THE TEOTIHUACAN VALLEY PROJECT

FINAL REPORT - VOLUME 3

THE TEOTIHUACAN PERIOD OCCUPATION OF THE VALLEY

PART 4 SPECIAL ANALYSES, MISCELLANEOUS APPENDICES, AND VOLUME BIBLIOGRAPHY

Edited by

William T. Sanders

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Preface

Part 4, This last portion of Volume 3 of the Final Report of the Teotihuacan Valley Project, dealing with the Teotihuacan occupation of the valley, includes Chapters 9-13, Appendices I-N, the volume bibliography and several pages of addenda and errata from all four publications of this volume.

Chapter 9 is a special analysis of the Teotihuacan Period ceramics from the Venta de Carpio (TC-10) excavation. The original excavation was conducted by Anthony Senulis and written up by William T. Sanders. The study published here is a modified version of a masters thesis written by Bradford W. Andrews. Our preliminary examination of the ceramics suggested that the sample pertained almost entirely to what we have defined as the Early Phase, a highly unusual situation on Teotihuacan Period sites in the Valley, and hence a special analysis could be very useful to define that phase.

Chapter 10 by Barbara J. Hodik was originally written as a Ph.D. dissertation for art education at The Pennsylvania State University. It has been modified to include only those materials directly relevant to archaeology and consist of a special analysis of what she calls formational processes, that is the manufacture of handmade figurines from the TC-8 site.

Chapter 11, written by William T. Sanders, treats of the minor artifacts - minor in terms of abundance - made of stone, ceramic, bone and shell. It was written principally to accompany the spatial analysis of artifacts published in Part 1 for TC-8. A more technical analysis of the artifacts, along with analyses in the tradition of material science, would be very useful and the author would be very amenable to provide access to the collection for any party interested in doing such analyses.

Chapter 12, written by Ann Corinne Freter and William C. Ciesielczym Jr., is an obsidian hydration study of a sample of artifacts from the TC-8 site. As the readers will note the results were somewhat unexpected and there is evidently a problem with the sample from the site.

Chapter 13, which describes the excavations conducted at the Mixcuyo site (TC-5), should have appeared in Part 1, where we described the excavations of Teotihuacan Period sites, but the original manuscript and field notes were temporarily lost and unavailable at the time of its publication. The field notes were ultimately located and William T. Sanders wrote the final report. The excavations were conducted by Jeffrey R. Parsons, then a graduate student at the University of Michigan.

Four of the five Appendices are included to enhance and illustrate the analysis and synthesis of Teotihuacan Period settlement and land use presented in Part 3. An additional purpose was to illustrate the process of analysis and to show the changing views that we held over the years of the project. Appendix J, for example, is a field report written by William T. Sanders at the end of the survey of the North Slope of Cerro Gordo, the richest portion of the survey area for Teotihuacan Period sites. Appendix L, written several years later by Thomas Charlton after a careful analysis of the surface samples, deals with the same topic and was originally written as part of a chapter in his Ph.D. dissertation. Appendices I and K are republished items from Volumes 1 and 2 respectively, the first on present day problems of land use in the same area, which provided models for our interpretation and reconstruction of land use in the past, and the second, a pre-Aztec, probably Tzacualli or Early Teotihuacan Phase irrigation system.

Appendix M written by Charles C. Kolb, is a laboratory report on the extraordinarily large sample of unworked shell found from several rooms in the TC-8 Mound 3 excavation. The analysis of this collection, along with a number of other discoveries in our analysis of our data, have had a significant impact on our concept of the rural versus urban nature of the TC-8 site.

Figures 276-288 were drawn by Charity Speers, a Pennsylvania State University undergraduate; Figures 289-294 are preliminary laboratory drawings made during the laboratory phase of the project.

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TABLE OF CONTENTS

	Page
Chapter 9 The Early Teotihuacan Ceramics from Venta de Carpio. By Bradford W. Andrews	733
A. Introduction	734
B. Venta de Carpio	736
1. Site description	736
2. Excavations	736
3. Occupational Chronology	737
C. Selection of Sample	738
1. Features	738
2. Figurines	738
D. Methods of Analysis	742
1. Methods	742
2. Comparative Studies	743
E. Description of the Paste and Ware Groups	744
1. Pastes A and B	744
2. Salt and Pepper	745
3. Copa Ware	746
4. Foreign Wares	746
Thin Orange Ware	746
Granular Ware	746
F. Description of the Vessel Forms	746
1. Ollas	747
Terminal Formative Olla Forms	747
Early Teotihuacan Olla Forms	747
Undated Olla Sherds	748
2. Hemispherical Bowls	749
3. Tecomates	750
4. Flat Bottomed Vessels	750
Incurved Flat Bottomed Bowls	750
Outcurved Flat Bottomed Bowls	751
Deep Flat Bottomed Bowls	752
Vases	752
Large Thick Walled Flat Bottomed Bowls	753
Flat Bottomed Vessel Rims and Bases	754
Flat Bottomed Vessel Rims	754
Flat Bottomed Vessel Bases	754
5. Shouldered Bowls	755
6. Comals	756
7. Shouldered Platters	757
8. Cazuelas and Craters	757
9. Censers	759
10. Composite Silhouettes	759
11. Miscellaneous Painted Sherds	760
12. Copa Ware	760
13. Foreign Ceramics	761
Thin Orange Ware	761
Thin Orange Hemispherical Bowls	761
Thin Orange Goblet/Cup	761

Thin Orange Olla 761
Thin Orange Cylindrical Vase 761
Thin Orange Box 762
Surface Treatment of Thin Orange Vessels 762
Discussion 762
Granular Ware 763
Possible Gulf Coast Cream Ware 763
G. Summary 763
1. The Features 763
2. The Ceramics 764
Early Teotihuacan Forms 764
Terminal Formative Forms 765
H. Conclusions 769
Appendix F Ceramic Attributes used in the Analysis of Features 1 and 4 781

Chapter 10 The Handmade Figurines of TC-8: 794
A Study of Formational Processes, Style, Meaning and Function. By Barbara J. Hodik
A. Introduction 796
1. Objective of the Study 796
2. Clarification of Terms 796
Descriptive and Stylistic Analysis 796
Handmade, Rural Teotihuacan Figurines 797
Santa Maria Maquixco Bajo Site, TC-8 797
B. Procedures of Investigation 797
1. Selection of Figurines 797
2. Procedures Followed in the Research 798
Preliminary Examination 798
Final Analysis 799
3. Summary 804
C. Descriptive Analysis of Handmade Figurines 804
1. Early Tzacualli 805
HH-1 805
HB-6a 806
HA-7a 806
HH-2 807
2. Early and Late Tzacualli 808
HH-9, HB-31 808
3. Early and Late Tzacualli and Miccaotli 808
HH-4 808
HH-11 809
HB-28 809
4. Late Tzacualli and Miccaotli 810
HH-5 810
HH-10 810
HB-9, 25 811
HA-1 811
HH-25 812
5. Miccaotli 812
HH-12 812
HH-15 813

HH-16 814
HH-19 814
6. Miccaotli, Early Tlamimilopa 815
HH-14 815
HB-32 816
7. Early Tlamimilopa 816
HH-6 816
HH-8 816
HB-7 817
HB-7a 817
HB-7b 817
HB-7c 817
HB-7d 818
HB-7e 818
HB-8 818
HH-13 819
HH-16 820
HH-17 820
HH-22 820
8. Early and Late Tlamimilopa 821
HH-23 821
9. Late Tlamimilopa 821
HH-7 821
10. Summary 822
D. Stylistic Analysis of Handmade Figurines 826
1. Early Tzacualli 826
Heads 827
Bodies and Appendages 828
Clothing 828
Ornamentation 828
Color 829
2. Late Tzacualli 829
Heads 830
Bodies and Appendages 830
Clothing 830
Ornamentation 830
Color 831
3. Miccaotli 831
Heads 831
Bodies and Appendages 831
Clothing 831
Ornamentation 832
Color 832
4. Early Tlamimilopa 832
Heads 832
Bodies and Appendages 833
Clothing 833
Ornamentation 833
Color 834
5. Late Tlamimilopa 834
E. Iconography and Function 834

F. Summary 836
Appendix G Format for Descriptive Analysis 837
Appendix H Description of Munsell Notation 838

Chapter 11 Miscellaneous Lithic, Ceramic, Bone and Shell Artifacts from TC-8. By William T. Sanders 840
A. Introduction 841
B. Ground Stone Artifacts Manufactured from Volcanic Materials 841
1. Introduction 841
2. Tezontle Artifacts 842
Masons Tools 842
Curtain Rings 847
Miscellaneous Artifacts 847
3. Basalt Artifacts 849
Manos and Metates 849
Pestles 849
Scrapers 850
Plaster Applicators 850
Miscellaneous Artifacts 851
4. Spheroids 853
C. Chipped Stone Artifacts 853
D. Stone Ornaments 853
E. Ceramic Artifacts 854
1. Candeleros 854
2. Miniature Vessels 857
3. Sherd Discs 857
4. Pipes - Flutes - Whistles 857
5. Pendant 858
6. Cone Shaped Artifacts 858
7. Effigies 858
8. Ear Spools 858
9. Figurine Molds 859
10. Small Moldmade Artifacts 859
11. Roof Ornaments 859
12. Seals or Stamps 859
F. Bone and Shell Artifacts 860

