J. M. Skibo and G. M. Feinman, pp. 157-170. University of Utah Press, Salt Lake City.

2003 Early Formative Pottery from the Tuxtla Mountains and Implications for Gulf Olmec Origins. *Latin American Antiquity* 14(1):29-46.

2007 *Isla Agaltepec: Ocupaciones Posclásicas en la Sierra de los Tuxtlas, Veracruz, México Reporte Final del Proyecto Arqueológico de la Isla Agaltepec*. Instituto Nacional de Antropología e Historia.

Arnold, P. J., III, C. A. Pool, R. R. Kneebone and R. S. Santley

1993 Intensive Ceramic Production and Classic-Period Political Economy in the Sierra de los Tuxtlas, Veracruz, Mexico. *Ancient Mesoamerica* 4:175-191.

Arnold, P. J., III and B. L. Stark

1997 Gulf Lowland Settlement in Perspective. In *Olmec to Aztec: Settlement Patterns in the Ancient Gulf Lowlands*, edited by B. L. Stark and P. J. Arnold, III, pp. 310-329. The University of Arizona Press, Tucson.

Arnold, P. J. III and M. L. Venter

2004 Postclassic occupation at Isla Agaltepec, southern Veracruz, Mexico. *Mexicon* 26(6):121-126.

Arnold, P. J. III. and V. J. McCormack

2002 *En la Sombra del San Martín: Informe Final del Proyecto Arqueológico La Joya*. Instituto Nacional de Antropología e Historia.

Arnold, P. J. III and R. S. Santley

2008 Classic Currents in the West-Central Tuxtlas. In *Classic Period CUltural CUrrents in Southern and Central Veracruz*, edited by P. J. Arnold III and C. A. Pool. Dumbarton Oaks Research Library and Collection, Washington D.C.

Ashmore, W. and B. A. Knapp (editors)
1999 *Archaeologies of Landscape: Contemporary Perspectives*. Blackwell Publishers.

Ashmore, W. and J. A. Sabloff
2002 Spatial Orders in Maya Civic Plans. *Latin American Antiquity* 13(2):201-215.

Ashmore, W. and R. Wilk
1988 Household and Community in the Mesoamerican Past. In *Household and Community in the Mesoamerican Past*, edited by R. Wilk and W. Ashmore, pp. 1-27. University of New Mexico Press, Albequerque.

Baines, J. and N. Yoffee
2000 Order, Legitimacy, and Wealth: Setting the Terms. In *Order, Legitimacy, and Wealth in Ancient States*, edited by J. Richards and M. Van Buren, pp. 13-20. Cambridge University Press.

Barabási, A.-L.
2002 *Linked: The New Science of Networks*. Perseus Publishing, Cambridge.

Barrett, T. P.
2003 Tuxtlas Obsidian: Organization and Change in a Regional Craft Industry. Doctoral Dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Bender, B.
1992 Theorising landscapes, and the prehistoric landscapes of Stonehenge. *Man* 27(4):735-755.

1993 Introduction: Landscape -- Meaning and Action. In *Landscape Politics and Perspective*, edited by B. Bender, pp. 1-17. Berg, Oxford.

2002 Time and landscape. *Current Anthropology* 43(Suppl):S103-S112.

Berlo, J. C.
1984 *Teotihuacan Art Abroad*. British Archaeological Reports.

1989 Early writing in Central Mexico: In Tlapalli before A. D. 1000. In *Mesoamerica after the Decline of Teotihuacan, A.D. 700-900*, pp. 19-47. Dumbarton Oaks Research Library and Collection, Washington D.C.

Bernal, I.
1966 Teotihuacan: Capital de Imperio? *Revista Mexicana de Estudios Antropológicos* 20:95-110.

Bernal, I. and E. Dávalos Hurtado
1952-53 Huastecos, Totonacos y Sus Vecinos. *Revista Mexicana de Estudios Antropológicos* 13(2-3).

Berry, B. J. L.
1961 City Size Distributions and Economic Development. *Economic Development and Culture Change* 9:573-588.

Betancourt, J. L., J. S. Dean and H. M. Hull
1986 Prehistoric long-distance transport of construction beams, Chaco Canyon, New Mexico. *American Antiquity* 51:370-375.

Binford, L. R.
1982 The Archaeology of Place. *Journal of Anthropological Archaeology* 1:5-31.

Blanton, R.
1998 Beyond Centralization: Steps Toward a Theory of Egalitarian Behavior in Archaic States. In *Archaic States*, edited by G. M. Feinman and J. Marcus, pp. 135-172. School of American Research, Santa Fe.

Blanton, R. and G. Feinman
1984 Mesoamerican World System. *American Anthropologist* 86(3):673-682.

Blanton, R., G. M. Feinman, S. A. Kowalewski and L. M. Finsten
1993 *Ancient Mesoamerica: A Comparison of Change in Three Regions*. University of Cambridge, Cambridge.

Blanton, R., G. M. Feinman, S. A. Kowalewski and P. N. Peregrine
1996 A Dual-Processual Theory for the Evolution of Mesoamerican Civilization. *Current Anthropology* 37(1):1-14.

Blanton, R. E.
1996 The Basin of Mexico Market System and the Growth of Empire. In *Aztec Imperial Strategies*, edited by M. E. Smith and F. F. Berdan. Dumbarton Oaks, Washington.

Blitz, J. H.
1993 Big Pots for Big Shots: Feasting and Storage in a Mississippian Community. *American Antiquity* 58(1):80-96.

Blom, F. and O. La Farge
1927 *Tribes and Temples*. Middle American Research Series No. 1. Tulane University, New Orleans.

Borowicz, J.

2003 Images of Power and the Power of Images: Early. Classic Iconographic Programs of the Carved Monuments of Tikal. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. E. Braswell. University of Texas Press, Austin.

Borstein, J. A.

2005 Epiclassic political organization in southern Veracruz, Mexico. Segmentary Versus Centralized Integration. *Ancient Mesoamerica* 16(1):11-21.

Borstein, J. P.

2001 Tripping over Colossal Heads: Settlement Patterns and Population Development in the Upland Olmec Heartland. Ph.D. dissertation, Anthropology, Pennsylvania State University, State College, Pennsylvania.

Bourdieu

1977 *Outline of a Theory of Practice*. Translated by R. Nice. University of Cambridge Press, Cambridge.

Bourdieu, P.

1990 *The Logic of Practice*. Stanford University Press.

Bove, F. J. and S. Medrano Busto

2003 Teotihuacan, Militarism, and Pacific Guatemala. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. Braswell, pp. 45-80. University of Texas Press, Austin.

Braswell, G.

2003(ed.) *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*. University of Texas Press, Austin.

2003a Introduction: Reinterpreting Early Classic Interaction. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. Braswell, pp. 1-43. University of Texas Press, Austin.

2003b Understanding Early Classic Interaction between Kaminaljuyu and Central Mexico. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. Braswell, pp. 105-142. University of Texas Press, Austin.

Brown, K. L.

1977 Valley of Guatemala: A Highland Port of Trade. In *Teotihuacan and Kaminaljuyu: A Study in Prehistoric Culture Contact* , , edited by W. T. Sanders and J. W. Michels, pp. 205-396. Pennsylvania State University Press, University Park.

Brueggemann, J. K.
1993 Problema Cronológico del Tajín. *Arqueología* 9:61-72.

2004 Donde Está la Presencia de Teotihuacan en El Tajin? In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 349-368. Universidad Nacional Autónoma de México, Mexico City.

Brüggemann, J. K. (editor)
1991 *Proyecto Tajín, Tomo II*. Cuaderno de Trabajo 9. INAH, México, D.F.

Brumfiel, E. and T. K. Earle
1987 Specialization, Exchange and Complex Societies: An Introduction. In *Specialization, Exchange and Complex Societies*, edited by E. Brumfiel and T. K. Earle, pp. 1-9. Cambridge University Press, Cambridge.

Brumfiel, E. M.
1994 Ethnic Groups and Political Development in Ancient Mexico. In *Factional Competition and Political Development in the New World*, edited by E. Brumfiel and J. W. Fox, pp. 89-102. Cambridge University Press.

Carrasco, P.
1999 *The Tenochca Empire of Ancient Mexico: The Triple Alliance of Tenochtitlán, Tetzcoco, and Tlacopan*. University of Oklahoma Press, Norman.

Casey, E. S.
2008 Place in Landscape Archaeology: A Western Philosophical Prelude. In *Handbook of Landscape Archaeology*, edited by D. Bruno and J. Thomas, pp. 44-50. Left Coast Press, Inc., Walnut Creek.

Caso, A.
1932 Monte Albán, Richest Archeological Find in America. A tomb in Oaxaca, Mexico, Yields Treasures which Reveal the Splendid Culture of the Mixtecs. *National Geographic Magazine*:487-512.

Caso, A. and I. Bernal
1965 Ceramics of Oaxaca. In *Handbook of Middle American Indians, Volume 3: Archaeology of Southern Mesoamerica, Part 2*, edited by R. Wauchope and G. R. Willey, pp. 871-895. University of Texas Press, Austin.

Ceja Acosta, J.
2007 Análisis de la Distribución de Materiales Cerámicos de El Salado-Ixtahuehue: Algunas Reflexiones Metodológicas Sobre los Procesos de Abandono del Clásico Tardío al Posclásic e Histórico Reciente. *Proceedings of the Cincuenta Años de Antropología en la Universidad Veracruzana*.

Chapman, H.
2006 *Landscape Archaeology and GIS*. The History Press.

Charlton, T. H.
1991 The Influence and Legacy of Teotihuacan on Regional Routes and Urban Panning. In *Ancient Road Networksand Settlement Hierarchies in the New World*, edited by C. D. Trombold, pp. 186-197. Cambridge University Press, New York.

Chase, A. F. and D. Z. Chase
1996 More than Kin and King: Centralized Political Organization among the Late Classic Maya. *Current Anthropology* 37(5):803-810.

Chase, D. Z. and A. F. Chase (editors)
2003 *Mesoamerican Elites: An Archaeological Assessment*. University of Oklahoma Press, Norman.

Chase-Dunn, C. and T. D. Hall
1998 World-systems in North America: Networks, Rise and Fall and Pulsations ofT in Stateless Systems. *American Indian Culture and Research Journal* 22(1):23-72.

Cheek, C. D.
1977 Teotihuacan Influence at Kaminaljuyu. In *Teotihuacan and Kaminaljuyu*, pp. 441-452. Pennsylvania State University Press, University Park.

Childe, V. G.
1950 The Urban Revolution. In *Contemporary Archaeology: A Guide to Theory and Contributions*, edited by M. Leone, pp. 43-51. Southern Illinois University Press, Carbondale.

Clark, J. E.
1985 Platforms, Bits, Punches and Vises: A Potpourri of Mesoamerican Blade Technology. *Lithic technology* 14(1):1-15.

1986 From Mountains to Molehills: A Critical Review of Teotihuacan's Obsidian Industry. In *Research in Economic Anthropology, Supplement 2*, edited by B. L. Isaac, pp. 23-74, Greenwich.

1994 The Development of Early Formative Rank Societies in the Soconusco, Chiapas, Mexico. PhD, Anthropology, University of Michigan. 593 pp., Ann Arbor.

1997a The Arts of Government in Early Mesoamerica. *Annual Review of Anthropology* 26:211-234.

1997b Prismatic Blademaking, Craftsmanship, and Production: An Analysis of

Obsidian Refuse from Ojo de Agua, Chiapas, Mexico. *Ancient Mesoamerica* 8(1):137-159.

Clark, J. E. and M. Blake
1994 Power of Prestige: Competitive Generosity and the Emergence of Rank in Lowland Mesoamerica. In *Factional Competition and Political Development in the New World*, edited by E. M. Brumfiel and J. W. Fox, pp. 17-30. Cambridge University Press, Cambridge.

Coe, M. D.
1965 Archaeological Synthesis of Southern Veracruz and Tabasco. In *Handbook of Middle American Indians, Volume 3: Archaeology of Southern Mesoamerica, Part 2*, edited by R. Wauchope and G. R. Willey, pp. 679-715. University of Texas Press, Austin.

1994 *Mexico: From the Olmecs to the Aztecs*. Thames and Hudson, London.

Coe, M. D. and R. A. Diehl
1980 *In the Land of the Olmec, Vol. 1: The Archaeology of San Lorenzo Tenochtitlán*. University of Texas Press, Austin.

Coggins, C. C.
1983 Instrument of Expansion: Monte Alban, Teotihuacan, and Tikál. In *Highland-lowland interaction in Mesoamerica*, pp. 49-68. Dumbarton Oaks Research Library and Collections, Washington.

Costin, C. L.
1991 Craft Specialization: Issues in Defining, Documenting, and Explaining the Organization of Production. In *Archaeological Method and Theory*, edited by M. B. Schiffer, pp. 1-56. vol. 3. University of Arizona Press, Tucson.

2005 The Study of Craft Production. In *Handbook of Methods in Archaeology*, edited by H. Maschner, pp. 1032-1105. Alta Mira Press.