Chapter 12 A Reanalysis of the Pachuca Obsidian Hydration Sample from the 1961-1962 TC-8 Excavation. By Ann Corinne Freter and William C. Ciesielczym Jr. 862
A. Introduction 863
B. Reanalysis Methodology 863
1. Slide Preparation 864
2. Rim Measurements 864
C. The Calculations of the Chronometric Date Estimate 864
D. Conclusion 866
E. Comments by William T. Sanders 868

Chapter 13 Excavations at Mixcuyo (TC-5). By Jeffrey R. Parsons and William T. Sanders 879
A. The Site 880
B. Operation 1 881
C. Operation 2 882

D. Operation 3 882
E. Operation 4 882
F. Operation 5-6 883
G. Operation 7 883
H. Summary 883

Miscellaneous Appendices
Appendix I Village Economy: Cerro Gordo: North Slope (Republished from Charlton 1970) 886
Appendix J Intensive Survey of the Maquixco Alto, Teacalco Area: A Field Report, by William T. Sanders 1963 892
Appendix K Possible Tzacualli, Hydraulic Works (Republished from Sanders et al 1975) 912
Appendix L Republished Part of Chapter V, Ph.D. Dissertation by Thomas Charlton 1966 914
Appendix M Marine Shell from TC-8, by Charles C. Kolb 920
Appendix N Republished Plate (Originally Plate 4, Page 255) from the Teotihuacan Valley Project Final Report Volume 4) 924
Volume Bibliography
Errata and Addenda

Tables

Chapter 9

		Page
69	Figurine Artifacts from Teotihuacan Valley Project Excavations (Adapted from Kolb 1994)	740
70	Figurine Categories (Adapted From Kolb 1994)	740
71	Temporal Affiliations of Figurine Fragments	741
72	Temporal Affiliation of Figurines from Features 1 and 4	741
73	Temporal Affiliation of Figurine Fragments from Features 1 and 4 Minus Appendage Fragments (Adapted from Kolb ND1960)	741
74	Stylistic Temporal Affiliation for the Vessel Types from Feature 1 Midden	766
75	Stylistic Temporal Affiliation for the Vessel Types from Feature 1 Burial	767
76	Stylistic Temporal Affiliation for the Vessel Types from Feature 4 Midden	768
77	Stylistic Temporal Affiliation for Vessel Types from Features 1 and 4	769
78	Key to Sherd Color Codes Used in Table 83	772
79	Catalog Numbers Assigned to Deposits from Feature 1 of Trench 1 and Feature 4 of Trench 2	773
80	Figurine Fragments from Venta de Carpio	774
81	Figurine Fragments from Feature 1 at Venta de Carpio	777
82	Figurine Fragments from Feature 4 at Venta de Carpio	780
83	Spreadsheet of Attributes for Sherds	785

Chapter 10

84	Comparative Chronological Sequence of the Basin of Mexico	795
85	Judges' Munsell Notation of Hue, Value, and Chroma for Ten Selected Figurine Heads	802
86	Percentage of Agreement on Munsell Color Notations of Hue, Value, and Chroma	803
87	Distribution of Percentage of Agreement, Number of Responses, and Percentage of Responses	804
88	Incidence of Handmade Head Subsets with Formation Technique Types for Faces, Eyes, Noses, and Mouths	823
89	Incidence of Handmade Body Subsets with Formation Technique Types for Bodies and Clothing	823
90	Incidence of Handmade Appendage and Body Subsets with Formation Technique Types for Arms, Hands, Legs, and Feet	824
91	Incidence of Handmade Head and Body Subsets with Formation Technique Types for Headpieces, Coiffeurs, Earspools, and Necklaces	824
92	Quantity and Incidence of Handmade Heads and Associated Bodies and Appendages with Chronological Phases	825

Chapter 11

93	Tezontle Stucco and/or Plaster Applicators	843
94	Miscellaneous Tezontle Artifacts	848
95	Mano Fragments	849
96	Basalt Trapezoidal Scrapers	850
97	Miscellaneous Basalt Artifacts	851

98	Reworked Mano Fragments	852
99	Candeleros	856
100	Bone Artifacts	861
101	Shell Artifacts	861

Chapter 12

102	Obsidian Hydration Dates from TC-8	870

Appendix J

103	Prehispanic Occupations: Cerro Gordo: North Slope, Intensively Surveyed Areas	911

Appendix L

104	Tzacualli Site Areas (in Hectares): (Table 2 in Charlton 1966)	915

Appendix M

105	Teotihuacan Valley Marine Shell from Rural Sites: Teotihuacan Period, by Charles C. Kolb	923

Figures

Chapter 9

Figures 247-269 Follow Page 792

Fig. 247	Venta de Carpio in Relation to Center of Teotihuacan
Fig. 248	Venta de Carpio
Fig. 249	Mound Group 1 with Trenches 1 and 2
Fig. 250	Location of Teotihuacan Period Features in Trenches 1 and 2
Fig. 251	Feature 1 in Trench 1
Fig. 252	Olla Rims and Bases
Fig. 253	Flat Bottomed Vessels and Vase Rims
Fig. 254	Cazuela and Crater Rims and Bases
Fig. 255	Thin Orange Ware Rims and Bases
Fig. 256	Hemispherical Bowl Rims and Bases
Fig. 257	Shouldered Platter, Copa Ware, Miscellaneous Red Painted, and Tecomate Rims and Bases
Fig. 258	Comal Rims
Fig. 259	Shouldered Bowl Rims
Fig. 260	Flat Bottomed Vessels and Vase Bases
Fig. 261	Composite Silhouette and Censer Second Profiles
Fig. 262	Incised Vase Rims and Copa Ware Sherds (Exterior Views)
Fig. 263	Red Painted Sherds ((Exterior Views)
Fig. 264	Incised Incurved Bowl
Fig. 265	Punctate Impressed Hourglass Censer and Zone Burnished Composite Silhouette (Exterior Views)
Fig. 266	Miscellaneous Incised Flat Bottomed Vessel Sherds
Fig. 267	Incised Thin Orange Sherds (Exterior Views)
Fig. 268	Vessel Forms from Venta de Carpio
Fig. 269	Diagrams of Lip Edge, Support Profile, and Support Placement Attributes

Chapter 10

Fig. 270	Ground Plan of Site TC-8 Excavation (from Sanders 1965, Fig. 12): Follows Page 794	
Fig. 271	HB-6a Loincloth Styles	806
Fig. 272	View of T-foot from Inside Leg	807
Fig. 273	HA-1, Puppet Leg	812
Fig. 274	T-Shaped Headpiece, Type A	813
Fig. 275	Napkin Ring Earspool Assemblage	829

Chapter 11

Figures 276-294 Follow Page 861

Fig. 276 Tezontle Stucco/Plaster Applicator
A-C Rectangular Handle

D-E Rectangular Handle
F-G Miscellaneous Handle
H-J Grooved Handle
K-M Rectangular Handle
Fig. 277 Tezontle Stucco/Plaster Applicator
A-B Rectangular Handle
C-D Rectangular Handle
E-F Miscellaneous Handle
G-H Square Handle
I-J Rectangular Handle
Fig. 278 Tezontle Stucco/Plaster Applicator
A-B Rectangular Handle
C-D Miscellaneous Handle
E-F Square Handle
G-H Rectangular Handle
Fig. 279 Tezontle Stucco/Plaster Applicator
A-B Pyramid Shaped Handle
C-D Square Handle
E-F Miscellaneous Handle
G-H Square Handle
I-J Rectangular Handle
K-L Ring Handle
M Rectangular Handle
N-O Knob Handle
Fig. 280 Tezontle Stucco/Plaster Applicator
A-C Rectangular Handle
D-E Rectangular Handle
F-G Square Handles
H-I Knob Handles
Fig. 281 Tezontle Stucco/Plaster Applicator
A-B Pyramidal Handle
C-D Ring Handle
E-G Knob Handle
H-I Square Handle
J-K Rectangular Handle
L-M Rectangular Handle
Fig. 282 Miscellaneous Tezontle Artifact
A-B Dome Shape Artifact
C-D "Hammer"
E Grey Box
F-G Red Box
H-I Rectangular Artifact
J-K Conical Artifact
L-M Spindle Shaped Artifact
N-O Spindle Shaped Artifact
P-Q Trapezoidal Shaped Artifact
R Tubular Artifact
S-T "Hammer"
U-V Small Basin Shaped Artifact
Fig. 283 Miscellaneous Basalt Artifacts
A-E Trapezoidal Scrapers

F-G Hammer
H-I Hammer
J-K Ring Handle Stucco Applicator
L-M Ring Handle Stucco Applicator
Fig. 284 **Miscellaneous Basalt Artifacts**
A-B Rectangular Artifact
C Pestle
D-E Pestle
F-G Rectangular Shaped Artifact
H-I Disc
J Pestle
K-L Pestle
M-N Pestle
O-P Pestle
Q-R Rectangular Shaped Artifact
S-T Rectangular Shaped Artifact
U-V Reused Mano Midsection
W-X Reused Mano End
Fig. 285 Ceramic Candeleros
A-C Single Row Small Punctate
D-F Three Row Large Punctate
G-H Three Row Large Punctate
I-J Three Row Large Punctate
K-L Plain
Fig. 286 Ceramic Candeleros - All Irregular Puncate
Fig. 287 Ceramic Candeleros
A-B Fine Punctate
C-D Plain
E-G Single Row Punctate
H-I Effigy
J-K Effigy
L-M Effigy
N-O Incised
P-Q-R Fine Punctate
S-T Incised + Fine Punctate
U-V Incised + Fine Punctate
W-X Fine Puncate
Y-Z Plain
AA-BB Incised + Punctate
Fig. 288 Ceramic Censer, Pipes, Flutes and Whistles
Fig. 289 Ceramic Stamps
Fig. 290 Ceramic Adornos from Large Composite Censers
Fig. 291 Ceramic Adornos from Large Composite Censers
Fig. 292 Miscellaneous Ceramic Artifacts
A Whistle
B Whistle
C Pipe
D Effigy
E Effigy
F-G Pendant
H Wheel from a Ceramic Toy

I-J Molded Ornament
K-L Conical Artifact
M Conical Artifact
N Effigy Conch
O Effigy Melon
P-Q Ear Plug

Fig. 293 Carved Stone Ornaments
A-B Effigy
C Incised Effigy on Slate
D Green Stone Pendant
E Green Stone Pendant
F Green Stone Ear Plug
G Green Stone Pendant
H Obsidian Point
I Obsidian Bead
J Obsidian Bead
K Obsidian Bead
L Round Obsidian Tubular Artifact

Fig. 294 Shell and Bone Artifacts
A Pendant
B Perforated Disc
C Effigy
D-E Gouge
F Awl
G Awl
H Tubular Shaped Artifact
I Tubular Shaped Artifact
J Musical Rasp

Chapter 12

Figures 295-296 Follow Page 877

Fig. 295 Projected Distribution of Obsidian Dates from TC-8
Fig. 296 Actual Distribution of Obsidian Dates from TC-8

Chapter 13

Figures 297-300 Follow Page 884

Fig. 297 TC-5 Site Plan and Inset Sketch of Cerro Mixcuyo Showing Distribution of Site Components
Fig. 298
A Plan View of Units A-G
B Plan View of Units J-H
C Plan View of Units N, Level 2
D Plan View of Units N-Q
E Plan View of Units K

Fig. 299
- A Plan View of Unit F, Level 2
- B Plan View of Unit K, Level 3, Clay Floor
- C Plan View of Unit Y, 40 cm BG

Fig. 300
- A Profile Drawing of Unit K, West Face
- B Profile Drawing of Unit K, North Face
- C Profile Drawing of Unit K, East Face
- D Profile Drawing of Unit K, South Face

Appendix I

Figures 301-306 Follow Page 890

Fig. 301 Cerro Gordo: North Slope - Terrace Systems and Private Lands (Charlton 1970, Map 8)
Fig. 302 Cerro Gordo: North Slope - Modern Occupations (Charlton 1970, Map 9)
Fig. 303 Cerro Gordo: North Slope - Crop Ecology (Charlton 1970, Map 10)
Fig. 304 Cerro Gordo: North Slope - Crop Ecology (Charlton 1970, Map 11)
Fig. 305 Crop Ecology, San Cristobal Colhuacan Village Area (Charlton 1970, Map 12)
Fig. 306 Crop Ecology, Santa Maria Maquixco Village Area (Charlton 1970, Map 13)

Appendix K

Figure 307 Follows Page 913

Fig. 307 Cerro Gordo: North Slope, Possible Tzacualli Irrigation System (from Sanders Et Al 1975, Fig. 102)

Appendix L

Figures 308-314 Follllow Page 919

Fig. 308 Cerro Gordo: North Slope Miccaotli Phase (Charlton 1966, Fig. 5)
Fig. 309 Cerro Gordo: North Slope Early Tlamimilolpa Phase (Charlton 1966, Fig. 8)
Fig. 310 Cerro Gordo: North Slope Late Tlamimilolpa Phase (Charlton 1966, Fig. 9)
Fig. 311 Cerro Gordo: North Slope Early Xolalpan (Charlton 1966, Fig. 11)
Fig. 312 Cerro Gordo: North Slope Late Xolalpan (Charlton 1966, Fig. 12)
Fig. 313 Cerro Gordo: North Slope TC-41, TC-42 Site Maps (Charlton 1966, Fig. 10)
Fig. 314 Cerro Gordo: North Slope TC-40 Site Maps (Charlton 1966, Fig 7)

Plates

Chapter 10

Plates 149-165 Follow Page 838

Plate 149	Face Formation Types (FFT) 1, 2, 3, 4, 5
Plate 150	Eye Formation Types (EFT) 1, 2, 3, 4, 5
Plate 151	Eye Formation Types (EFT) 6, 7, 8, 9, 10
Plate 152	Nose Formation Types (NFT) 1, 2, 3, 4, 5
Plate 153	Nose Formation Types (NFT) 6, 7, 8, 9, 10
Plate 154	Mouth Formation Types (MFT) 1, 2, 3, 4, 5
Plate 155	Mouth Formation Types (MFT) 6, 7
Plate 156	Coiffeur Formation Types (CFT) 1, 2, 3, 4, 5 and Eye Formation Type (EFT) 11
Plate 157	Earspool Formation Types (eFT) 1, 2, 3
Plate 158	Necklace Formation Types (nFT) 1, 2, 3
Plate 159	Headpiece Formation Types (hFT) 1, 2, 4
Plate 160	Headpiece Formation Types (hFT) 5, 6, 7, 8
Plate 161	Clothing Formation Types (cFT) 1, 2
Plate 162	Body Formation Types (BFT) 1, 2, 3, 4
Plate 163	Body Formation Types (BFT) 5, 6, 7, 8
Plate 164	Arm Formation Type (AFT) 1 and Hand Formation Types (HFT) 1, 2, 4
Plate 165	Leg Formation Type (LFT) 1, and Foot Formation Types (fFT) 1, 2

Chapter 11

Plates 166-184 Follow Figure 294

Plate 166	
A	Tezontle Plastered/Stucco Applicators: Plan View
B	Same Artifacts - Profile Views of Long Sides
Plate 167	
A	Same Artifacts as in Plate 166, Profile Views of Short Sides
B	Tezontle Plaster/Stucco Applicators: Plan View
Plate 168	
A	Same Artifacts as Plate 167B, Profile View of Long Sides
B	Same Artifacts as Plate 167B, Profile View of Short Sides
Plate 169	
A	Tezontle Plaster/Stucco Applicators: Plan View
B	Same Artifact, Profile View of Long Sides
Plate 170	
A	Same Artifacts as Plate 169, Majority are Profile Views of Short Sides
B	Upper Row; Center Row, Center and Right are Tezontle Plaster/Stucco Applicators: Center Row Left, Bottom Row Left are Basalt Plaster Applicators; Lower Right Tezontle Plaster/Stucco Applicator with Pierced Handle
Plate 171	
A	Same Artifacts as Plate 170B, Profile View of Long Sides
B	Same Artifacts as Plate 170B, Profile View of Short Sides

Plate 172

A Mano Fragments

B Mano and Metate Fragments

Plate 173

A Miscellaneous Basalt Artifacts, Row 1 Left and Center Grooved Hammers, Rows 2 and 3 are all Small Tringuloid, Disc or Square Basalt Artifacts of Unknown Use. Row 4 are all well Polished Artifacts of Non Volcanic Material, the Central Artifact of which is a Fragment of an Adze

B Rows 1-2 Basalt Pestles Some are Reused Manos Ends, Rows 3-4 Small Rectangular Artifacts of Basalt of Unknown Use

Plate 174

A Miscellaneous Tezontle Artifacts of Unknown Use. Row 1 Left and Center Grooved Hammers; Row 3 Two Central Artifacts are Spindle Shaped; Row 3 Irregular Shape Artifact; the Rest are Rectangular, Square or Cylindrical Shaped Artifacts

B Cores and Flakes of Jasper/Quartz

Plate 175

A Stone Spheroids of Various Sizes and Materials, the Latter Primarily Basalt and Tezontle

B Tezontle "Curtain Holders"

Plate 176

A Row 1, and Row 2 Left and Center Artifacts are Basalt Scrapers, Row 2 Right and Row 3 Left are Polished Adzes or Celts, Row 3 Right Small Tezontle Box

B Upper Row Ceramic Prongs from Three Pronged Braziers; Lower Row Adornos from Unknown Vessel Types

Plate 177

A Ceramic Fragments from Roof Ornaments, in the Form of Marching Felines

B Ceramic Pipe Fragments: View of the Longest Dimension. Exceptions are Pipe Bowls in Row 3 Artifact to the Right and Row 4 two Artifacts to Left.