Covarrubias, M.
1980 *El Sur de México*. Colección Clásico de la Antropología Mexicana. Instituto Nacional Indigenista.

Cowgill, G. and H. Neff
2004 Algunos Resultados del Análisis por Activavación Neutrónica de la Ceramica Foránea de Teotihuacan. In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 63-77. Universidad Nacional Autónoma de México, Mexico City.

Cowgill, G. L.

1992 Teotihuacan glyphs and imagery in the light of some early colonial texts. In *Art, Ideology, and the City of Teotihuacan*, pp. 231-246. Dumbarton Oaks, Washington, D.C.

1992a Social differentiation at Teotihuacan. In *Mesoamerican Elites: an Archaeological Assessment*, pp. 206-220. University of Oklahoma Press, Norman.

1997 State and Society at Teotihuacan, Mexico. *Annual Review of Anthropology* 26:129-161.

2000 Intentionality and Meaning of the Layout of Teotihuacan, Mexico. *Cambridge Archaeological Journal* 10(2):358-365.

2003 Teotihuacan: Cosmic Glories and Mundane Needs. In *The Social Construction of Ancient Cities*, edited by M. L. Smith. Smithsonian Institution Press, Washington.

Crespo, A. M.

1998 La Expansión de la Frontera Norte. In *Los Ritmos de Cambio en Teotihuacán: Reflexiones y Discusiones de su Cronología*, edited by R. Brambila and R. Cabrera, pp. 323-331. Série Arqueología. Instituto Nacional de Antropología e Historia.

Crespo, A. M. and A. G. Mastache de Escobar

1981 La Presencia en el Área de Tula, Hidalgo, de Grupos Relacionados con el Barrio de Oaxaca en Teotihuacan. *Serie Antropológica* 41:99-106.

Crumley, C. L.

1995 Heterarchy and the Analysis of Complex Societies. In *Heterarchy and the Analysis of Complex Societies*, edited by R. M. Ehrenreich, C. L. Crumley and J. E. Levy, pp. 1-5. Archaeological Papers of the American Anthropological Association.

Crumley, C. L. and W. H. Marquardt

1990 Landscape: A Unifying Concept in Regional Analysis. In *Interpreting Space: GIS and Archaeology*, edited by K. M. Allen, S. W. Green and E. B. W. Zubrow. Taylor and Francis, London.

D'Altroy, T. N.

1992 *Provincial Power in the Inka Empire*. Smithsonian Institution Press, Washington D. C.

Daneels, A.

2002a El Patrón de Asentamiento del Periodo Clásico en la Cuenca Baja del Río Cotaxtla, Centro de Veracruz. Unpublished Ph.D. dissertation, Instituto de

Investigaciones Antropológicas, Universidad Nacional Autónoma de México, México, D.F.

2002b Presencia de Teotihuacan en el Centro y Sur de Veracruz. In *Ideología y Política a Través de Materiales, Imágenes y Símbolos*, edited by M. E. Ruíz Gallut, pp. 655-683. UNAM and INAH, México, D.F.

2004 Máscaras de Piedra de Estilo Teotihuacano en las Costa del Golfo. In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto. Universidad Nacional Autónoma de México, Mexico City.

2008a Ballcourts and Politics in the Lower Cotaxtla Valley: A Model to Understand Classic Central Veracruz? In *Classic Period Cultural Currents in Southern and Central Veracruz*, edited by P. J. III Arnold and C. A. Pool, pp. 197-224. Dumbarton Oaks Research Library & Collection, Washington D.C.

2008b *Monumental Earthen Architecture at La Joya, Veracruz, México*. Foundation for the Advancement of Mesoamerican Archaeology, Inc.

Darwin, C.
2010 *The Origin of Species*. Cricket House Books.

David, B. and J. Thomas
2008 Landscape Archaeology: Introduction. In *Handbook of Landscape Archaeology*, edited by B. David and J. Thomas, pp. 27-43. Left Coast Press, Inc., Walnut Creek.

de la Fuente, B.
1996 Homocentrism in Olmec Art. In *Olmec Art of Ancient Mexico*, edited by E. P. Benson and B. de la Fuente, pp. 41-49. National Gallery of Art, Washington, D.C.

de Montmollin, O.
1989 *The Archaeology of Political Structure: Settlement Analysis in a Classic Maya Polity*. University of Cambridge, Cambridge.

DeBoer, W. R.
1990 Interaction, Imitation, and Communication as Expressed in Style: The Ucayali Experience. In *The Uses of Style in Archaeology*, edited by M. Conkey and C. Hastorf, pp. 82-104. Cambridge University Press, Cambridge.

Demarest, A. A.
1984 Proyecto El Mirador de la Harvard University, 1982-1983. *Mesoamérica* (7):1-13.

Demarest, A. A. and A. E. Foias
1993 Mesoamerican horizons and the cultural transformations of Maya civilization. *Latin American Horizons: a symposium at Dumbarton Oaks, 11th and 12th October 1986*:147-191.

Diaz, C. L.
1981 Chingú y la expansión teotihuacana. *Serie Antropológica* 41:107-112.

Díaz Oyarzabal, C.
1998 Ocoyoacac: Un Sitio con Influencia Teotihuacana el el Valle de Toluca. In *Los Ritmos de Cambio en Teotihuacán: Reflexiones y Discusiones de su Cronología*, edited by R. Brambila and R. Cabrera, pp. 353-375. Série Arqueología. Instituto Nacional de Antropología e Historia.

Diehl, R. A.
2000 The Precolumbian Cultures of the Gulf Coast. In *Mesoamerica, part 1*, edited by R. E. W. Adams and M. J. Macleod, pp. 156-196. Cambridge History of the Native Peoples of the Americas. vol. 2. Cambridge University Press, Cambridge.

Dietler, M.
2006 Alcohol: Anthropological/Archaeological Perspectives. *Annual Review of Anthropology* 35(2006):229-249.

Dietler, M. and B. D. Hayden
2001 Digesting the Feast -- Good to Eat, Good to Drink, Good to Think: An Introduction. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by M. Dietler and B. D. Hayden, pp. 1-20. Smithsonian Institution Press, Washington.

Dietler, M. and I. Herbich
1998 Habitus, Techniques, Style: an Integrated Approach to the Social Understanding of Material Culture and Boundaries. *The Archaeology of Social Boundaries,* edited by M. Stark, pp. 232-263. Smithsonian Institution Press, Washington D.C.

Dirzo, R. and R. C. Vogt
1997 Introduction. In *Historia Natural de los Tuxtlas*, edited by R. Dirzo and R. C. Vogt, pp. 1-24. Universidad Nacional Autónoma de México, Mexico City.

Dominguez Covarrubias, E.
2001 La Arquitectura Monumental del Periodo Clásico en el Sur de Veracruz: Un Enfoque Regional. Tesis de licensiatura, Department of Anthropology, Universidad de las Amércias, Puebla, Puebla, México.

Doyle, M. W.
1986 *Empires*. Cornell University Press, Ithica.

Drennan, R. D.
1988 Household Location and Dispersed versus Compact Settlement in Prehispanic Mesoamerica. In *Household and Community in the Mesoamerican Past*, edited by R. Wilk and W. Ashmore, pp. 273-295. University of New Mexico Press, Albequerque.

Drennan, R. D., H. Dehn and P. T. Fitzgibbons
1990 Imports and Exportsi Classic Mesoamerican Political Economy: The Tehuacán Valley and the Teotihuacán Obsidian Industry. *Research in Economic Anthropology* 12:177-199.

Drennan, R. D. and J. A. Nowack
1984 Exchange and Sociopolitical Development in the Tehuacan Valley. In *Trade and Exchange in Early Mesoamerica. Albuquerque*, pp. 147-156. University of New Mexico Press, Albequerque.

Drucker, P.
1943 *Ceramic Sequence at Tres Zapotes, Veracruz, Mexico*. Bureau of American Ethnology. Smithsonian Institution, Washington D. C.

Dunnell, R. C. and W. S. Dancey
1983 Siteless Survey: A Regional Scale Data Collection Strategy. In *Advances in Archaeological Method and Theory*, edited by M. B. Schiffer, pp. 267-287. Academic Press, New York.

Durán, D.
1994 *The History of the Indies of New Spain*. Translated by D. Heyden. Civilization of the American Indian. University of Oklahoma Press, Norman.

Durkheim, É.
1964 *The Division of Labor in Society*. Free Press Paperbacks. Free Press of Glencoe, New York.

DuSolier, W.
1945 La Ceramica Arqueologíca de El Tajín. In *Anales del Museo Nacional de Arqueología, Historia y Etnografía*, pp. 174-191. vol. III(5). Instituto Nacional de Antropología e Historia.

Earle, T.
1991 *Chiefdoms: Power, Economy, and Ideology*. Cambridge University Press.

Earle, T. K.
1997 *How Chiefs Come to Power: The Political Economy in Prehistory*.

Stanford University press.

Ekholm, G. F.
1944 Excavations at Tampico and Panuco in the Huasteca, Mexico. (Publications for the Institute of Andean research. 1a). *American museum of natural history. Anthropological papers*:319-512.

1949 Palmate Stones and Thin Stone Heads: Suggestions on their Possible Use. *American Antiquity* 15:1-9.

Emberling, G.
1997 Ethnicity in complex societies: Archaeological Perspectives. *Journal of Archaeological Research* 5(4):295-344.

Fash, W. L. and B. W. Fash
2000 Teotihuacan and the Maya: A Classic Heritage.

Feinman, G. M.
2001 Mesoamerican Political Complexity: The Corporate-Network Dimension. In *From leaders to Rulers*, pp. 151-175. Kluwer Academic Press, New York.

Filini, A.
2004 *The Presence of Teotihuacan in the Cuitzeo Basin, Michoacan, Mexico: A World-System Perspective*. British Archaeological Reports.

Flannery, K. and J. Marcus (editors)
2003 *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*. Percheron Press, New York.

Flannery, K. V.
1999 Process and Agency in Early State Formation. *Cambridge Archaeological Journal* 9(1):3-21.

Follensbee, B. J. A.
2000 Sex and Gender in Olmec Art and Archaeology. Doctoral Dissertation, Department of Comparative Literature, University of Maryland.

Fowler, M. L.
1978 Cahokia and the American Bottom: Settlement Archaeology. In *Mississippian Settlement Patterns*, pp. 455-478. Academic Press, New York.

Fox, J. W., G. W. Cook, A. F. Chase and D. Z. Chase
1996 Questions of Political Economic Integration: Segmentart Versus Centralized States among the Ancient Maya. *Current Anthropology* 37(5):795-801.

Frank, A. G.

1999 Abuses and Uses of World Systems Theory in Archaeology. In *World Systems Theory in Practice: Leadership, Production, and Exchange*, edited by P. N. Kardulias, pp. 275-296. Rowman and Littlefield Publishers, Inc. , Lanham.

Frank, A. G. and B. K. Gills

1993 *The World System: Five Hundred Years or Five Thousand* Routledge, New York.

Fried, M. H.

1967 *The Evolution of Political Society: An Essay in Political Anthropology*. Random House, New York.

Friedman, J.

1994 *Cultural Identity and Global Processes*. Sage Publications.

García Cook, A.

1972 Investigaciones Arqueológicas en el Estado de Tlaxcala. *Deutsche Forschungsgemeinschaft [founded in 1949] Comunicaciones del Proyecto Puebla - Tlaxcala* 6:21-26.

1981 The Historical Importance of Tlaxcala in the Cultural Deveolpment of the Central Highlands. In *Suppliment to the Handbook of Middle American Indians*, edited by J. Sabloff, pp. 244-276. University of Texas Press, Austin.

García Cook, A. and B. L. Merino Carrión

1996 Situación Cultural en Tlaxcala Durante el Apogeo de Teotihuacan. In *Arqueología Mesoamericana: Homenaje a William T. Sanders*, pp. 281-316. Instituto Nacional de Antropología e Historia, Arqueología Mexicana, Mexico D. F.

1998 Cantona: Urbe Prehispánica en el Altiplano Central de México. *Latin American Antiquity* 9(3):191-216.

García, E.

1970 Los Climas del Estado de Veracruz. In *Anales del Instituto de Biologia*, pp. 3-42. vol. 41. Universidad Nacional Autonóma de México, Mexico City.

García, M. B.

1987 *Los Pueblos de la Sierra: El poder y el Espacio Entre los Indios del Norte de Puebla hasta 1700*. Centro de Estudios Históricos, El Colegio de México, Mexico City.

García Payón, J.

1964 Secuencia Cultural de Tajín. *Proceedings of the Congreso Internacional de Americanistas*. Mexico.

1971 Archaeology of Central Veracruz. In *Archaeology of Northern Mesoamerica*, edited by G. F. Ekholm and I. Bernal, pp. 505-542. Handbook of Middle American Indians. vol. 11.

Gerhard, P.
1993 *A Guide to the Historical Geography of New Spain (revisited)*. University of Oaklahoma Press.

Giddens, A.
1979 *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis*. University of California Press.