Plate 178

A Ceramic Pipes all but Row 2 Center are Views of Pipe Bowls from above

B Miscellaneous Stems or Handles of Ceramic Censers (Rows 1-3) or Pipes (Rows 4,5)

Plate 179

A Rows 1-3 Ceramic Stamps
Row 4 Solid Ceramic Ear Spools
Row 5 Solid Ceramic Ear Spools or Hollow "Napkin Ring" Type Ear Spools (Three to Left)
Row 6 Incised Slate Ornaments Left and Center; Rim of a Tecali Bowl to Right

B Rows 1-3 Unperforated Ceramic Discs
Row 4 Pierced Ceramic Discs
Row 5 the Three to the Left are Pierced Ceramic Discs, Two to Right are Wheels from "Toys"

Plate 180

A Ceramic Candeleros with Large Impressed Punctate Design

B Rows 1-3 same as A, Row 4 Molded Incised Design to the Left, Undecorated to Right

Plate 181

A Ceramic Candeleros with a Variety of Decoration, Grooved, Small Punctate + Incision, Punctate, Incision, Modelling

Plate 182

A Rows 1-4 Worked Shell Fragments or Portions of Broken Artifacts, Row 5 Unworked Shell

B Unworked Shell, Primarily Spondylous

Plate 183 Huehueteotl Censers from Three Excavations

A,D From Mound 3 TC-8. Made of Tepetate

B,E From Oxtotipac Feature. Made of Basalt

C,F From Tlaltenco, TC-46 Excavation. Made of Basalt

Plate 184

A Obsidian Types used on Distribution Maps in Part 1, Left Column Bifacial Scrapers, Center Column and Bottom Artifact in Right Column Bifacial Points and Knives*, Right Column Rectangular Blades and a Cylindrical Core

B Upper Row Left, Pestle, Upper Row Right Adze, Lower Row Left Basalt Plasterer, Lower Row Center and Right Tezontle Stucco Applicators

C Left Column Hard Stone Beads, Center Column Upper Three Artifacts, and Right Column Lower two Artifacts are made from Shell, and are probably Clothing Ornaments, Right Column Upper Three Artifacts are Bone Awls and a Needle

D Same Artifacts as B, Profile View

Chapter 13

Plates 185-189 Follow Figure 300

Plate 185

A Cerro Mixcuyo - Facing East

B Linear Feature 1

C Continuous Linear Terraces above U-Shaped Terraces

D Tlatel Area at the Base of Cerro Mixcuyo

E The Large U-Shape Platform - Site of Operation 3

F Small U-Shaped Platforms on the Lower flank of Cerro Mixcuyo

Plate 186

A Unit A, Early Phase of Excavation, Trowel Points to the North and is Located on a Hard Packed Earth Surface

B Unit B, after Excavation, Note Rough Surface of Tepetate

C Completed Excavation of Units A-B-C, Looking West, Platform A in the Background, C in Foreground

D Rock Rubble at the Base of Platform, Square E, Trowel Points North

E Rock Rubble in Square F - Trowel Points N

F Square I, Prior to Excavation in Upper Non-sherd Bearing Part of the Site - Operation 2

Plate 187

A Surface of the Tlatel Area - Note Heavy Ceramic and Rock Concentrations

B Beginning Excavation of Unit L in Tlatel Area

C Profile of Soil within U-Shaped Platform, Unit C, Operation 1

D Pit K (Operation 3) to the Base of Level 1 - Exposing the Hard Earth Floor - Trowel Points N.

Plate 188

A Units N-O Completed, Operation 5, View to East

B Surface of Unit Y - Note Heavy Sherd Concentrations - Trowel Points N

C Unit Z before Excavation - at Edge of Linear Feature 1

D Unit Z Showing Concentration of Rock Rubble - Trowel Points N

*Editor's Note: The complete bifacial knife in center of photograph is from Oxtotipac and probably pertains to that phase

Plate 189

A Wall at Base of Unit Y - Trowel Points N

B Unit Y Main E-W Wall, Just West of Corner C - Trowel Points N and is Placed on a Large Block of Hard Packed Earth - Possibly the Remnants of Melted Adobes

C Unit Y - Corner D - Trowel Rests on Tepetate and Points N

D Unit Y - Remains of Stucco Floors near Corner D - Trowel Points N

Appendix K (Republished Plates 148-151 from Volume 2)

Plates 190-194 Follow Figure 307

Plate 190 General View to West from Flank of Cerro Ahuatepec across the Barranca toward Cerro Tezqueme. Eroded Area in Center of Photo is the remains of the Barranca/Ancient West Canal. Site TF-3 is on Lower Right Flank of Cerro Tezqueme. Canal intake from the Barranca is Immediately Beyond the Maguey Plant

Plate 191 (A) View to North Showing West Canal [to Left] and Barranca [to Right] at the Canal Intake [Note Arrows];
(B) View to North of West Canal

Plate 192 (A) View to North of West Canal and Barranca Immediately below the Canal Intake; (B) View of Barranca near West Canal Intake, View to North

Plate 193 (B) View to North of West Canal, Several Hundred Meters below the Intake, the Milpa is in a Modern Check Dam [Presa]; (B) View to South of West Canal from below the Presa

Plate 194 (A) Ancient Canal System, East Canal, North Branch, Lower End a Few Hundred Meters above its Terminus at the Barranca de Tecorral; (B) Ancient Canal System, East Canal, South Branch

Appendix N (Feature from Oxtotipac Cave Excavation - Republished from Volume 4)

Plate 195

A,B Partially Excavated Feature

C Assembled Artifacts from the Feature

D,E Basalt Incensario with Modelled Huehueteotl Image

CHAPTER 9

THE EARLY TEOTIHUACAN CERAMICS

FROM VENTA DE CARPIO

Bradford W. Andrews

A. INTRODUCTION

Chronology is at the root of the matter, being the nerve electrifying the dead body of history (Laufer cited in Willey & Sabloff 1974).

The development of techniques for dating archaeological material contributed to the emergence of modern archaeology from pre-nineteenth century antiquarianism (Trigger 1989, Willey & Sabloff 1974). Beginning around the turn of this century, the culture-historical approach became the dominant paradigm in archaeology, associated with the development of such methods as stratigraphic excavation, seriation, and classification (Kroeber A.L. 1916, Pitt-Rivers 1906). These methods are still used today to establish chronological sequences, the accurate temporal information essential for understanding the evolution of prehistoric cultural systems.

The ceramic assemblage from Features 1 and 4, both undisturbed midden deposits, excavated at the site of Venta de Carpio during the Teotihuacan Valley Project is described in this paper (Sanders 1965). According to the preliminary analysis by Sanders (1995) and Sanders et al. (1975), Teotihuacan period sherds from the site were stylistically similar to sherds in Millon's (1973) Miccaotli (A.D. 150 - 300) and Tlamimilolpa phases (A.D. 300 - 500). In particular, the sherds best matched those from the early part of the Tlamimilolpa phase. If this preliminary conclusion is accurate, the materials from Venta de Carpio are valuable resources for refining our knowledge of the Early Teotihuacan phase ceramics.

This study re-evaluates the site's temporal affiliation by documenting the diagnostic characteristics of assemblages from both Teotihuacan features. In so doing, the results refine our understanding of the Teotihuacan ceramic chronology and provide the first detailed description of a ceramic assemblage from a rural "hinterland" context.

The analysis focused on evaluating the depositional integrity of Features 1 and 4 from Venta de Carpio. Feature 1 was identified as a midden/burial, while Feature 4 was classified as a midden. There are two alternative possibilities for the depositional history of these features. First, both features were deposited over a relatively short span of time. Second, both features were deposited by different occupations over a long period of time, beginning as early as the Tzacualli phase (100 B.C. - A.D. 150) and lasting until the end of the Tlamimilolpa phase (A.D. 400 - 500).

The only materials available for evaluating the depositional integrity of Features 1 and 4 were lithic and ceramic artifacts from these deposits. According to the law of association, items deposited together may be contemporary in age. If so, ceramic items should reflect homogeneity in style, decoration, and vessel form. Conversely, ceramics deposited over a long period should reflect considerably more variation in these same characteristics. The first alternative outlined above would offer broad diachronic comparative data on ceramic material affiliated with the Early Teotihuacan period. The second alternative would offer synchronic comparative data on ceramic material from the Early Teotihuacan period (A.D. 150 - 500).

Refinement of the chronological sequence for the Teotihuacan period is important for two reasons (Rattray 1973). First, good chronological control will enable archaeologists to understand how Teotihuacan's pre-eminent political and economic position in the Teotihuacan period developed. Second, a sound chronology will aid in understanding events that took place elsewhere in Mesoamerica. The expression of strong links between Teotihuacan and the greater Mesoamerican region has always been evident in the archaeological record of the Teotihuacan period.

Previous attempts at constructing a chronological ceramic sequence for the Basin of Mexico, including the Teotihuacan Valley, were initiated during the middle of this century (Vaillant 1930, 1931, 1935a, 1935b, Noguera 1935, 1943, Armillas 1944, Tolstoy 1958). Though the basic content of these earlier works has remained valid, new data collected during the 1960s augmented our knowledge of ceramics for the valley. The two principal projects undertaken at that time were the Teotihuacan Mapping Project (Millon 1973) and the Teotihuacan Valley Project (Sanders 1965, 1970, 1975).

The Teotihuacan Mapping Project consisted of intensive mapping and limited test excavations in the urban center of Teotihuacan. The artifact assemblages collected during the mapping project have added significantly to our knowledge of Teotihuacan period ceramics (Bennyhoff 1964, 1967, Kolb 1967, Muller 1967, 1978, Noguera 1965, Rattray 1973, nd, Sejourne 1966, Smith 1987). However, chronological ordering of ceramics from the city of Teotihuacan remains unreliable because few excavated deposits have good temporal context.

Efforts to refine the chronology using deposits with relatively good temporal context have met with several problems. For example, Smith (1987:3) attempted to date the developmental construction of the Pyramid of the Sun by examining associated ceramic material. He compared the ceramic chronologies derived by Blucher (1971) and Bennyhoff (1964, 1967) to assemblages found in fill deposits excavated from the Pyramid of the Sun. Smith compared existing chronological information to ceramic material deposited during short phases of construction. However, because the majority of the pyramid was built during the Tzacualli (100 B.C. - A.D. 150) and Miccaotli (A.D. 150 - 300) phases, the study was able to refine only the earliest portion of the Teotihuacan sequence. In addition, the assemblages inevitably contained some sherds from midden contexts deposited prior to their use as pyramid fill. If the study sought to define ceramic components by examining fill contexts affiliated with those components, then any earlier material had to be separated prior to compiling the diagnostic inventories specific to the phases. Failure to identify these earlier sherds may have compromised the reliability of temporal control over the material. Finally, because the sherds were used as construction fill, many were deteriorated and difficult to identify.

The Teotihuacan Valley Project (Sanders 1965) was an intensive survey of the Teotihuacan Valley designed to identify the spatial and temporal extent of its prehistoric occupation. The participants collected extensive ceramic data from prehistoric sites throughout the valley. Most of these data derived from surface collections of sites recorded during the survey. In addition, a series of sites were excavated and ceramic samples were collected with the objective of establishing control over temporal phasing.

Small sites were selected for study by the Teotihuacan Valley Project because they are less likely to contain more than one component and are thus more useful for developing a ceramic chronology. Large sites, in contrast, tend to have long occupational histories (Marcus 1976). Activities related to reoccupation or reconstruction, or both, of large sites mix deposits from different time periods. Earlier midden features may be moved during the remodeling of structures or activity areas. Subsequent refuse discarded on top of relocated midden deposits can result in confusing stratigraphy. Because soils are often softer and less compact, midden strata are frequently disturbed by burials and other intrusive activities. Moreover, structures at large sites often have construction fill consisting of artifactual debris from earlier periods. Consequently, assemblages from larger multi-component sites frequently confound attempts to order ceramics chronologically, much less those to refine a ceramic chronology. However, sites with short occupations are less likely to present these sorts of problems. Temporally diagnostic ceramic traits are more readily perceived in assemblages deposited over a brief span of time (Moseley & Mackey 1972).

Venta de Carpio was selected for excavation because of its small size and rural location adjacent to the ancient Texcoco lakebed. Although three temporally discontinuous components (Middle Formative, Early Teotihuacan, and Late Aztec) were identified at the site, this study contains details only on two Early Teotihuacan features and their associated ceramic material. The artifacts from those particular features help refine our knowledge of Early Teotihuacan period vessel forms and styles. The results provide a basis for distinguishing Early Teotihuacan rural occupations in the Teotihuacan Valley using ceramic artifacts.

B. VENTA DE CARPIO

1. Site Description

Survey teams working on the Teotihuacan Valley Project in 1963 recorded a number of sites distributed along the dried-up margin of Lake Texcoco. One of them was Venta de Carpio (TC-10), located between the rancherias of Venta de Carpio and Atlautenco on the old Mexico City-Teotihuacan highway (Fig. 248) (Kolb 1979, Marino 1965, 1975, Sanders 1994, Sanders et al. 1975). The site is situated on nearly flat terrain composed of salinized soils covered with spiky grass. The soil salinity has resulted from occasional flooding by Lake Texcoco during years of above-average precipitation. Venta de Carpio was excavated in 1963 under the supervision of John Senulis. Excavation data complete with maps are published in Sanders (1994, 1995) and Sanders et al. (1975). The Feature 1 map is reproduced as Fig. 251 in this report.

The primary excavation objective at Venta de Carpio was to obtain chronological information on ceramics that could be used to date samples collected by the surface survey. Located on the edge of Lake Texcoco (Fig. 247), archaeologists also believed the site would supply information on prehistoric water level fluctuations and changes in the shoreline important for reconstructing the Basin of Mexico's climatic history.

Venta de Carpio consists of several localized concentrations of ceramic and obsidian artifacts that were particularly dense around a number of low mounds (Sanders et al. 1975:22). The mounds were arranged in two clusters, designated Mound Groups 1 and 2 (Fig. 248) separated by about 150 m, of four mounds each. These surface mound features covered with Aztec ceramics are the remains of Aztec habitation structures.

Several modern drainage ditches cutting across the site area disturbed Formative and Teotihuacan ceramic assemblages. The Formative ceramic assemblage seems to be temporally affiliated with Vaillant's (1941) Lower-Middle Zacatenco phase (1050 - 650 B.C.). The Teotihuacan assemblage was tentatively identified as dating to the Miccaotli and Tlamimilolpa phases (Sanders et al. 1975).

2. The Excavations

Published field maps show the relative placement of features uncovered during excavations at Venta de Carpio (Sanders 1994, Sanders et al. 1975). However, a detailed stratigraphic profile was executed only for a 2 x 2 m unit in Trench 1 (1N to 1S, 9E to 11E). Therefore, the actual vertical provenience of the features described below remains uncertain because locations have been inferred from schematic drawings.

Two trenches (Figs. 248-250), designated as Trench 1 and Trench 2, were excavated in mound group 1 at Venta de Carpio. Trench 1 was 12 meters long and two meters wide; oriented along an east-west baseline (Fig. 249-250). Trench 2 was located on the edge of Mound TA-9E about 5 m north of Trench 1 (Sanders et al. 1975:23). Trench 2 consisted of a north-south trending trench five meters long and one meter wide. Excavation of 1 x 1 m grid squares in Trenches 1 and 2 was conducted using artificial, natural, and arbitrary levels.

In grid squares 4-5E, 0-1N, and 4-5E, 0-1S the Feature 1 midden was found between 60 and 70 cm below the surface with some artifacts as deep as 80 cm (Fig. 250). A human burial, found in grid square 5-6E, 0-1S of Trench 1 (Feature 1, Fig. 250), was between 60 and 70 cm below ground surface (Fig. 251, reproduced from original field map).

It is not clear whether the burial is intrusive into the adjacent Feature 1 midden (Sanders et al. 1975). The badly-disturbed flexed skeleton was lying on its right side, head facing northwest. Because no reconstructible vessels were found among the burial deposits, it is unlikely that any were left as funerary offerings. The pottery found in and around the burial is probably associated with the Feature 1 midden.

North of the Feature 1 midden deposits, a small section of adobe wall was found crossing the north extension of Trench 1 in grid square 4-5E, 1-2N (Feature 2). The identification of Feature 2 as a wall is uncertain because the hard compact clay material of the feature showed no evidence of brick-like coursing. Because Feature 1 was located adjacent to Feature 2, the burial and midden may have been situated either immediately inside or outside a Teotihuacan period habitation structure. Lack of time unfortunately prevented further investigation of their relationships.

Between squares 4E and 11E of Trench 1, a probable hard packed Formative earthen living surface was noted about 80 to 85 cm deep. A midden containing Formative artifacts, designated Feature 3 (squares 7-8E, 0-1S), was found in association with the probable living surface. Most of the midden material consisted of fragments from a few large ceramic jars.

Trench 2 contained Feature 4, consisting of a midden in squares 2-3N, 0-1W and 3-4N 0-1W (Fig. 250). Artifacts in this midden were predominantly sherds appearing to date to the Early Teotihuacan Phase. Feature 4 was the only feature noted in Trench 2 (Sanders 1994, Sanders et al. 1975).

3. Occupational Chronology

The occupation of Venta de Carpio consists of three discrete components belonging respectively to the Middle Formative (850-600 B.C.), Early Teotihuacan (A.D. 150-400), and Late Aztec (A.D. 1400-1519) (Sanders et al. 1975). Because Venta de Carpio is located along the ancient shoreline of Lake Texcoco, the cycle of occupations may relate to changing lake levels. The site is characterized by very little soil deposition over time. This condition would indicate the site was periodically exposed to wind erosion. If so, the lake level probably became lower during periods of abandonment.

Artifacts from the Middle Formative occupation were found at depths of around 75 to 95 cm situated above and below the hard-packed earthen surface and midden Feature 3 (Sanders 1994). The earthen surface may be part of a house or courtyard area. Estimates based on the extent of surface remains (2-3 ha) support the inference that the Middle Formative community was a permanently occupied village of about 100 people (Sanders et al. 1975).

The site probably consisted of adobe-walled house clusters with intervening unroofed areas. However, few figurine fragments or stone tools were associated with the Formative remains. This restricted assemblage, therefore, supports the conclusion that the site was a locus of special-purpose exploitation during the Middle Formative. Based on the geographic location of the site, two possible forms of activities were fishing or salt-making, but the lack of fishing-related artifacts makes the latter possibility more reasonable.

According to Sanders (1994), the Teotihuacan period occupation is heavier than the Formative, despite a similar spatial distribution. The Teotihuacan occupation may have been a larger, more tightly nucleated settlement than the Middle Formative one. Unfortunately, direct evidence of house site distribution was not encountered.

The majority of the Teotihuacan occupation lies between 50 and 70 cm depth, with occasional Teotihuacan remains found as low as 80 cm. The Teotihuacan inhabitants may have used some of the scattered Formative mounds as platforms for their houses (Sanders 1994), and may have reused some of the Middle Formative middens.

In contrast to the Formative artifacts, the Teotihuacan assemblage contained the entire array of residential ceramic and lithic artifacts (Sanders 1994). Kolb (1979:389) suggests that the Teotihuacan occupation was a small nucleated village of 100-200 people. Because of salinized soils, the inhabitants, like the Formative occupants, may have practiced either salt-making or fishing rather than agriculture.

The remains of the Aztec occupation were concentrated between 12 and 30 cm below the surface, and were less dense than the Teotihuacan Period remains (Sanders 1994). During Aztec times, the site consisted of two isolated house mound clusters situated on the outer fringe of TA-9, a large site extending up the slope of Cerro Chiconautla (Fig. 248). Again, it is hypothesized that the Aztec period inhabitants may have been fishermen who primarily supplied TA-9 with aquatic resources.