1984 *The Constitution of Society: Outline of the Theory of Structuration*. University of California Press, Berkeley.

Glascock, M. D.
1992 Characterization of Archaeological Ceramics at MURR by Neutron Activation Analysis and Multivariate Statistics. In *Chemical Characterization of Ceramic Pastes in Archaeology*, edited by H. Neff, pp. 11-26. Prehistory Press, Madison.

Glascock, M. D., G. E. Braswell and R. H. Cobean
1998 A Systematic Approach to Obsidian Source Characterization. In *Archaeoogical Obsidian Studies: Method and Theory*, edited by M. S. Shackley, pp. 15-65. Advances in Archaeological and Museum Science.

Gledhill, J.
1984 The Transformation of 'Asiatic' Formations: Late Prehispanic Mesoamerica. In *Marxist Perspectives in Archaeology*, edited by M. Spriggs, pp. 135-148. Cambridge University Press.

Gledhill, J., B. Bender and M. T. Larsen (editors)
1995 *State and Society: The Emergence and Development of Social Hierarchy and Political Centralization*. Routledge Press.

Gómez Chavez, S., J. Gazzola and J. Núñez Hernández
2004 Nuevas Ideas sobre e; Juego de Pelota en Teotihuacan. In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 165-200. Universidad Nacional Autónoma de México, Mexico City.

Gomez-Pampa, A.
1973 Ecology of the Vegetation of Veracruz. In *Vegetation and Vegetational History of Northern Latin America*, edited by A. Graham, pp. 73-148. Elsevier Scientific Publishing Company, New York.

Gosselain, O. P.

1992 Bonfire of the Enquiries. Pottery Firing Temperatures in Archaeology: What for? *Journal of Archaeological Science* 19:243-259.

1998 Social and Technical Identity in a Clay Crystal Ball. In *The Archaeology of Social Boundaries*, edited by M. T. Stark, pp 78-106. Smithsonian Institution Press.

2000 Materializing identities: an African perspective. *Journal of Archaeological Method and Theory* 7(3):187-217.

Graham, I.

1986 *Corpus of Maya Hieroglyphic Inscriptions, Volume 5, Part 3: Uaxactun*. Harvard University Press: Peabody Museum of Archaeology and Ethnology.

Guevara Sada, S., J. Laborde Dovalí and G. Sánchez-Ríos

2004 La Deforestación. In *Los Tuxtlas: El Paisaje de la Sierra*, edited by S. Guevara Sada, J. Laborde Dovalí and G. Sánchez-Ríos, pp. 85-110. Instituto de Ecología, Xalapa.

Gutiérrez, G.

2002 The Expanding Polity: Patterns of the Territorial Expansion of the Post-Classic Señorio of Tlapatlachinollan in the Mixteca-Nahuatl-Tlapaneca Region of Guerrero, Department of Anthropology, Pennsylvania State University, University Park.

Hall, T. D.

1999 World-systems and Evolution: an Appraisal. In *World Systems Theory in Practice: Leadership, Production, and Exchange*, edited by P. N. Kardulias, pp. 1-24. Rowman and Littlefield Publishers, Inc., Lanham.

Hall, T. D. and C. Chase-Dunn

1993 World-systems Perspective and Archaeology: Forward into the Past. *Journal of Archaeological Research* 1(2):121-143.

Halperin, R. H.

2007 The Political Economy of Mesoamerican States: An Economic Ethnographer's View. In *The Political Economy of Mesoamerica: Transformations during the Formative and Classic Periods*, edited by V. L. Scarborough and J. E. Clark, pp. 175-184. University of New Mexico Press, Albuquerque.

Halstead, P.

1989 Economy has a Normal Surplus: Economic Stability and Social Change among Early Farming Communities of Thessaly, Greece. In *Bad Year Economics: Cultural Responses to Risk and Uncertainty*, edited by P. Halstead and J. O'Shea, pp. 68-80. Cambridge University Press.

Halstead, P. and J. O'Shea
1989 Introduction: cultural responses to risk and uncertainty. In *Bad Year Economics: Cultural Responses to Risk and Uncertainty*, edited by P. Halstead and J. O'Shea, pp. 1-7. Cambridge University Press.

Hare, T. S.
2004 Using Measures of Cost Distance in the Estimation of Polity Boundaries in the Postclassic Yautepec Valley, Mexico. *Journal of Archaeological Science* 31(6):799-814.

Hassig, R.
1985 *Trade, Tribute, and Transportation: The Sixteenth Century Political Economy of the Valley of Mexico*. Norman University Press.

1988 *Aztec Warfare*. University of Oklahoma Press, Norman.

1992 *War and Society in Ancient Mesoamerica*. University of California Press, Berkeley.

Hayden, B.
1990 Nimrods, Piscators, Pluckers, and Planters: The Emergence of Food Production. *Journal of Anthropological Archaeology* 9(1):31-69.

Headrick, A.
1999 The Street of the Dead... it Really Was: Mortuary Bundles at Teotihuacan. *Ancient Mesoamerica* 10(1):69-85.

2007 *The Teotihuacan Trinity: The Sociopolitical Structures of an Ancient Mesoamerican City*. University of Texas Press, Austin.

Healan, D. M.
1986 Technological and Nontechnological Aspects of an Obsidian Workshop Excavated at Tula, Hidalgo. *Research in economic anthropology*:133-152.

Hegmon, M.
1998 Technology, Style, and Social Practices: Archaeological Approaches. In *The Archaeology of Social Boundaries*, edited by M. Stark, pp. 264-279. Smithsonian Institution Press.

Hegmon, M., M. C. Nelson, R. Anyon, D. Creel, S. A. LeBlanc and H. J. Shafer
1999 Scale and time-space systematics in the post-A. D. 1100 Mimbres region of the North American Southwest. *Kiva* 65(2):143-166.

Helms, M. W.

1993 *Craft and the Kingly Ideal*. University of Texas Press, Austin.

Hicks, F.

1994 Cloth in the Political Economy of the Aztec State. In *Economies and Polities in the Aztec Realm*, edited by M. D. Hodge and M. E. Smith, pp. 89-112. Institute for Mesoamerican Studies. State University of New York at Albany.

Hirsch, E.

1995 Introduction. In *Anthropology of Landscape*, edited by E. Hirsch and M. O'Hanlan, pp. 1-30. Clarendon Press, Oxford.

Hirth, K. G.

1978 Interregional Trade and the Formation of Prehistoric Gateway Communities. *American Antiquity* 43(1):35-45.

1980 *Eastern Morelos and Teotihuacan: A Settlement Survey*. Publications in Anthropology No. 25. Vanderbilt University, Nashville.

1984 Early Exchange in Mesoamerica: An Introduction. In *Trade and exchange in Early Mesoamerica,* pp. 1-15. University of New Mexico Press, Albuquerque.

1996 Political Economy and Archaeology: Perspectives on Exchange and Production. *Journal of Archaeological Research* 4(3):203-239.

1998 The Distributional Approach: A New Way to Identify Marketplace Exchange in the Archaeological Record. *Current Anthropology* 39(4):451-476.

2000a *Archaeological Research at Xochicalco: Ancient Urbanism at Xochicalco Vol. 1*. University of Utah Press, Salt Lake City.

2000b *Archaeological Research at Xochicalco: The Xochicalco Mapping Project* Volume 2. University of Utah Press, Salt Lake City.

2006 *Obsidian Craft Production in Ancient Central Mexico*. University of Utah Press, Salt Lake City.

Hirth, K. G. and J. Angulo Villaseñor

1981 Early State Expansion in Central Mexico: Teotihuacan in Morelos. *Journal of Field Archaeology* 8(2):137-150.

Hoebel, E. A.

1954 *The Law of Primitive Man*. Harvard University Press.

Hopkins, M. R.

1995 Teotihuacan Cooking Pots: Scale of Production and Product Variability.

Doctoral Dissertation, Department of Anthropology, Brandeis University.

Hyslop, J.
1990 *Inka Settlement Planning*. University of Texas Press, Austin.

Iglesias, P. d. L. M. J.
2003 Problematical deposits and the Problem of Interaction: the Material Culture of Tikál During the Early Classic. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. Braswell, pp. 167-198. University of Texas Press, Austin.

Ingold, T.
1993 The Temporality of Landscape. *World Archaeology* 25:152-174.

Isaac, B. L.
2005 Karl Polanyi. In *Handbook of Economic Anthropology*, edited by J. G. Carrier, pp. 11-25. Edward Elgar Publishing, LTD, Cheltenham.

Jennings, J.
2006 Core, peripheries, and regional realities in middle Horizon Peru. *Journal of Anthropological Archaeology* 25(3):346-370.

Jennings, J., K. L. Antrobus, S. J. Atencio, E. Glavich and R. Johnson
2005 'Drinking Beer in a Blissful Mood'. Alcohol Production, Operational Chains, and Feasting in the Ancient World. *Current anthropology* 46(2):275-303.

Johnson, A. W. and T. K. Earle
1987 *The Evolution of Human Societies*. Stanford University Press.

Jones, S.
1997 *The Archaeology of Ethnicity: Constructing Identities in the Past and Present*. Routledge.

Joyce, A. A.
1993 Interregional Interaction and Social Development on the Oaxaca Coast. *Ancient Mesoamerica* 4(1):67-84.

Joyce, R. A.
1992 Ideology in Action: Classic Maya Ritual Practice. *Ancient Images, Ancient Thought: the Archaeology of Ideology*:497-505.

2005 Pathways to Power: Principles for Creating Socioeconomic Inequalities. *Annual Review of Anthropology* 34:139-158.

Kann, V.
1990 Anthropomorphic Figurines as Ideological Discourse and Practice at

Matacapan, Veracruz, Unfinished Doctoral Dissertation, Department of Anthropology, University of Illinois, Urbana-Champagne.

Kardulias, P. N.
1999 Multiple levels in the Aegean Bronze Age world-system. *World Systems Theory in Practice: Leadership, Production, and Exchange*, edited by P. N. Kardulias, pp. 179-201. Lanham Rowman and Littlefield Press.

Kardulias, P. N. and T. D. Hall
2008 Archaeology and world-systems analysis. *World Archaeology* 40(4):572-583.

Kearney, M.
1995 The Local and the Global: The Anthropology of Globalization and Transnationalism. *Annual Review of Anthropology* 24:547-565.

2004 *Changing Fields of Anthropology: From Local to Global*. Rowman & Littlefield Publishers, Inc.

Kelly, J. E., J. A. WIlliams and S. J. Ozuk (editors)
1989 *The Range Site 2: Emergent Mississippian, Dohack, and Range Phase Occupations*. University of Illinois Press.

Kelly, R. L.
1995 *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Smithsonian Institution Press.

Kepecs, S., S. Boucher and G. Feinman
1994 Chichen Itza and its hinterland: a world-systems perspective. *Ancient Mesoamerica* 5(2):141-158.

Kerber, E.
1882 Eine Alte Mexikanischen Ruistaate bei San Andres Tuxtla. *Verhandlinguen der Berliner Gessellschaft fur Anthropologie, Ethnologie und Urgeschichte* 14:488-489.

Killion, T. W.
1987 Agriculture and Residential Site Structure among Campesinos in Southern Veracruz, Mexico: Building a Foundation for Archaeological Inference. Doctoral Dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

1990 Cultivation Intensity and Residential Site Structure: An Ethnoarchaeological Examination of Peasant Agriculture in the Sierra de los Tuxtlas, Veracruz, Mexico. *Latin American Antiquity* 1(3):191-215.

Killion, T. W. and J. Urcíd
2001 The Olmec Legacy: Cultural Continuity in Mexico's Southern Gulf Coast Lowlands. *Journal of Field Archaeology* 28(1 and 2):3-25.

Knight, C.
1999 The Late Formative to Classic Period Obsidian Economy at Palo Errado, Veracruz, Mexico. Doctoral Dissertation, Department of Anthropology, University of Pittsburgh.

2007 Obsidian Production, Consumption, and Distribution at Tres Zapotes: Piecing Together Political Economy. In *Settlement Archaeology and Political Economy at Tres Zapotes, Veracruz, Mexico*, edited by C. A. Pool, pp. 69-89. Cotsen Institute of Archaeology, University of California, Los Angeles.

Kohl, B.
1980 Lower Pliocene Benthic Foraminifera from the Isthmus of Tehuantepec. Doctoral Dissertation, Tulane University, New Orleans.

Kohl, P. L.
1989 Use and abuse of world systems theory: the case of the "pristine" West Asian state. In *Archaeological Thought in America*, edited by C. Lamberg-Karlovski, pp. 218-240. Cambridge University Press.

Kolata, A. L.
1987 Tiwanaku and its hinterland. *Archaeology* 40:36-41.

1997 Of Kings and Capitals: Principals of Authority and the Nature of Cities in the Native Andean State. In *The Archaeology of City States: Cross-Cultural Approaches*, edited by D. L. Nichols and T. H. Charlton, pp. 245-254. Smithsonian Institution Press, Washington D.C.