C. SELECTION OF THE SAMPLE

1. Features

Reoccupation and sequential construction is the best explanation for the superimposition of Formative, Teotihuacan, and Aztec artifact-bearing deposits at Venta de Carpio. Architectural remodeling episodes and intrusive features, such as burials (Feature 1) and cooking pits, may have caused additional mixture of deposits in some areas of the site. These conditions precluded the use of seriation techniques as a viable method for arranging the ceramic data chronologically.

To reevaluate the temporal affiliation of Venta de Carpio's Teotihuacan period component, a ceramic sample with the best context was selected. During the initial stages of analysis, the sherds from the Middle Formative, Teotihuacan, and Aztec period components were separated from one another (Sanders pers. comm.). Most of the sherds associated with Features 1 and 4 exhibited Teotihuacan period characteristics. Because of their good context relative to the other deposits at Venta de Carpio, the sherds from Features 1 and 4 were selected as the sample (see Table 79). Hereafter, the contents of both features will be referred to as the sample for this study.

Of the two features comprising the sample, Feature 1, consisting of a burial and midden found in Trench 1 (Figs. 250-251), seems to be the most disturbed. This inference is based on conditions encountered during the excavation of Trench 1 (Sanders 1994). In general, Trench 1 contained the bulk of Formative material recovered (i.e., Feature 3, a Formative midden and a possible Formative living surface). The greatest quantity of Teotihuacan artifacts were found directly on top of the Formative concentrations. Therefore, Sanders et al. (1975:26) suggest that the Formative and Teotihuacan deposits may overlap, having been considerably mixed. This condition increases the possibility of Formative artifacts in the Feature 1 ceramic sample.

The Feature 1 burial was probably an intrusion into the Feature 1 midden, thereby contributing further to the mixing of Trench 1 deposits. Therefore, the Feature 1 assemblage may contain sherds affiliated with the later burial, if there were any ceramic accompaniments. Absolute dates for the burial and midden are not available and, as a result, the temporal affiliation of the sample may be broader than expected. Moreover, the burial may have been subjected to later disturbance because the bones had been moved around and most were missing (Sanders et al. 1975:24).

The only significant cultural manifestation found in Trench 2 was the Feature 4 midden (Sanders et al. 1975:22-27). The excavation notes for Trench 2 do not indicate as much potential for deposit mixture as was evident in Trench 1 (Sanders et al. 1975:22-27, Senulis Fieldnotes nd). However, Trench 2 cut through a portion of an Aztec house mound before encountering the deeper remains of the Feature 4 midden. Construction or use of the site during the Aztec period may have affected the integrity of the underlying Teotihuacan midden.

2. Figurines

Besides stratigraphic information, the figurine data from Venta de Carpio have provided additional support in favor of a pre-Xolalpan affiliated Teotihuacan component. A figurine typology was developed by Kolb (1994) using the artifacts recovered from 55 of 131 sites recorded during the Teotihuacan Valley Project. Chronological data on the figurines came from excavations conducted at 5 of the 55 Teotihuacan Period sites during the project. These sites consisted of Santa Maria Maquixco Bajo (TC-8), Cerro Mixcuyo (TC-5), Venta de Carpio (TC-10), Tlaltenco (TC-46), and Tenango (TC-49), which collectively yielded a sample of 2978 figurines (Table 69). An additional 1343 Teotihuacan Period figurines incorporated into the typology came from surface survey collections. A total sample of 4301 figurines was used to derive the typology (Kolb

1994).

Kolb's (1994) typology is a modified type-variety system that emphasizes the morphological form and the technology used to manufacture the figurines as the primary basis for classification. Initially, Kolb separated the figurine fragments into either handmade or moldmade specimens. He further divided the figurines into head, body, or torso, and unattached appendage fragments (hands, feet, arms, legs, tripod prongs, etc.). A total of 205 figurine types were defined.

Each type has an alpha-numeric designation consisting of two capital letters followed by a sequential series of numbers that correspond to the six figurine type subcategories (Table 70).

Table 69, Figurine Artifacts from Teotihuacan Valley Project Excavations (adapted from Kolb 1994).

Excavated Sites	Fig. Artifacts Recovered
TC-8	2150
TC-5	294
TC-10	412
TC-46	43
TC-49	59
Total	2958

Table 70, Figurine Categories (adapted from Kolb 1994).

Alphabetic Symbols	Figurine Fragments Category	No. of Types Defined
HH	Handmade Head	41
MH	Moldmade Head	58
HB	Handmade Body	30
MB	Moldmade Body	50
HA	Handmade Appendage	24
MA	Moldmade Appendage	2

The subcategories were ranked in the order shown in Table 70 for two reasons (Kolb 1994). First, handmade figurines are known to be chronologically earlier than their moldmade counterparts. Second, the Head-Body-Appendage hierarchy reflects the chronologic value of the data; head fragments have the most chronologic value, whereas appendage fragments have the least.

Table 80 lists all of the figurines and their designated types found at Venta de Carpio. Most head and body types have been assigned temporal affiliations that span no more than four phases. These phase affiliations are usually indications that a specific figurine type falls into either the early portion of the Teotihuacan (Tzacualli to Late Tlamimilolpa, 100 B.C. to A.D. 500) or the latter portion of the Teotihuacan (Early Xolalpan to Metepec, A.D. 500 to 750) sequence. However, the appendage fragments have very little diagnostic value because most types persist throughout the Teotihuacan period. Although the Venta de Carpio figurine sample has styles dating to all phases of the Teotihuacan period, most are affiliated with the earlier phases (Table 3).

Kolb (1994) concluded that appendage fragments have little diagnostic value because many of the appendage types were manufactured during all Teotihuacan period phases. Therefore, appendage fragments would weigh lightly in an argument refuting the overall earlier Teotihuacan date for the Venta de Carpio features. If the appendage fragments are removed from the figurine sample then 47, or 82%, (13HH + 34HB = 47: Appendices 3 & 4, Tables 4 & 5) may date to the Teotihuacan phases prior to the Early Xolalpan.

Tables 81 and 82 list the figurine fragments found in Features 1 & 4 at Venta de Carpio. These features contained 50% (211) of all figurine fragments. If the appendage fragments with styles persisting throughout the Teotihuacan period are included (HA-15, HA-20, and HA-24), then as many as 73% (151) of the types in Features 1 & 4 could have been manufactured prior to the Early Xolalpan phase (Table 82).

Table 71, Temporal Affiliations of Figurine Fragments.

Figurine Type Category	Occurring Before Early Xolalpan		Spanning Entire Teotihuacan Period		Totals	
	n	%	n	%	n	%
Handmade Head	25	100	0	0	25	6
Handmade Body	68	85	0	0	68	17
Handmade Appendage	25	9	185	74	210	51
Moldmade Head	0	0	0	0	0	0
Moldmade Body	0	0	0	0	0	0
Moldmade Appendage	2	100	0	0	2	.5
Totals	120	29	185	45	305	74

Table 72, Temporal Affiliation of Figurines from Features 1 & 4

Figurine Type Category	Occurring Before Early Xolalpan		Spanning Entire Teotihuacan Period		Totals	
	n	%	n	%	n	%
Handmade Head	13	100	0	0	13	6
Handmade Body	34	89	0	0	34	16.5
Handmade Appendage	12	9	91	88	103	50
Moldmade Head	0	0	0	0	0	0
Moldmade Body	0	0	0	0	0	0
Moldmade Appendage	1	100	0	0	1	.5
Totals	60	29	91	44	151	73

Table 73, Temporal Affiliation of Figurine Fragments from Features 1 & 4 Minus Appendage Fragments (from Kolb nd:60).

Figurine Types	Quantity	Percent of Total
Handmade Head Fragments	13	22
Handmade Body Fragments	38	64.5
Moldmade Head Fragments	3	5
Moldmade Body Fragments	5	8.5
	59	

D. METHODS OF ANALYSIS

While the sample of 470 sherds from Venta de Carpio's Features 1 and 4 seems small, it is still useful. Most of the body sherds from the site were left in Mexico when the sample was brought to the United States. Accordingly, the sherds analyzed here must be regarded as representative of a relatively large number of vessels deposited during the Teotihuacan occupation at the site. The majority of these sherds exhibit diagnostic attributes. Because of the size and location of the site, the range of vessel types represented, and the absence of artifacts related to specialized activities (i.e., ceramics related to salt production, etc.), the sample is likely the result of general use residential discard. Among the 470 sherds, 268 were rim sherds. If none of the rim sherds came from the same vessel, there is a maximum of 268 vessels in the sample.

Although a sample of 470 sherds is small, a sample of 268 vessels from a residential setting is large. By viewing the entire assemblage of sherds (especially the rim sherds), the sample can be used to infer the range of vessel function categories represented, and, by examining its composition, the presence of different occupational components. The conclusions ultimately drawn from this analysis are based on these assumptions.

The sherds from Features 1 and 4 were sorted first by paste and surface finish, then by vessel form. In turn, the vessel form attributes coded from the sample were compared to previously published Teotihuacan period ceramic studies. This section briefly summarizes the methods used to sort the Venta de Carpio Feature 1 and 2 sample. Appendix F is a description of how the attributes were coded and what their respective symbols stand for (both alphabetic and numeric). Table 83 is a spreadsheet listing of raw data.

1. Methods

The sample was first sorted by paste types described below. To expose the paste for examination, a small portion of each sherd was broken with a pair of pliers. The freshly broken interior of each sherd was then examined with the naked eye. General distinctions of clay grain size and the size and frequency of aplastic inclusions were noted. This process enabled sorting of the sherds into very broad paste categories.

Identification of some rare paste types (Copa, Granular, Thin Orange, see descriptions below) were also aided by examination of sherd surface treatment and vessel form affiliation. However, the majority of sherds had burnished surfaces and were either paste types A or B (see descriptions below). This project concentrated on the basic vessel forms from Venta de Carpio's Teotihuacan component. Therefore, more detailed analysis of paste types by such methods as petrographic or chemical testing was not necessary. The paste types were then sorted into identifiable vessel forms. For each sherd, 25 attributes (where applicable) were coded onto a computerized spreadsheet generated by Quattro Pro (see Table 83). The profiles of different rims and bases from the separate vessel forms were drawn and assigned numbers (Figs. 252-261). In addition, sherds with surface decoration such as incision and painted designs were drawn (Figs. 262-267).

A number of rim sherds were classified as unknown because they were either too fragmentary or too deteriorated to place them in a vessel form category. These rim sherds, as well as the body sherds in the sample, were not drawn, but their paste type, surface treatment, and sherd thickness were recorded. As we pointed out, most body sherds were removed from the overall Venta de Carpio sample prior to being transported from Mexico to the United States, so the tallies of body sherds are considerably lower than what was actually found during the excavations (Sanders pers. comm.).

After coding the sherds, morphological characteristics, paste type and surface treatment for each identified vessel form were described (see Description of the Vessel Forms section). This information was compared to ceramic information provided by other Teotihuacan period archaeological investigations undertaken in Highland Mexico. By far, the most useful comparative attribute for assigning temporal affiliation to a particular vessel form seems to be rim morphology. The challenge of distinguishing paste varieties, and, to a great extent, the widespread use of burnishing for surface treatment, may be largely responsible for an emphasis on changes in Teotihuacan period vessel rim form. This is especially true for ceramic samples like Venta de

Carpio that have few examples of decorative surface treatment such as painting or incision. By comparing the characteristics of the Venta de Carpio sample to other studies from the region, inferences on the site's chronological affiliation were drawn.

2. Comparative Studies

Not surprisingly, the most useful studies employed for comparison were those describing material from the Teotihuacan Valley (Blucher 1971, Kolb 1973, Rattray 1973, Sanders et al. 1975, Smith 1987). From a general perspective, Muller (1967, 1978) provided additional information, although her descriptions and drawings are neither thorough nor comprehensive. Hirth's (1980) description of ceramics from the Valley of Morelos helps to support the notion that some Teotihuacan vessel forms from the Basin of Mexico had a larger spatial distribution. The following is a summary of the comparative studies used to analyze the Venta de Carpio material.

Darlena Blucher (1971) described the Late and Terminal Formative ceramics from the site of Tlachinolpan, located in the northeastern sector of Teotihuacan, the main locus of occupation prior to the city's major expansion during the Miccaotli and Tlamimilolpa phases (A.D. 150 to 500). Blucher's main objective was to gain information on settlement distribution in the Teotihuacan Valley for the period 300 B.C. and A.D. 150 (Blucher 1971:6). Studying the extent and intensity of cultural continuity from Late Formative through the Teotihuacan period is important for understanding the evolution of Teotihuacan period Teotihuacan.

Tlachinolpan was selected because surface collections from the site were predominantly composed of Patlachique phase ceramics (250 to 100 B.C.), with almost no evidence of post-Tzacualli ceramics (after A.D. 150). The virtual absence of post-Tzacualli phase occupation enabled the study of Terminal Formative assemblages with relatively good stratigraphic context. Blucher (1971:278) sorted her ceramics first by ware categories and then by vessel form. These categories were then phased based on general form, lip and rim modifications, paste, temper, color, finish, and decoration. Since most comprehensively defined ceramic complex from Tlachinolpan dates to the Patlachique phase, Blucher's descriptions were useful for identifying Venta de Carpio sherds exhibiting Terminal Formative vessel characteristics.

Kolb (1973) presents an analysis of Thin Orange sherds recovered from the survey surface collections and excavations conducted during the Teotihuacan Valley Project. It contains detailed information on physical properties (color, hardness, texture, aplastic contents, and firing variations) and cultural (methods of manufacture, surface treatment, decorative techniques, vessel shapes and rim forms, vessel sizes and wall thickness, and function of the vessels) of Thin Orange ware. The chronological affiliation of vessel forms and their decorative techniques were useful for analyzing the Thin Orange sherds from the Venta de Carpio sample.

Muller (1978, 1967) developed a ceramic chronology based on material from excavations at supposed ceremonial contexts throughout the city of Teotihuacan. Her chronology begins with the Tezoyuca phase (300 B.C.) and ends with the Spanish conquest (A.D. 1521). However, this study has minimal utility because it lacks descriptive and illustrative detail. The material is classified into ware categories by phase. For each ware category, specific vessel forms are described with reference to attributes such as paste, morphological characteristics, manufacturing technique, and decorative styles where these attributes are applicable.

Rattray's (1973) ceramic classification proved to be invaluable in the analysis of the ceramics from Venta de Carpio. This classification, intended as a relative rather than an absolute chronology, is based on ceramic data collected during the Teotihuacan Mapping Project (Millon 1973) and describes material from the Early Tzacualli (100 B.C.) through the Early Tlamimilolpa (A.D. 400) subphases. This block of time corresponds to the tremendous urban expansion that occurred at Teotihuacan period Teotihuacan.

Rattray (1973) sorted sherds into ware categories defined by paste, surface finish, vessel form, and decoration. Based on diagnostic modes, the ware categories were lumped together into ceramic complexes associated with chronological phases. The illustrations of ceramic material from the phase specific ceramic complexes were excellent sources of comparative data.

Sanders et al. (1975) contains descriptions of Formative period data recovered from excavations at Venta de Carpio, Cuanalan, Tezoyuca, and El Tepalcate. These data sets were classified to establish a relative chronology and gain an understanding of vessel function. Sanders et al. (1975:16) found that attributes associated with vessel form, while obviously related to function, were also significant markers of chronological change. The classificatory emphasis was on ceramic varieties derived by grouping rim sherds similar in form, surface color and treatment, decorative technique, and, to a lesser extent, decorative design.

The Sanders et al. (1975) classification described primarily material dating to the Chiconautla phase (850 to 650 B.C.), the Cuanalan phase (650 to 300 B.C.), and the Tezoyuca phase (300 to 250 B.C.). In addition, a limited amount of data from the Patlachique (250 to 100 B.C.) and Tzacualli (100 B.C. to A.D. 150) phases were also included. This study was useful for comparing and describing Terminal Formative and Early Teotihuacan ceramic vessel forms and styles.

Smith (1987) used a type-variety system to classify ceramics recovered from the Pyramid of the Sun in order to date its construction. Smith (1987:7) sorted his material first by ware groups and then distinguished types based on decorative modes. Major construction of the pyramid occurred during the Late Tzacualli to Miccaotli phase transition (A.D. 150). As a result, Smith's (1987) study contains information primarily on Tzacualli phase ceramics, though some information on Miccaotli and Tlamimilolpa phase material is also included. Because the sherds analyzed came from construction fill deposits, most were deteriorated and consequently provided little information on surface treatment.

Hirth (1980) reports on the settlement survey of the Rio Amatzinac Valley in eastern Morelos, and describes previously established Central Mexican ceramic types used to date the surface collections obtained during the survey. The ceramic types are presented in three temporal groups, Terminal Formative (150 B.C. to A.D. 200), Early Teotihuacan Period (A.D. 200 to 500), and Late Teotihuacan Period (A.D. 500 to 750). The correlation of the Amatzinac ceramic types with other types from the highland region indicates widespread similarities.

E. DESCRIPTION OF THE PASTE AND WARE GROUPS

Sherds from the Venta de Carpio sample were separated into paste types or wares. Paste types are defined here as groups of sherds that appear to have similar composition. The paste types identified in the sample consist of A, B, and Salt and Pepper. Ware categories are defined here as groups of sherds with similar paste type and surface finish. The ware categories identified in the sample are Copa, Thin Orange, and Granular. The Copa Ware, supposedly indigenous to Teotihuacan, is also distinguished by vessel form (cups, goblets, small bowls). Thin Orange Ware and Granular Ware are distinct foreign ceramic groups widely reported and described in Central-Mexican archaeological literature.

1. Pastes A and B

The majority of sherds in the sample (89%) were identified as either A or B paste. Both of these paste types appear to have been composed of similar local clays and as such, both types actually represent extremes along a continuum. Vessels from both groups probably belong to broad functionally distinct categories. Therefore, the specific clays corresponding to both paste types may have been selected or modified on the basis of designated use in regard to quantity of aplastic inclusion, techniques of manufacture, and firing temperature. Because these categories are the probable expression of a continuum, it was difficult to place some sherds into one type or the other.

Studies using x-ray diffraction (Upchurch nd, cited in Rattray 1973:49), neutron activation (Abascal, Harbottle, and Sayre 1974, Sheehy 1992) and petrographic analysis (Sotomayor 1978, 1968) have confirmed that the majority of vessels from Teotihuacan period Teotihuacan were manufactured from very similar local clay deposits. The clays come from the Becerra formation that underlies large parts of the Basin of Mexico. Because the majority of the Venta de Carpio sample is characterized as A or B paste, it is likely that these paste groups come from Becerra formation clays.