Kolb, C. C.
1986 Commercial aspects of Classic Teotihuacan Period "Thin Orange" wares. In *Research in economic anthropology*, pp. 155-205. Greenwich Press.

Koontz, R.
2008 Iconographic Interaction between El Tajin and South-Central Veracruz. In *Classic-Period Cultural Currents in Southern and Central Veracruz* edited by P. J. III Arnold and C. A. Pool, pp. 323-360. Dumbarton Oaks Research Library and Collection, Washington D. C.

Kowalewski, S. A.
1990 Evolution of Complexity in the Valley of Oaxaca. *Annual Review of Anthropology* 19:39-58.

Kroeber, A. L.
1944 *Configurations of culture growth*. University of California Press, Berkeley, Los Angeles,.

Krotser, R. and P. H. Krotser
1973 Topografia y Ceramica de El Tajin, Ver. *Mexico Instituto Nacional de Antropologia e Historia Anales* (51):177-221.

Kruszczynski, M.
2001 Prehistoric Basalt Exploitation and Core-Periphery Relations Observed from the Cerro el Vigía Hinterland of Tres Zapotes, Veracruz, Mexico. Doctoral Dissertation, Department of Anthropology, University of Pittsburgh.

Kurtz, D.
2001 The Paradigm of Political Economy. In *Political Anthropology: Paradigms and Power*, pp. 113-132. Wesview Press, Cambridge.

Kurtz, D. V.
1987 Economics of Urbanization and State Formation at Teotihuacan. *Current Anthropology* 28(3):329-353.

Laporte Molina, J. P.
2003 Architectural Aspects of Interaction Between Tikal and Teotihuacan during the Early Classic Period. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction*, edited by G. E. Braswell, pp. 199–216. University of Texas Press, Austin.

Lemonnier, P.
1992 *Elements for an Anthropology of Technology*. Museum of Anthropology, University of Michigan, Ann Arbor.

Lesure, R. G. and M. Blake
2002 Interpretive Challenges in the Study of Early Complexity: Economy, Ritual, and Architecture at Paso de la Amada, Mexico. *Journal of Anthropological Archaeology* 21:1-24.

Lightfoot, K. G. and A. Martinez
1995 Frontiers and Boundaries in Archaeological Perspective. *Annual Review of Anthropology* 24:471-492.

Linné, S.
1942 *Mexican Highland Cultures: Archaeological Researches at Teotihuacan, Calpulalpan and Chalchicomula in 1934/35*. Ethnographical Museum of Sweden, Stockholm.

Lira López, Y.
2004 *Arqueología del Valle de Maltrata, Veracruz : Resultados Preliminares*. Universidad Nacional Autónoma de México, Instituto de Investigaciones Antropológicas.

Loughlin, M. D.
n.d. Doctoral Dissertation, Department of Anthropology, University of Kentucky, Lexington.

Manzanilla, L. and A. Ortiz
1991 Altares Domésticos en Teotihuacán: Hallazgo de dos Fragmentos de Maqueta. *Cuadernos de Arquitectura Mesoamericana* (13):11-13.

Marcus, J.
1983 Teotihuacán Visitors on Monte Albán Monuments and Murals. In *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*, edited by K. V. Flannery and J. Marcus, pp. 175-181. Academic Press, New York.

2003 The Conquest Slabs of Building J, Monte Albán. In *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*, edited by K. V. Flannery and J. Marcus, pp. 106-108. Percheron Press, New York.

2003 The Maya and Teotihuacan. In *The Maya and Teotihuacan: Reinterpreting Early Classic Interaction,* edited by G. Braswell, pp. 337-356. University of Texas Press, Austin.

Martin-Del Pozo, A. L.
1997 Geología. In *Historia Natural de los Tuxtlas*, edited by R. Dirzo and R. C. Vogt, pp. 25-53. Universidad Nacional Autónoma de México, Mexico City.

Marx, K.
1967 *Capital* vol. 3. New York: International.

Matheny, R. T. (editor)
1980 *El Mirador, Peten, Guatemala : an Interim Report* Brigham Young University, Provo.

Matos Moctezuma, E., M. T. García García, F. López Aguilar and I. Rodríguez García
1981 Proyecto Tepeapulco: Resumen Preliminar de las Actividades Realizadas en la Primera Temporada de Trabajo. In *Interacción Cultural en México Central*, edited by E. C. Rattray, J. Litvak King and C. Díaz Oyarzabal, pp. 113-147. Universidad Nacional Autónoma de México, México.

Mauss, M.
1967 *The Gift: Forms and Functions of Exchange in Archaic Societies*. W. W. Norton and Company, New York.

McAndrews, T. L.
1997 Regional Settlement Patterns in the Tiwanaku Valley of Bolivia. *Journal of Field Archaeology* 24:67-83.

McCormack, V. J.
2002 Sedentism, Site Occupation andd Settlement Organization at La Joya, A Formative Village in the Sierra de los Tuxtlas, Veracruz, Mexico. Doctoral Dissertation, Department of Anthropology, University of Pittsburgh.

Medellín Zenil, A.
1960 *Cerámicas del Totonacapan*. Universidad Veracruzana, Xalapa.

Mehta, S. K.
1964 Some Demographic and Economic Correlates of Primate Cities: A Case for Reevaluation. *Demography* 1:136-147.

Melgar, J. M.
1869 Antiguedades Mexicanos. *Boletin de la Sociedad Mexicana de Geografia y Estadistica 2 ep.* 1:292-297.

Miller, D., M. Rowlands and C. Tilley (editors)
1995 *Domination and Resistance*. Routledge.

Millon, R.
1992 Teotihuacan Studies: from 1950 to 1990 and Beyond. In *Art, Ideology, and the City of Teotihuacan*, pp. 339-429. Dumbarton Oaks, Washington, D.C.

Millon, R. F.
1967 Urna de Monte Albán IIIA Encontrada en Teotihuacan. *Mexico. Instituto Nacional de Antropologia e Historia. Boletin* (29):42-44.

1973 *Urbanization at Teotihuacan, Mexico* Volume 1, *The Teotihuacan Map. Part 1: Text*. University of Texas Press, Austin.

Millon, R. F., B. Drewitt and G. L. Cowgill
1973 *Urbanization at Teotihuacán, Mexico* Volume 1, *The Teotihuacan Map. Part 2: Maps*. University of Texas Press, Austin.

Moholy-Nagy, H.
1999 Mexican obsidian at Tikal, Guatemala. *Latin American Antiquity* 10(3):300-313.

Montiel, L.
2010 Teotihuacan Imperialism in the Yautepec Valley, Morelos. Doctoral Dissertation, Department of Anthropology, University at Albany, State University of New York.

Moore, J. D.
1996 *Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings.* Cambridge University Press.

Morelos García, N.
1993 *Proceso de Produción de Espacios y Estructural en Teotihuacán*. Instituto Nacional de Antropología e Historia, Mexico City.

Múnera, L.
1985 Un Taller de Cerámica Ritual en la Ciudadela, Teotihuacan, Escuela Nacional de Anthropología e Historia, Mexico City.

Nalda, E.
1997 El Noreste de Morelos y la Desestablización Teotihuacana. *Arqueología* 18:103-117.

Neff, H.
2000 Neutron Activation Analysis for Provenance Determination in Archaeology. In *Modern Analytical Methods in Art and Archaeology*, edited by E. C. A. G. Spoto, pp. 81-134. John Wiley and Sons, Inc., NY.

Neff, H. and M. D. Glascock
2002 Instrumental Neutron Activation Analysis of Ceramics and Clays from the Sierra de Los Tuxtlas, Vera Cruz, Mexico. Technical report provided to Wesley D. Stoner for the analysis of Coarse Orange ceramics.

Netherly, P. J.
1993 The Nature of the Andean State. In *Configurations of Power: Holistic Anthropology in Theory and Practice*, edited by J. S. Henderson and P. J. Netherly, pp. 11-35. Cornell University Press.

Newman, M., A.-L. Barabási and D. J. Watts
2006 *The Structure and Dynamics of Networks*. Princeton University Press, Princeton.

Nichols, D. and T. H. Charleton (editors)
1997 *The Archaeology of City-States*. Smithsonian Institution Press, Washington.

Nichols, D. L.
1987 Risk and Agricultural Intensification during the Formative Period in the Northern Basin of Mexico. *American Anthropologist* 89(3):596-616.

Ortiz Ceballos, P.
1975 La Ceramica de los Tuxtlas, Universidad Veracruzana, Jalapa. Unpublished tesis de licenciatura.

Ortiz Ceballos, P. and R. S. Santley
1998 Matacapan: un Ejemplo de Enclave Teotihuacano en la Costa del Golfo. In *Los ritmos de Cambio en Teotihuacán: Reflexiones y Discusiones de su Cronología*, edited by R. Brambila and R. Cabrera, pp. 377-460. INAH, México, D.F.

Ortíz Ceballos, P. and R. S. Santley
1988 La Cerámica de Matacapan, ms. on file, Department of Anthropology, University of New Mexico, Albuqurque, New Mexico.

O'Shea, J. and P. Halstead
1989 Conclusions: Bad Year Economics. *Bad Year Economics: Cultural Responses to Risk and Uncertainty*, edited by P. Halstead and J. O'Shea, pp. 123-126. Cambridge University Press.

Paddock, J.
2003 The Oaxaca Barrio at Teotihuacán. In *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*, edited by K. V. Flannery and J. Marcus, pp. 174-175. Percheron Press, New York.

Parker, B. J.
2006 Toward an Understanding of Borderland Processes. *American Antiquity* 71(1):77-100.

Pascual Soto, A.
1997 El Tajín: en Visperas del Clásico Tardío, Universidad Nacional Autonóma de México, Mexico City.

2000 El Tajín en Visperas del Clásico Tardío: Arte y Cultura, Department of Anthropology, Universidad Mexico CIty.

2002 El Tajín: First Approximations of a Civilization. *Voices of Mexico* 60:79-82.

2004 La Cultura de El Tajín en el Clásico Temprano. In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 441-452. Universidad Nacional Autónoma de México, Mexico City.

Pasztory, E.
1992 Abstraction and the Rise of a Utopian State at Teotihuacan. In *Art, Ideology, and the City of Teotihuacan*, pp. 281-320. Dumbarton Oaks, Washington, D.C.

1997 *Teotihuacan, an Experiment in Living*. University of Oaklahoma Press, Norman.

Pauketat, T. R.
1992 Reign and Ruin of the Lords of Cahokia: A Dialectic of Dominance. In *Lords of the Southeast: Social Inequality and the Native Elites of Southeastern North America*, Archaeological Papers of the American Anthropological Association Number 3:31-51.

Pauketat, T. R., L. S. Kelly, G. J. Fritz, N. H. Lopinot, S. Elias and E. A. Hargrave
2002 Residues of feasting and public ritual at early Cahokia. *American Antiquity* 67(2):257-279.

Pearson, M. P. and C. Richards (editors)
1994 *Architecture and Order: Approaches to Social Space*. Routledge, New York.

Peregrine, P.
1992 *Mississippian Evolution: A World-System Perspective*. Prehistory Press, Madison, Wisconsin.

Peregrine, P. N.
1999 Legitimation Crises in Prehistoric Worlds. *World Systems Theory in Practice: Leadership, Production, and Exchange*, edited by Kardulias, pp. 37-52. Lanham Rowman and Littlefield Press.

Polanyi, K.
1957 Economy as an Instituted Process. In *The Sociology of Economic Life*, edited by M. Granovetter and R. Swedberg. Westview Press, Boulder.

Pool, C. A.
1990 Ceramic Production, Resource Procurement, and Exchange at Matacapan, Veracruz, Mexico. Doctoral Disseratation, Department of Anthropology, Tulane University, New Orleans.

1992a Strangers in a Strange Land: Ethnicity and Ideology at an Enclave Community in Middle Classic Mesoamerica. In *Ancient Images, Ancient Thought: The Archeology of Ideology*, edited by A. S. Goldsmith, pp. 41-55. University of Calgary, Calgary, Alberta.

1992b Integrating Ceramic Production and Distribution. In *Ceramic Production and Distribution: An Integrated Approach*, edited by G. J. Bey, III and C. A. Pool, pp. 275-313. Westview Press, Boulder, Colorado.

1995 La Cerámica del Clásico tardío y el Postclásico en la sierra de los Tuxtlas. *Arqueología* 13-14:37-48.
1997 Proyecto arqueológico Tres Zapotes. In *Memoria del Coloquio*

Arqueología del centro y sur de Veracruz, edited by S. Ladrón de Guevara and S. Vásquez Z., pp. 169-176. Universidad Veracruzana, Xalapa, Veracruz, México.

2006 Current research on the Gulf Coast of Mexico. *Journal of archaeological research* 14(3):189-241.

2007a Ceramic Production at Terminal Formative and Classic Period Tres Zapotes. In *Settlement Archaeology and Political Economy at Tres Zapotes, Veracruz, Mexico*, edited by C. A. Pool, pp. In Press. Cotsen Institute of Archaeology, University of California, Los Angeles.

2007b *Olmec Archaeology and Early Mesoamerica*. Cambridge World Archaeology. Cambridge University Press.

2008 Architectural Plans, Factionalism, and the Proto-Classic-Classic Transition at Tres Zapotes. In *Classic Period Cultural Currents in Southern and Central Veracruz*, edited by P. J. III Arnold and C. A. Pool, pp. 121-158. Dumbarton Oaks Research Library and Collection, Washington D.C.

Pool, C. A. and G. J. Bey, III
2007 Conceptual Issues in Mesoamerican Pottery Economics. In *Pottery Economics in Mesoamerica*, edited by C. A. Pool and G. J. Bey, III, pp. 1-38. University of Arizona Press.

Pool, C. A. and G. M. Britt
2000 A Ceramic Perspective on the Formative to Classic Transition in Southern Veracruz, Mexico. *Latin American Antiquity* 11(2):139-161.

Pool, C. A. and L. Cliggett
2008 Introduction. In *Economies and the Transformation of Landscape*, edited by L. Cliggett and C. A. Pool, pp. 1-15. Altamira Press.

Pool, C. A. and M. A. Ohnersorgen
2007 Archaeological Survey at Tres Zapotes. In *Settlement Archaeology and Political Economy at Tres Zapotes, Veracruz, Mexico*, edited by C. A. Pool, pp. In Press. Cotsen Institute of Archaeology, University of California, Los Angeles.

Pool, C. A. and P. Ortiz Ceballos
n.d. *Unpublished Ceramic Typology of Tres Zapotes*.

Pool, C. A. and R. S. Santley
1992 Middle Classic Pottery Economics in the Tuxtla Mountains, Southern Veracruz, Mexico. In *Ceramic Production and Distribution: An Integrated Approach*, edited by G. J. Bey, III and C. A. Pool, pp. 205-234. Westview Press, Boulder, Colorado.

Pool, C. A. and W. D. Stoner

2004 El fenómeno teotihuacano en Tres Zapotes y Matacapan: una discusión comparativa. In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto. Memoria de la Segunda Mesa Redonda de Teotihuacan. Universidad Nacional Autónoma de México, Mexico City.

Price, T. D., J. H. Burton, R. J. Sharer, J. E. Buikstra, L. E. Wright, P. T. Loa and K. A. Miller

2007 Kings and Commoners at Copan: Isotopic Evidence for Origins and Movement in the Classic Maya Period. *Journal of Anthropological Archaeology* 29(1):15-32.

Protzen, J.-P.

1993 *Inca Architecture and Construction at Ollantaytambo* Oxford University Press.

Rattray, E. C.

1977 Los Contactos entre Teotihuacán y Veracruz. *Sociedad Mexicana de Antropología Mesa redonda* 15(2):301-311.

1979 La Cerámica de Teotihuacan: Relaciones Externas y Cronología. *Anales de antropología. Universidad Nacional Autónoma de México* 16:51-70.

1988 Nuevas interpretaciones en torno al Barrio de los Comerciantes. *Anales de Antropología* 25:165-180.

1998 Rutas de Intercambio en el Periodio Clásico en Mesoamerica. In *Rutas de Intercambio en Mesoamérica*, edited by E. C. Rattray, pp. 77-100. Universidad Nacional Autónoma de México, Mexico.

2000 Teotihuacan: Ceramics, Chronology and Cultural Trends--Color Illustrations Latin American Archaeology Database, University of Pittsburgh. <URL: http://www.pitt.edu/~laad/>.

2001 *Teotihuacan: Ceramics, Chronology and Cultural Trends*. University of Pittsburgh Press.

Rattray, E. C. and G. Harbottle

1992 Neutron Activation Analysis and Numerical Taxonomy of Thin Orange Ceramics from the Manufacturing Sites of Rio Carnero, Puebla, Mexico. In *Chemical Characterization of Ceramic Pastes in Archaeology*, edited by H. Neff, pp. 221-231. Prehistory Press, Madison.

Redmond, E. M.

1983 *A Fuego y Sangre: Early Zapotec Imperialism in the Cuicatlán Cañada,* *Oaxaca*. University of Michigan, Museum Anthropology, Ann Arbor.

Reilly, F. K., III
1995 Art, Ritual, and Rulership in the Olmec World. In *The Olmec World: Ritual and Rulership*, edited by J. Guthrie and E. P. Benson, pp. 27-45. The Art Museum, Princeton University, Princeton, New Jersey.

Reinhardt, B. K.
1991 Volcanology of the Younger Volcanic Sequence and Volcanic Hazards Study of the Tuxtla Volcanic Field, Veracruz, Mexico. Master's Thesis, Tulane University, New Orleans.

Renfrew, C.
1994 Peer Polity Interaction and Sociopolitical Change. In *Contemporary Archeology in Theory, A Reader*, edited by R. W. Preucel and I. R. Hodder, pp. 114-142. Blackwell Publishers, Cambridge.

Renfrew, C. and E. V. Level
1979 Exploring Dominance: Predicting Polities from Centers. In *Transformations: Mathematical Approaches to Culture Change*, edited by C. Renfrew and K. L. Cooke, pp. 145-167. Academic Press, New York.

Rice, P. M.
1987 *Pottery Analysis: A Sourcebook* University of Chicago Press.

Rios Macbeth, F.
1952 Estudio Geológico de la Región de los Tuxtlas, pp. 324-376. vol. 4. Boletín de la Asosciación Mexicana de Geólogos Petroleros.

Robotham, D.
2005 Political Economy. In *Handbook of Economic Anthropology*, edited by J. G. Carrier, pp. 14-25. Edward Elgar Publishing.

Roseberry, W.
1988 Political Economy. *Annual Review of Anthropology* 17:161-185.

Rowlands, M.
1987 Center and Periphery: A Review of a Concept. In *Center and Periphery in the Ancient World*, edited by M. Rowlands, M. Larson and K. Kristiansen, pp. 1-11. Cambridge University Press.

Sackett, J. R.
1985 Style and Ethnicity in the Kalahari: A Reply to Wiessner ['Style and social Information in Kalahari San Projectile Points' by P. Wiessner in Amer Antiquity 1983 48(2) 253-76]. *American Antiquity* 50:154-159.

Sahlins, M.
1972 *Stone Age Economics*. Aldine de Gruyter, New York.

Saint-Charles Zetina, J. C.
1996 El Reflejo del Poder Teotihuacano en el Sur de Guanajuato y Guerrero. In *Tiempo y Territorio en Arqueología. El Centro- Norte de México*, edited by A. M. Crespo and C. Viramontes, pp. 143-161. Instituto Nacional de Antropología e Historia, Mexico City.

1998 Los Problemas para la Periodificación del Bajío y la Secuencia de San Juan del Río. In *Los Ritmos de Cambio en Teotihuacán: Reflexiones y Discusiones de su Cronología*, edited by R. Brambila and R. Cabrera, pp. 335-344. Série Arqueología. Instituto Nacional de Antropología e Historia.

Saitta, D. J.
1994 Agency, Class, and Archaeological Interpretation. *Journal of Anthropological Archaeology* 13(3):201-227.

1999 Prestige, Agency, and Change in Middle-Range Societies. In *Material Symbols: Culture and Economy in Prehistory*, pp. 135-149. Carbondale : Center for Archaeological Investigations, Southern Illinois University.

Sánchez Bonilla, J.
1999 Estela de los Cerros. In *Antropología e Historia en Veracruz*, pp. 11-22. Universidad Veracruzana, Xalapa.

Sánchez Sánchez, J. E.
2004 Influencia Religiosa y su Correspondencia Pictória entre Teotihuacan y la Costa del Golfo en la Fase Tlamimilolpa (200-450 d.C.). In *La Costa del Golfo en Tiempos Teotihuacanos: Propuestas y Perspectivas: Memoria de la Segunda Mesa Redonda de Teotihuacan*, edited by M. E. Ruiz Gallut and A. Pascual Soto, pp. 245-278. Universidad Nacional Autónoma de México, Mexico City.

Sanders, D.
1990 Behavioral Conventions and Archaeology: Methods for the Analysis of Ancient Architecture. In *Domestic Architecture and the Use of Space*, edited by S. Kent, pp. 43-72. Cambrifge University Press.

Sanders, W. T.
1976 The Agricultural History of the Basin of Mexico. In *Valley of Mexico: Studies in Pre-Hispanic Ecology and Society*, edited by E. R. Wolf, pp. 101-159. University of New Mexico Press, Albuquerque

Sanders, W. T., J. Parsons and R. S. Santley
1979 *The Basin of Mexico: Ecological Processes in the Evolution of Civilization*. Academic Press, New York.

Sanders, W. T. and B. J. Price
1968 *Mesoamerica: The Evolution of a Civilization*. Random House, New York.

Sanders, W. T. and R. S. Santley
1983 A Tale of Three Cities: Energetics and Urbanization in Prehispanic Central Mexico. In *Prehistoric Settlement Patterns*, edited by E. Vogt and R. Leventhal, pp. 243-291. University of New Mexico Press, Albuquerque.

Santley, R. S.
1982 *Final Field Report: Matacapan Project, 1982 Field Season*. National Science Foundation and Instituto Nacional de Antropología e Historia.

1983 Obsidian Trade and Teotihuacan Influence in Mesoamerica. In *Interdisciplinary Approaches to the Study of Highland-Lowland Interaction*, edited by A. Miller, pp. 69-123. Dumbarton Oaks, Washington, D.C.

1984 Obsidian exchange, economic stratification, and the evolution of complex society in the Basin of Mexico. In *Trade and exchange in early Mesoamerica. Albuquerque*, pp. 43-86. University of New Mexico Press, 1984.

1989 Obsidian Working, Long Distance Exchange, and the Teotihuacan Presence on the South Gulf Coast. In *Mesoamerica after the Decline of Teotihuacan AD 700-900*, edited by R. A. Diehl and J. C. Berlo, pp. 131-151. Dumbarton Oaks, Washington, D.C.

1991 *Final Field Report: Tuxlas Region Archaeological Survey, 1991 Field Season*. Department of Anthropology, University of New Mexico, Albuquerque. Submitted to the National Science Foundation, Washington D.C.

1994 The Economy of Ancient Matacapan. *Ancient Mesoamerica* 5(2):243-266.

2004 Prehistoric Salt Production at El Salado, Veracruz, Mexico. *Latin American antiquity* 15(2):199-221.

2006 Ranchoapan: The "New Obsidian" City of the Tuxtlas? LAII Research Paper Series. Latin American and Iberian Institute.

2007 *The Prehistory of the Tuxtlas*. University of New Mexico Press, Albuquerque.

Santley, R. S. and R. T. Alexander
1996 Teotihuacan and Middle Classic Mesoamerica: A Pre-Columbian World System? In *Arqueología Mesoamericana: Homenaje a William T. Sanders*, pp. 173-194. Mexico : Instituto Nacional de Antropología e Historia, Arqueología Mexicana.

Santley, R. S. and P. J. Arnold, III
1996 Prehispanic Settlement Patterns in the Tuxtla Mountains, Southern Veracruz, Mexico. *Journal of Field Archaeology* 23(2):225-249.

Santley, R. S., P. J. Arnold, III and C. A. Pool
1989 The Ceramics Production System at Matacapan, Veracruz, Mexico. *Journal of Field Archaeology* 16:107-132.

Santley, R. S. and P. J. III Arnold
2005 The obsidian trade to the Tuxtlas region and its implications for the prehistory of southern Veracruz, Mexico. *Ancient Mesoamerica* 16(2):179-194.

Santley, R. S., T. P. Barrett, M. D. Glascock and H. Neff
2001 Pre-hispanic obsidian procurement in the Tuxtla mountains, southern Veracruz, Mexico. *Ancient Mesoamerica* 12(1):49-63.

Santley, R. S. and K. G. Hirth
1993 Household Studies in Western Mesoamerica. In *Prehispanic Domestic Units in Western Mesoamerica: Studies or the Household, Compound, and Residence*, edited by R. S. Santley and K. G. Hirth, pp. 3-17. CRC Press, Boca Raton.

Santley, R. S., R. R. Kneebone and J. Kerley
1985 Rates of obsidian utilization in Central Mexico and on the South Gulf Coast. *Lithic technology* 14:107-119.

Santley, R. S., S. A. Nelson, B. K. Reinhardt, C. A. Pool and P. J. Arnold, III
2000 When Day Turned to Night: Volcanism and the ARchaeological Record from the Tuxtla Mountains, Southern Veracruz, Mexico. In *Environmental Disaster and the Archaeology of Human Response*, edited by G. Bawden and R. M. Reycraft, pp. 143-161. Maxwell Museum of Anthropology, Albuquerque, New Mexico.

Santley, R. S., P. Ortiz Ceballos, P. J. Arnold, R. R. Kneebone, M. P. Smyth, J. M. Kerley, M. Berman, B. A. Hall, V. Kann, C. A. Pool, Z. S. B. and C. Yarborough
1985 *Final Field Report , Matacapan Project: 1984 Season*. A report to the Instituto Nacional de Antropologia e Historia.

Santley, R. S., P. Ortiz Ceballos, P. J. III Arnold, R. R. Kneebone, M. P. Smyth and J. M. Kerley
1984 *Final Field Report, Matacapan Project: 1983 Season*. A report to the Instituto Nacional de Antropologia e Historia.

Santley, R. S., P. Ortiz Ceballos and C. A. Pool
1987b Recent Archaeological Research at Matacapan, Veracruz: A Summary fo the Results of the 1982 to 1986 Field Seasons. *Mexicon* IX(2):41-52.

Santley, R. S. and C. A. Pool
1993 Prehispanic Exchange Relationships among Central Mexico, the Valley of Oaxaca, and the Gulf Coast of Mexico. In *The American Southwest and Mesoamerica*, edited by J. E. Ericson and T. G. Baugh, pp. 179-212. Plenum Press, New York.

Santley, R. S. and H. M. Richards
2007 The Political Economy of Mesoamerican States: An Economic Ethnographer's View. In *The Political Economy of Mesoamerica: Transformations during the Formative and Classic Periods*, edited by V. L. Scarborough and J. E. Clark, pp. 115-134. University of New Mexico Press, Albuquerque.

Santley, R. S., C. Yarborough and B. Hall
1987 Enclaves, Ethnicity, and the Archaeological Record at Matacapan. In *Ethnicity and Culture*, edited by R. Auger, M. F. Glass, S. MacEncher and P. H. McCartney, pp. 85-100. Archaeological Association, University of Calgary, Calgary, Alberta.

Schele, L. and D. A. Friedel
1990 *A Forest of Kings: The Untold Story of the Ancient Maya*. Morrow and Company, Inc., New York.

Schneider, J.
1977 Was There a pre-capitalist World-System? [review article on 'The modern world-system: capitalist agriculture and the origins of the European world economy in the sixteenth century', by I. Wallerstein]. *Peasant Studies* 6:20-29.

Schortman, E. M. and S. Nakamura
1991 A Crisis of Identity: Late Classic Competition and Interaction on the Southeast Maya Periphery. *Latin American Antiquity* 2(311-336).

Schortman, E. M. and P. A. Urban
2004 Modeling the Roles of Craft Production in ancient Political Economies. *Journal of Archaeological Research* 12(2):185-226.

Séjourné, L.
1966 *Arqueología de Teotihuacan: La Ceramica*. Fondo de Cultural Econónica, México.

Seler-Sachs, C. F.
1922 Altertümer des Kanton Tuxtla im Staate Vera-cruz. *Festschrift Eduard Seler*:543-556.

Sempowski, M. L.
1992 Economic and Social Implications of Variations in Mortuary Practices at

Teotihuacan. In *Art, Ideology, and the City of* Teotihuacan, pp. 27-58. Dumbarton Oaks Research Library and Collection, Washington D. C.

Sempowski, M. L., M. W. Spence and R. F. Millon
1994 *Mortuary Practices and Skeletal Remains at Teotihuacan*. University of Utah Press, Salt Lake.

Senter, D.
1981 Algunas Semejanzas entre Xochicalco y Teotihuacan. *Serie Antropológica* 41:149-158.

Service, E. R.
1968 The Prime-Mover of Cultural Evolution. *Southwestern Journal of Anthropology* 24(4):396-409.

Sheehy, J. J.
1992 Ceramic Production in ancient Teotihuacan, Mexico: a case sudy of Tlajinga 33., Department of Anthropology, Pennsylvania State University, University Park.

Siemens, A. H.
2004 Book Photography. In *Los Tuxtlas: El Paisaje de la Sierra*, edited by S. Guevara Sada, J. Laborde Dovalí and G. Sánchez-Ríos. Instituto de Ecología, Xalapa.

Sillar, B. and M. S. Tite
2000 The Challenge of 'Technological Choices' for Materials Science Approaches in Archaeology. *Archaeometry* 42(1):2-20.

Small, D.
1997 City-State Dynamics through a Greek Lens. In *The Archaeology of City-States: Cross Cultural Approaches*, edited by D. L. Nichols and T. H. Charleton. Smithsonian Institution Press, Washington D.C.

Smith, A. T.
2004 *The Political Landscape: Constellations of Authority in Early Complex Polities*. University of California Press.

Smith, C. A.
1976 Analyzing Regional Social Systems. In *Regional Analysis, Vol. 2, Social Systems*, edited by C. A. Smith, pp. 3-20. Academic Press, New York.

1976 Regional Economic Systems: Linking Geographical Models and Socioeconomic Problems. In *Regional Analysis, Vol 1, Economic Systems*, edited by C. A. G. Smith, pp. 3-63. Academic Press, New York.

Smith, M. E.

1979 The Aztec Marketing System and Settlement Pattern in the Valley of Mexico: a Central Place Analysis. *American Antiquity* 44(1):110-125.

1992 *Archaeological Research at Aztec-Period Rural Sites in Morelos, Mexico*. University of Pittsburgh Memoirs in Latin American Archaeology, Pittsburgh.

2004 The Archaeology of Ancient State Economies. *Annual Review of Anthropology* 33:73-102.

Smith, M. E. and F. Berdan (editors)

2003 *The Postclassic Mesoamerican World*. University of Utah Press, Salt Lake City.

Smith, M. E. and L. Montiel

2001 The archaeological study of empires in pre-Hispanic central Mexico. *Journal of Anthropological Archaeology* 20(3):245-284.

Smith, M. E. and K. J. Schreiber

2006 New World States and Empires: Politics, Religion, and Urbanism. *Journal of Archaeological Research* 14(1):1-52.

Smyth, M. P. and D. Rogart

2004 A Teotihuacan presence at Chac II; Yucatan, Mexico. Implications for Early Political Economy of the Puuc Region. *Ancient Mesoamerica* 15(1):17-47.

Soto, M. and L. Gama

1997 Climas. In *Historia Natural de los Tuxtlas*, edited by R. Dirzo and R. C. Vogt, pp. 7-23. Universidad Nacional Autónoma de México, Mexico CIty.

Soto, M. E.

2004 El Clima. In *Los Tuxtlas: El Paisaje de la Sierra*, edited by S. Guevara Sada, J. Laborde Dovalí and G. Sánchez-Ríos, pp. 195-200. Instituto de Ecología, Xalapa.

Spence, M. W.

1981 Obsidian Production and the State of Teotihuacan. *American Antiquity* 46(4):769-788.

1984 Craft Production and Polity in Early Teotihuacan. In *Trade and Exchange in Early Mesoamerica. Albuquerque*, pp. 87-114. University of New Mexico Press.

1996a A Comparative Analysis of Ethnic Enclaves. In *Arqueología Mesoamericana: Homenaje a William T. Sanders*, pp. 333-353. Instituto Nacional de Antropología e Historia, Arqueología Mexicana.

1996b Commodity or gift: Teotihuacan obsidian in the Maya region. *Latin American Antiquity* 7(1):21-39.

Spencer, C. S. and E. M. Redmond
1997 *Archaeology of the Cañada de Cuicatlán, Oaxaca*. American Museum of Natural History, New York.

2004 Primary State Formation in Mesoamerica. *Annual Review of Anthropology* 33(2004):173-199.

Sprajc, I.
2000 Astronomical Alignments at Teotihuacan, Mexico. *Latin American Antiquity* 11(4):403-415.

Stark, B. L.
1978 An Ethnohistoric Model for Native Economy and Settlement Patterns in Southern Veracruz, Mexico. In *Prehistoric Coastal Adaptations: The Economy and Ecology of Maritime Middle America*, edited by B. L. Stark and B. Voorhies, pp. 211-238. Academic Press, New York

1989 *Patarata Pottery: Classic Period Ceramics of the South-central Gulf Coast, Veracruz, Mexico*. University of Arizona Press, Tucson.

1990 Gulf Coast and the Central Highlands of Mexico: Alternative models for Interaction. In *Research in Economic Anthropology*, edited by B. L. Isaac, pp. 243-285. vol. 12. JAI Press, Greenwich.

1991 *Settlement Archaeology of Cerro de Las Mesas, Veracruz, Mexico*. Institute of Archaeology Monograph 34. University of California, Los Angeles.

1992 Ceramic Production in Prehistoric La Mixtequilla, South-Central Veracruz, Mexico. In , edited by G. J. Bey III and C. A. Pool, pp. In *Ceramic Production and Distribution: An Integrated Approach*, edited by G. J. Bey, III and C. A. Pool, pp. 175-204. Westview Press, Boulder, Colorado.

1998 Estilos de Volutas en el Periodo Clásico. In *Rutas de Intercambio en Mesoamérica, III Coloquio Pedro Bosch-Gimpera*, edited by E. C. Rattray. Universidad Nacional Autónoma de México, México, D.F.

1999 Formal Architectural Complexes in South-Central Veracruz, Mexico: A Capital Zone? *Journal of Field Archaeology* 26(2):197-225.

2001 *Classic Period Mixtequilla, Veracruz, Mexico: Diachronic Inferences from Residential Investigations*. Institute for Mesoamerican Studies, The University at Albany, State University of New York, Albany, New York.

2003 Social and Economic Perspectives on a Gulf Center. In *Urbanism in Mesoamerica*, edited by G. Mastache and W. T. Sanders. vol. 1. The Pennsylvania State University Press, University Park.

2008 Polity and Economy in the Western Lower Papaloapan Basin. In *Classic Period Cultural Currents in Southern and Central Veracruz*, edited by P. J. III Arnold and C. A. Pool, pp. 85-120. Dumbarton Oaks Research Library & Collection, Washington D.C.

Stark, B. L. and P. J. Arnold, III (editors)
1997 *Olmec to Aztec: Settlement Patterns in the Ancient Gulf Lowlands*. The University of Arizona Press, Tucson, Arizona.

Stark, B. L. and L. A. Curet
1994 The Development of the Classic-Period Mixtequilla in South-Central Veracruz, Mexico. *Ancient Mesoamerica* 5(2):267-287.

Stark, B. L. and C. P. Garraty
2004 Evaluations of Systematic Surface Evidence for Pottery Production in Veracruz, Mexico. *Latin American antiquity* 15(2):123-143.

Stark, B. L., M. D. Glascock, J. M. Elam, H. Neff and L. Heller
1992 Obsidian-Artifact Source Analysis for the Mixtequilla region, South-Central Veracruz, Mexico. *Latin American Antiquity* 3(3):221-239.

Stark, B. L., L. Heller and M. A. Ohnersorgen
1998 People with Cloth: Mesoamerican Economic Change from the Perspective of Cotton in South-Central Veracruz. *Latin American Antiquity* 9(1):7-36.

Stark, M. T. (editor)
1998 *The Archaeology of Social Boundaries*. Smithsonian Institution Press, Washington D.C.

Stark, M. T., R. L. Bishop and E. Miksa
2000 Ceramic Technology and Social Boundaries: Cultural Practices in Kalinga Clay Selection and Use. *Journal of Archaeological Method and Theory* 7(4):295-331.

Stein, G. J.
1999 Rethinking World-Systems: Power, Distance, and Diasporas in the Dynamics of Interregional Interaction. In *World Systems Theory in Practice: Leadership, Production, and Exchange*, edited by Kardulias pp. 153-177. Lanham Rowman and Littlefield Press.

Steward, J. H.
1955 Cultural Evolution. *Hoebel, E. Adamson, [et al.]: Readings in*

Anthropology:322-340.

Stirling, M. W.
1941 Expedition Unearths Buried Masterpieces of Carved Jade. *National Geographic Magazine*:277-302.

1943 *Stone Monuments of Southern Mexico*. Bureau of American Ethnology, Bulletin 138. Smithsonian Institution, Washington D. C.

Stocker, T. L. and R. H. Cobean
1984 Preliminary Report on the Obsidian Mines at Pico de Orizaba, Veracruz. In *Prehistoric Quarries and Lithic Production*, edited by J. E. Ericson and B. Purdy, pp. 83-95. Cambridge University Press.

Stoltman, J. B.
1989 Quantitative Approach to the Petrographic Analysis of Ceramic Thin Sections. *American Antiquity* 54(1):147-160.

1991 Ceramic Petrography as a Technique for Documenting Cultural Interaction: an Example from the Upper Mississippi Valley. *American Antiquity* 56(1):103-120.

Stoner, W. D.
2003 Coarse Orange Pottery Exchange in Southern Veracruz: A Compositional Perspective on Centralized Craft Production and Exchange in the Classic Period. Master of Arts thesis at the University of Kentucky, http://lib.uky.edu/ETD/ukyanth2002t00066/Stoner_thesis2002.pdf.

2008 *Tepango Valley Archaeological Survey: Final Report*. National Science Foundation.

2009 *A Phase I Archaeological Survey of a Proposed 509.9-acre Coal Mine Area in Leslie County, Kentucky. University of Kentucky Program for Archaeological Research (UK-PAR 09-35, Report No. 659).*

Stoner, W. D., C. A. Pool, H. Neff and M. D. Glascock
2008 Exchange of Coarse Orange pottery in the Middle Classic Tuxtla Mountains, Southern Veracruz, Mexico. *Journal of Archaeological Science* 35:1412-1426.

Storey, R.
1991 Residential Compound Organization and the Evolution of the Teotihuacan State. *Ancient Mesoamerica* 2(1):107-118.

1992 *Life and Death in the Ancient City of Teotihuacan: A Modern Paleodemographic Synthesis*. University of Alabama Press.

Strachan, B. M.
1986 The Biostratigraphy and Paleoecology of Miocene Benthic Foraminifera from the Salin Basin, State of Veracruz, Mexico, Tulane University, New Orleans.

Stuart, D.
2000 'The Arrival of Strangers': Teotihuacan and Tollan in Classic Maya History. In *Mesoamerica's Classic Heritage: From Teotihuacan to the Great Aztec Temple*, edited by D. Carrasco, pp. 465-513. University of Colorado Press, Boulder.

Sugiyama, S.
1989 Iconographic Interpretation of the Temple of Quetzalcoatl at Teotihuacan. *Mexicon* 11(4):68-74.

2005 *Human Sacrifice, Militarism, and Rulership: Materialization of State Ideology at the Feathered Serpent Pyramid, Teotihuacan*. Cambridge University Press.

Sugiyama, S. and R. Cabrera Castro
2007 The Moon Pyramid Project and the Teotihuacan state polity : a brief summary of the 1998-2004 excavations. *Ancient Mesoamerica* 18(1):109-125.

Sullivan, K. S.
2006 Specialized Production of San Martín Orange Ware at Teotihuacan, Mexico. *Latin American Antiquity* 17(1):23-53.

Symonds, S. C.
2002 Settlement Distribution and the Development of Cultural Complexity in the Lower Coatzacoalcos Drainage, Veracruz, Mexico: An Archaeological Survey at San Lorenzo Tenochtitlan. Doctoral Dissertation, Department of Anthropology Vanderbilt University.

Tajfel, H. and J. C. Turner
1986 The Social Identity Theory of Inter-Group Behavior. In *Psychology of Intergroup Relations*, edited by S. Worchel and L. W. Austin. Nelson-Hall Publishers, Chicago.

Taube, K. A.
1992 Iconography of Mirrors at Teotihuacan. In *Art, Ideology, and the City of Teotihuacan,* pp.169-204. Dumbarton Oaks Research Library and Collections, Washington, D. C.

1992 Temple of Quetzalcoatl and the Cult of Sacred War at Teotihuacan. *Res* (21):53-87.

1993 *Aztec and Maya Myths*. British Museum Press.

Tedlock, D.
1996 *Popol Vuh: The Definitive Edition of the Mayan Book of the Dawn of Life and the Glories of Gods and Kings*. Touchstone, New York.

Thompson, V. D., P. J. III Arnold and A. M. VanDerwarker
2009 Geophysical Investigations at Teotepec, Mexico (1000 B.C.–A.D. 1000) *Journal of Field Archaeology* 34(4):439-455.

Tilley, C.
1994 *A Phenomenology of Landscape: Places Paths and Monuments*. Providence Press, Oxford.

2008 Landscape Phenomenology. In *Handbook of Landscape Archaeology*, edited by D. Bruno and J. Thomas, pp. 271-276. Left Coast Press, Walnut Creek.

Topic, J. R.
2003 From Stewards to Bureaucrats: Architecture and Information Flow at Chan Chan, Peru. *Latin American Antiquity* 14:243-274.

Trigger, B. G.
2003 *Understanding Early Civilizations: A Comparative Study*. Cambridge University Press.

Tuan, Y.
1977 *Space and Place: The Perspective of Experience*. Edward Arnold, Ltd., London.

Turnbow, C. A.
1992 The Fox Farm Site. In *Fort Ancient Cultural Dynamics in the Middle Ohio Valley*, edited by A. G. Henderson, pp. 51-68. Monographs in WOrld Archaeology No. 8. Prehistory Press, Madison, Wisconsin.

Turner, M. H.
1987 The Lapidary Industry of Teotihuacan, Mexico., University of Rochester.

Urcid, J. and T. W. Killion
2008 Social Landscapes and Political Dynamics in the Southern Gulf Coast Lowlands (500-1000 CE). In *Classic Veracruz: Cultural Currents in the Ancient Gulf Lowlands*, edited by P. J. III Arnold and C. A. Pool, pp. 259-291. Dumbarton Oaks Research Library and Collection, Washington D. C. .

Uriarte, M. T.
2006 The Teotihuacan Ballgame and the Beginning of Time. *Ancient Mesoamerica* 17(1):17-38.

Valenzuela, J.

1945a Las Exploraciones Efectuadas en Los Tuxtlas, Veracruz. *Mexico. Museo Nacional de Arqueología, Historia y Etnografía. Anales* 5:83-107.

1945b La Segunda Temporada de Exploraciones en la Région de Los Tuxtlas, Estado de Veracruz. *Mexico. Instituto Nacional de Antropología e Historia. Anales*:81-94.

VanDerwarker, A. M.

2003 Agricultural Intensification and the Emergence of Political Complexity in the Formative Sierra de los Tuxtlas, Southern Veracruz, Mexico. Doctoral Dissertation, Department of Anthropology, North Carolina University, Chapel Hill.

Vega Sosa, C.

1981 Comparaciones entre los Teteles de Ocotitla, Tlaxcala y Teotihuacan a través de Materiales Cerámicos. In *Interaccion Cultural en Mexico Central*, edited by E. C. Rattray, J. Litvak King and C. Díaz Oyarzabal, pp. 43-53. Serie Antropológica. Universidad Nacional Autonoma de México, México.

Venter, M. L.

2001 Intra-Site Settlement Organization at Formative Period Tres Zapotes, Veracruz, Mexico: A Perspective from the Spatial Patterning of Ceramic Motifs. Master's Thesis, Department of Anthropology, University of Kentucky.

2008 Community Strategies in the Aztec Imperial Frontier: Perspectives from Totogal, Veracruz, Mexico, Doctoral Dissertation, Department of Anthropology, University of Kentucky, Lexington.

Vivó-Escoto

1964 Weather and Climate of Mexico and Central America. In *Handbook of Middle American Indians.*, edited by R. West, pp. 187-215. vol. 3. University of Texas Press, Austin.

Vogel, V.

1970 *American Indian Medicine*. University of Oklahoma Press, Norman.

von Winning, H.

1987 *La Iconografía de Teotihuacan: Los Dioses y los Signos (2 volumes)*. Universidad Nacional Autónoma de México, Mexico City.

Wallerstein, I.

1974 *The Modern World-System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. Academic Press, New York.

Weber, M.
1978 *Economy and Society: An Outline of Interpretive Sociology* 2 volumes. University of California Press, Berkeley.

2002 *The Protestant Ethic and "The Spirit of Capitalism"*. Penguin Books.

Weiant, C. W.
1943 *An Introduction to the Ceramics of Tres Zapotes, Veracruz, Mexico*. Bureau of American Ethnology, Bulletin 139. Smithsonian Institution, Washington D. C.

Wells, P. S.
2005 Creating an Imperial Frontier: Archaeology of the Formation of Rome's Danube Borderland. *Journal of Archaeological Research* 13(1).

Wendt, C. J.
1998 Intra-Community Settlement Organization at Tres Zapotes: The Perspectives from a Sub-Surface Testing Program, Department of Anthropology, University of Kentucky.

2007 Buried Occupational Deposits at Tres Zapotes: The Results from an Auger Testing Program. In *Settlement Archaeology and Political Economy at Tres Zapotes, Veracruz, Mexico*, edited by C. A. Pool, pp. 32-46. Cotsen Institute of Archaeology, University of California, Los Angeles.

White, C. D., T. D. Price and F. J. Longstaffe
2007 Residential Histories of the Human Sacrifices at the Moon Pyramid, Teotihuacan: Evidence from Oxygen and Strontium Isotopes. *Ancient Mesoamerica* 18(1):159-172.

White, C. D., M. W. Spence, F. J. Longstaffe and K. R. Law
2000 Testing the Nature of Teotihuacán Imperialism at Kaminaljuyú using Phosphate Oxygen-Isotope Ratios. *Journal of Anthropological Research* 56(4):535-558.

White, C. D., M. W. Spence, F. J. Longstaffe, H. Stuart-Williams and K. R. Law
2002 Geographic Identities of the Sacrificial Victims from the Feathered Serpent Pyramid, Teotihuacan: Implications for the Nature of State Power. *Latin American Antiquity* 13(2):217-236.

Widmer, R.
1996 Procurement, Exchange, and Production of Foreign Commodities at Teotihuacan: State Monopoly or Local Control? In *Arqueología Mesoamericana: Homenaje a William T. Sanders*, edited by A. G. Mastache, J. Parsons, R. S. Santley and M. C. Sierra Puche, pp. 271-279. INAH, Mexico City.

Widmer, R. J.

1991 Lapidary Craft Specialization at Teotihuacan: Implications for Community Structure at 33:S3W1 and Economic Organization in the City. *Ancient Mesoamerica* 2(1):131-147.

Wiessner, P.

1983 Style and Social Information in Kalahari San Projectile Points. *American Antiquity* 48:253-276.

1984 Reconsidering the Behavioral Basis for Style: A Case Study among the Kalahari San. *Journal of Anthropological Archaeology*.

1985 Style or Isochrestic Variation?: A Reply to Sackett ['Style and ethnicity in the Kalahari: a reply to Wiessner' by J.R. Sackett in Amer Antiq 1985 (5O:l) 154-9]. *American Antiquity* 50(1):160-166.

Wilkerson, S. J. K.

1999 Classic Veracruz Architecture: Cultural Symbolism in Time and Space. In *Mesoamerican Architecture as a Cultural Symbol*, edited by J. K. Kowalski, pp. 110-139. Oxford University Press, New York.

Willey, G. R.

1956 Prehistoric Settlement Patterns in the New World. *Viking Fund. Publications in Anthropology* (23).

1965 Settlement Patterns of the Guatemalan Highlands. In *Handbook of Middle American Indians, Volume 3: Archaeology of Southern Mesoamerica, Part 1*, edited by Wachope and Willey, pp. 59-75. University of Texas Press, Austin.

1991 Horizonal integration and regional diversity: an alternating process in the rise of civilizations. *American Antiquity* 56(2):197-215.

Williams, H. and R. F. Heizer

1965 Sources of rocks used in Olmec monuments. In *Sources of stones used in prehistoric Mesoamerican sites*, pp. 1-39. University of California Press, Berkeley.

Williams, P. R. and D. J. Nash

2006 Sighting the Apu: A GIS Analysis of Wari Imperialism and the Worship of Mountain Peaks. *Archaeology at Altitude* 38(3):455-468.

Winter, M.

1998 Monte Albán and Teotihuacan. In *Rutas de Intercambio en Mesoamérica*, edited by E. C. Rattray, pp. 153-184. Universidad Nacional Autonóma de México, Mexico CIty.

Winter, M. C., C. Martínez Lopez and D. E. Peeler

1998 Monte Albán y Teotihuacan: Cronología e Interpretaciones. In *Los Ritmos de Cambio en Teotihuacán: Reflexiones y Discusiones de su Cronología*, edited by R. Brambila and R. cabrera C, pp. 461-473. Instituto Nacional de Antropología e Historia, Mexico City.

Wobst, H. M.

1977 Stylistic Behavior and Information Exchange. *Michigan University, Ann Arbor Museum of Anthropology Anthropological papers no* 61:317-342.

1999 Style in Archaeology or Archaeologists in Style. In *Material Meanings: Critical Approaches to the Interpretation of Material Culture*, edited by M. Schiffer, pp. 118-132. University of Utah Press, Salt Lake City.

Wolf, E. R.

1982 *Europe and the People Without History*. University of California Press.

Yarborough, C.

1992 Teotihuacan and the Gulf Coast: Ceramic Evidence for Contact and Interactional Relationships. Doctoral Dissertation, Department of Anthropology, University of Arizona.

Yoffee, N.

1995 Political Economy in Early Mesopotamian States. *Annual Review of Anthropology* 24:281-311.

Zedeño, M. N.

1997 Landscapes, Land Use, and the History of Territory Formation: An Example from the Puebloan Southwest. *Journal of Archaeological Method and Theory* 4(1):67-103.

2000 On What People Make of Places: A Behavioral Cartography. *Social Theory in Archaeology*, pp. 97-111. University of Utah Press, Salt Lake City.

Zipf, G. K.

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PUBLICATIONS

Overholtzer, Lisa and Wesley D. Stoner
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Stoner, Wesley D., Christopher A. Pool, Hector Neff, and Michael D. Glascock
2008 Exchange of Coarse Orange pottery in the Middle Classic Tuxtla Mountains, Southern Veracruz, Mexico. *Journal of Archaeological Science*, 35: 1412-1426.

Pool, Christopher A and Wesley D. Stoner
2008 But Robert, Where did the Pots Go? Ceramic Exchange and the Economy of Ancient Matacapan. *Journal of Anthropological Research*, 64: 411-423.

Thompson, Victor D., Wesley D. Stoner, and Harold D. Rowe
2008 Early Hunter-Gatherer Pottery along the Atlantic Coast of the Southeastern United States: A Ceramic Compositional Study. In *Journal of Island & Coastal Archaeology*, 3:1–24, 2008

Pool, Christopher A., and Wesley D. Stoner
2004 El Fenomeno Teotihuacano en Tres Zapotes y Matacapan: Una Discusión Comparativa. Proceedings of the 2nd Mesa Redonda de Teotihuacan, Teotihuacan, Mexico, November 2000. Instituto Nacional de Antropología e Historia, Mexico.

Stoner, Wesley D, Christopher A. Pool, Hector Neff, and Michael D. Glascock
2003 Variation in Coarse Orange Ceramic Production Recipe at Classic Period Matacapan. In *La Tinaja*, vol 14(2).

Stoner, Wesley D.
2002 Coarse Orange Pottery Exchange in Southern Veracruz: A Compositional Perspective on Centralized Craft Production and Exchange in the Classic Period. Master of Arts thesis at the University of Kentucky. http://lib.uky.edu/ETD/ukyanth2002t00066/Stoner_thesis2002.pdf

TECHNICAL REPORTS (Primary Author)

Stoner, Wesley D.
2010 Phase III Data Mitigation at 15ES111 for the Proposed Water Treatment Plant in Estill County, Kentucky (in preparation).

Stoner, Wesley D.
2010 *Phase II National Register Evaluation of 15LS205 in Leslie County, Kentucky*. University of Kentucky Program for Archaeological Research (in preparation).

Stoner, Wesley D.
2005-2010 *Multiple small Phase I survey reports throughout Kentucky.*

Stoner, Wesley D, Michael D. Glascock, and Jeffrey R. Ferguson
2008 Instrumental Neutron Activation Analysis of Aztec and Other Figurines from the site of Xaltocan, Valley of Mexico. Report written for client Lisa Overholtzer. University of Missouri research Reactor (MURR), Archaeometry Laboratory.

Stoner, Wesley D.
2008 Final Report Doctoral Dissertation Improvement Grant: Tepango Valley Archaeological Survey (NSF Grant # 0712056). Final report of field and laboratory results submitted to the National Science Foundation (NSF).

Stoner, Wesley D.
2008 Tepango Valley Archaeological Survey: Tuxtla Mountains, Southern Veracruz, México (FAMSI Grant # 07049). Final report of field and laboratory results submitted to the Foundation for the Advancement of Mesoamerican Studies, Inc (FAMSI).

Stoner, Wesley D.
2006 Petrographic Analysis of Cayuga Ceramics from the Corey Site, New York. Kentucky Archaeological Survey.

Stoner, Wesley D. and A. Gwynn Henderson
2006 Analysis of Ceramics and Fired Clay Objects at Dreaming Creek, Madison County, Kentucky. Kentucky Archaeological Survey.

Stoner, Wesley D. and R. Matt Byron
2006 An Archaeological Assessment of Areas Affected by the Proposed Rehabilitation and Improvement of Facilities Associated with the Green River Ferry in Mammoth Cave National Park (NPS Order #H553020026). Program for Archaeological Research, University of Kentucky, Lexington.

Stoner, Wesley D. and Gabrielle Leigh Paschall
2005 An Archaeological Assessment of the Rock Bridge Ridge Tract, Daniel Boone National Forest, Wolfe Co., KY. Kentucky Archaeological Survey Report No. 118.

TECHNICAL REPORTS (Non-Primary Author)

Boulanger, Matthew T, Wesley D. Stoner, and Michael D. Glascock
2008 Neutron Activation Analysis of Teotihuacan-period Pottery from the Teotihuacan Valley, Mexico. Report written for client Thomas Charlton. University of Missouri research Reactor (MURR), Archaeometry Laboratory.

Cropper, Dwight and Wesley D. Stoner
2006 An Archaeological Assessment of the LG&E Tract of the Green River Nature Preserve, Henderson County, Kentucky. Kentucky Archaeological Survey.

Rush, Carrell and Wesley D. Stoner
2006 Archaeological Testing at Site 15Ma428 in Madison County, Kentucky. Kentucky Archaeological Survey.

Schlarb, Eric and Wesley D. Stoner
2006 An Archaeological Assessment of the Bouteloua Nature Preserve, Lincoln County, Kentucky. Kentucky Archaeological Survey.

PAPERS PRESENTED AT PROFESSIONAL CONFERENCES

Stoner, Wesley D.
2010 Modeling Polity Boundaries in the Classic Period Tuxtlas. Paper presented at the 75th Annual Meeting of the Society for American Archaeology. St. Louis, MO.

Stoner, Wesley D., Maria del Carmen Rodriguez, Zenaido Salazar
2009 Olmec and Epi-Olmec Burials at Tres Zapotes. Paper presented at the 74th Annual Meeting of the Society for American Archaeology. Atlanta, GA.

Venter, Marcie L. and Wesley D. Stoner
2009 Classic to Postclassic Changes in the Tepango Valley of Southern Veracruz, Mexico. Poster to be presented at the 74th Annual Meeting of the Society for American Archaeology. Atlanta, GA

Christopher A. Pool, Michael D. Loughlin, and Wesley D. Stoner
2008 The Middle Formative Period in Western Olman. Paper presented at the meeting of the American Anthropological Association. San Francisco, CA.

Stoner, Wesley D.
2008 Interpolity Pottery Exchange in the Tuxtla Mountains, Southern Veracruz, Mexico. Paper presented at the 73rd Annual Meeting of the Society for American Archaeology in Vancouver, British Columbia.

Stoner, Wesley D. and Christopher A. Pool
2007 But Robert, Where Did the Pots Go? Debating the Economy of Ancient Matacapan. Paper presented at the 72nd Annual Meeting of the Society for American Archaeology. Austin, TX.

Thompson, Victor D., Wesley D. Stoner, and Harold D. Rowe
2005 Slice It, Digest It, and Zap It: Petrographic and Chemical Analyses of Late Archaic Ceramics from Two Shell Ring Sites on the Southeastern Coast. Paper presented at the 2005 Meeting of the Southeastern Archaeological Conference, Columbia, South Carolina.

Thompson, Victor D., Wesley D. Stoner, and Harold D. Rowe
2005 Slice It and Digest It: Petrographic and Chemical Analyses of Late Archaic Ceramics from Two Shell Ring Sites on the Southeastern Coast. Poster presented at the 2005 Meeting of the Society for American Archaeology, Salt Lake City, Utah.

Stoner, Wesley D., Christopher A. Pool, Hector Neff, and Michael D. Glascock
2003 Coarse Orange Pottery Exchange in Southern Veracruz: A Compositional Perspective on Centralized Craft Production and Exchange in the Classic Period. Presented in the Ceramic Ecology Symposium at the 2003 meeting of the American Anthropological Association, Chicago, IL.

Stoner, Wesley D., Christopher A. Pool, Hector Neff, and Michael D. Glascock
2002 A Compositional Perspective on Ceramic Production and Distribution in Southern Veracruz, Mexico. Paper presented at the 66th annual meeting of the Society for American Archaeology in Denver, CO.

Stoner, Wesley D., Christopher A. Pool, Hector Neff, and Michael D. Glascock
2002 A Compositional Perspective on Ceramic Production and Distribution in Southern Veracruz, Mexico. Paper presented at the regional meeting of the Geological Society of America in Lexington, KY.

Mink, Phillip J. II, Jim Fenton, Jo Stokes, Wesley D. Stoner, Gene Hume, and David Pollack
2001 *Points versus Polygons: Predictive Modeling in a Statewide Geographic Information System.* Paper presented at the Program for GIS and Archaeology Conference, Argonne National Laboratory, Chicago, IL.

Mink, Phillip J. II, Jo Stokes, Wesley D. Stoner, Gene Hume, and David Pollack
2001 *Update of Statewide Archaeological and Historic Structures Geographic Information System Databases.* Paper presented at the meeting of the Kentucky Heritage Council, Northern Kentucky University.

Pollack, David, Phillip Mink, Jo Stokes, Wesley D. Stoner, and Gene Hume
2000 *Distribution of Prehistoric Archaeological Sites and Historic Structures in Central Kentucky*. Poster presented at the University of Kentucky GIS Poster Day.

Pool, Christopher A., and Wesley D. Stoner
2000 *El Fenomeno Teotihuacano en Tres Zapotes y Matacapan: Una Discucion Comparativa*. Paper presented at the 2nd Mesa Redonda de Teotihuacan, at Teotihuacan, Mexico. November 2000.

GRANTS AND AWARDS

2008 $200.00 – Margaret Lantis Award for Original Research by a Graduate Student. Awarded by the University of Kentucky Department of Anthropology.

2007 $748.35 – Graduate Student Incentive Program. Awarded by the University of Kentucky Graduate School to match a percentage of funds awarded by the National Science Foundation to conduct PhD. fieldwork.

2007 $14,967 – National Science Foundation Dissertation Enhancement Grant. (NSF Grant # 0712056). Awarded to fund doctoral field and laboratory work in southern Veracruz, Mexico.

2007 $9932.00 – Foundation for the Advancement of Mesoamerican Archaeology Inc. (FAMSI Grant # 07049). Awarded to fund doctoral field work in southern Veracruz, Mexico.

2007 $800.00 – International research-related travel grant awarded by the Graduate School, University of Kentucky

2005 $2,000.00 – Susan Abbott Jamieson Grant. Awarded by the Department of Anthropology, University of Kentucky for preliminary research in the Tepango Valley, southern Veracruz, Mexico.

2005 $780.00 – International research-related travel grant awarded by the Graduate School, University of Kentucky

2005 $400.00 – Travel grant for presenting results of research awarded by the Graduate School, University of Kentucky

2003 $400.00 – Travel grant for presenting results of research awarded by the Graduate School, University of Kentucky
2002 $350.00 – Travel grant for presenting results of research awarded by the Graduate School, University of Kentucky

2001 Rate reduction granted by the National Science Foundation through the Missouri University Research Reactor (MURR).

RESEARCH SKILLS

Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) – Trained by Harold D. Rowe at the University of Kentucky, Department of Geology. Analyzed Late Archaic ceramics from the Sapelo Island Shell Ring in coastal Georgia.

Petrographic analysis – Trained at the University of Kentucky by Dr. Kevin Henke (Department of Geology) and Dr. Christopher A. Pool (Department of Anthropology). This training also involved basic crystallography and mineral chemistry. Practical experience with petrography comes from my thesis research on Coarse Orange ceramics from Mexico; a preliminary analysis of Hope Plantation Colonoware, North Carolina; analysis of Late Archaic ceramics from Georgia and South Carolina; and a preliminary analysis of Iroquois ceramics from New York.

X-ray Diffraction – Trained at the University of Kentucky by Dr. Kevin Henke (Department of Geology).

GIS (ArcGIS 9.3) – Trained by Phillip Mink at the University of Kentucky (Department of Anthropology). I use GIS in every aspect of my archaeological research from construction of models to presentation of graphics.

Ceramic Analysis – Trained by Dr. Christopher A. Pool and several others. Practical experience analyzing ceramics from several sites in Veracruz, Mexico, Kentucky, and limited experience with Iroquois ceramics. I have experience with analyzing neutron activation data for both the master's thesis and doctoral dissertation at the University of Kentucky and with ICP-OES data from Late Archaic ceramics in the Southeastern United States. I also gained experience working with compositional data for several other projects in the Basin of Mexico and the Southwestern United States while at the University of Missouri Research Reactor (MURR)

Lithic Analysis – Trained by Dr. Richard Jefferies at the University of Kentucky. Analyzed lithics from several sites in Kentucky through a class (Ant 651) in the Department of Anthropology at the University of Kentucky and through a research assistantship to Melody Pope at Wilbur Smith Associates in Lexington, KY. I have analyzed several lithic assemblages from Kentucky and Mexico, including the obsidian assemblage collected during my doctoral field work. The analyses I have conducted cover a variety of different lithic technologies, including, expedient flake and unifacial technologies, bifacial reduction, bipolar reduction, and blade core reduction.

Paleoethnobotanical Analysis – Working knowledge of theory and methods. Trained by Renee Bonzani at the University of Kentucky

Statistical Analysis – I have worked with SPSS statistical packages for basic descriptive statistics as well as powerful analytical procedures such as cluster analysis, principal component analysis, and discriminant analysis. I also frequently utilize GAUSS statistical software using routines written by Hector Neff.

MEMBERSHIP WITH PROFESSIONAL ORGANIZATIONS

2010 Member of the Southeastern Archaeological Conference (SEAC).

2003-2004 Member of the American Anthropological Association (AAA).

1999-2010 Member of the Society for American Archaeology (SAA).

2000-2001 Secretary to the Anthropological Graduate Student Association (AGSA), University of Kentucky.