The most important criteria for distinguishing the A and B paste groups are aplastic size, aplastic frequency, and coloration. Differences in aplastic composition may be the result of conscious decisions by a potter to add either fine-or coarse-grained temper to the clay according to the vessel being manufactured. Whether the archaeologist can consistently distinguish intentionally added aplastic from natural inclusions present in clay sources is controversial (Arnold 1974). However, if the majority of Teotihuacan ceramics were composed of similar Beccera formation clays, then the aplastic difference between A and B paste groups may reflect intentional modification. Alternatively, Teotihuacan potters may have exploited clay sources nearly similar in composition except for proportion and size of aplastic components.

Paste A sherds are relatively soft (easily broken with pliers), contain many large-grain aplastic inclusions such as sand or quartzite, and are orangish brown to dark brown. Many of them have a non-oxidized core, perhaps from low firing temperatures or high proportions of organic material. The thickness of some paste A sherds (0.8 to 1.5 cm) may explain the great frequency of large temper fragments whose presence would enable better heat conduction during the firing process.

Compared to paste A sherds, paste B specimens have a more homogenous composition, a probable result of more thorough oxidation of the B paste vessels during the firing process. This paste group may have been fired at higher overall temperatures or contained less organic material than the paste A group. Paste B sherds are harder, have little to no visible aplastic inclusions, and generally exhibit a light brown to tan coloration. Most of the paste B sherds are less than 1 cm thick.

2. Salt and Pepper Paste

The Salt and Pepper paste sherds from the Venta de Carpio sample closely resemble the Tzacualli Salt and Pepper paste described by Rattray (1973). Considered by Kolb (1979) a good Tzacualli phase diagnostic, a similar Salt and Pepper paste helped to sort out Tzacualli components in surface collections from the Teotihuacan Valley Project.

Salt and Pepper sherds from Venta de Carpio are predominantly medium textured, although a few coarse-textured sherds are also included. The paste is predominantly brown (7.5YR 5/4 & 5/6) and light brown (7.5YR 6/4) with a few examples of red (2.5YR 4/8). The aplastic inclusions consist of white and black particles averaging 0.05 cm in diameter. White aplastic particles are the most visible because they are generally large in size (as much as 0.2 cm in diameter) and high in frequency. Some sherds have a uniform well-fired matrix while others have a dark interior core indicative of incomplete oxidation. Vessel forms associated with this paste type include ollas and comals.

The Salt and Pepper paste described by Rattray (1973) and Kolb (1979) is slightly different from the variety from Venta de Carpio. Rattray's (1973:76) Salt and Pepper paste is characterized as medium-fine in texture with many black and white aplastic inclusions. She lists ollas, cazuelas, and bowls as vessel forms associated with this paste type.

According to Kolb (1979), surface sample TC-46-10 (from the Teotihuacan Valley Project) contains primarily sherds with a medium-to fine-textured Tzacualli Salt and Pepper paste. Differing from the Venta de Carpio Salt and Pepper sherds, the aplastic inclusions were smaller, ranging in size from 0.025 to 0.05 cm in diameter. In addition, most of the TC-46-10 sherds were well-fired and reddish brown (5YR 4/4, 4/6, and 5/6).

The differences observed among Salt and Pepper paste varieties are not extreme. However, considering the temporal phasing of Teotihuacan ceramics based on paste types, these differences are certainly worth noting. It is possible that the character of Salt and Pepper paste found at Venta de Carpio falls within the range of other varieties dating to the Tzacualli period. On the other hand, future research may conclude that Venta de Carpio Salt and Pepper paste fits within the range of variation present for the Teotihuacan period A paste.

3. Copa Ware

The Venta de Carpio sample contained three Copa Ware sherds. Vessel forms associated with Copa Ware are predominantly thin-walled cups and goblets. The paste is very fine, with a tan coloration, and is usually completely oxidized. As a result, these sherds have a relatively hard, almost "china-like" texture. Widespread manufacture of this ware was initiated sometime after the Tlamimilolpa phase, and is therefore considered a Late Teotihuacan Period marker.

4. Foreign Wares

Foreign wares identified in the Venta de Carpio sample include Thin Orange (Armillas 1944, Kolb 1973, Seler 1915, Shepard 1946, Vaillant 1938), and Granular (Hirth & Cyphers-Guillen 1988, Linne 1934, Muller 1978). These wares are considered foreign intrusives based on distinct pastes and vessel types.

Thin Orange Ware

Thin Orange ware is one of the most visually distinct ware groups found in prehistoric Mesoamerica. Thin orange sherds from five sites excavated during the Teotihuacan Valley Project (including Venta de Carpio) have a Munsell range of reddish yellow to yellowish red (Kolb 1973). Besides vessel side wall thickness ranging from 2 to 7 mm, these sherds have very distinct temper types consisting of white particles of quartzite, calcite and muscovite mica. The most common vessel form is the hemispherical bowl with an annular base. Thin Orange Ware probably originated somewhere in southern Puebla (Kolb 1973, Rattray 1981).

Granular Ware

Granular Ware is characterized by a pinkish or yellowish paste with dark grains of igneous temper (Muller 1978, Rattray 1973). Because the paste is very porous, Granular Ware sherds are evenly oxidized. The most common vessel form is an amphora. Red paint over a white slip is the customary surface treatment for this ware. Petrographic studies point to Morelos or Guerrero as a possible location of origin for the ware (Sotomayor 1978).

At the site of Xochicalco in Morelos, granular sherds found in phase E assemblages (400 B.C. to A.D. 200) occur with frequencies as high as 44% (Hirth and Cyphers-Guillen 1988). Such a predominance would tend to support the hypothesis that granular ware, at least during the Late and Terminal Formative, may have been manufactured in Morelos. However, during the Teotihuacan Period, granular ceramic types are most common in Guerrero. Teotihuacan period amphoras resemble vessels according to Aztec tribute lists, used, for transporting honey from Guerrero (Dibble and Anderson 1959). Based on this similarity, Sanders (pers. comm.) suggests that Granular Ware amphoras may have been used to import honey from either Morelos or Guerrero to Teotihuacan.

F. DESCRIPTION OF THE VESSEL FORMS

The Venta de Carpio ceramic sample from Features 1 and 4 totalled 470 sherds. Vessel forms or foreign pastes were identified for 53% of these sherds. Unidentifiable rim sherds constituted 14% of the sample (Table 83: V-For 22). Body sherds comprised the remaining 33% (Table 83: V-For 23). There are 268 rim sherds (65 of these are unidentifiable) in the assemblage. Consequently, among Features 1 and 4, there is an estimated maximum of 268 vessels represented. If this assemblage is the product of residential refuse, it should contain a vessel inventory typical of domestic household units at the time of its deposition.

1. Ollas

Ollas are defined as globular-bodied vessels with necks. Although usually this vessel form is distinguished from jars (smaller than ollas), here they are treated as the same vessel form. Ollas were probably used for storage of water or food but also may have been used for cooking. Necks, in comparison with the size of the vessel, are relatively high, measuring 2 to 4 cm. from articulation with the vessel body to the top of the rim. Olla rims are valuable diagnostic markers in highland Mexico. The rim forms from this sample resemble forms reported for the Late Cuanalan, Patlachique, Tzacualli, Miccaotli, and Tlamimilolpa phases. Rims resembling Late Cuanalan, Patlachique, and Tzacualli phase styles will be treated as Terminal Formative olla forms; those resembling Miccaotli and Tlamimilolpa phase styles will be treated as Early Teotihuacan Period olla forms.

Terminal Formative Olla Forms

Subsample: 15 rims
3% of sample; V-For 7 (Table 83)

Form. Olla forms exhibiting Terminal Formative characteristics have slightly to moderately everted rims bevelled on the outside and ranging in diameter from 14-30 cm. Body sherds range between 0.3 and 1.3 cm in thickness.

Paste.

A Paste: 7 rims
B Paste: 1 rim
Salt and Pepper Paste: 6 rims
Unknown Paste: 1 rim

Surface Treatment. Sherd surfaces range from light brown (7.5 YR 6/6 & 7/6, 10 YR 7/3), through brown (5 YR 4/3, 7.5 YR 5/6 & 5/4), to dark brown (7.5 YR 4/2). Smudged portions range from black (7.5 YR 2/0) to dark grey (10 YR 2/1 & 3/1).

Nearly all (90%) Terminal Formative rim sherds have high and low quality horizontal burnishing on the interior neck and upper rim surfaces. On 92% (n = 12) of the Terminal Formative rim forms, the external neck has been horizontally wiped with a stiff brush or cloth. Only two of the rim sherds had extant portions of the exterior vessel body, both burnished.

Comparable Material. Rim forms R6, R7, R8, and R9 identified in the sample (Fig. 6) resemble many previously reported examples of Terminal Formative olla rims (Hirth 1980, Fig. 17 d, Rattray 1973, Fig. 18 e & d, Sanders et al. 1975, Fig. 68 h & Fig. 69 a). Also recognized in the sample, rim form R7 (Fig. 6) resembles two Terminal Formative examples illustrated in Sanders et al. (1975, Fig. 69 b & d). Rim R44 (Fig. 6) from Feature 1 resembles a Cuanalan phase (650 to 300 B.C.) rim illustrated in Blucher (1971, Fig. 49 a).

Though burnishing of varying degrees is mentioned in the literature, there are no specific descriptions of Terminal Formative ollas with horizontal burnishing on the interior neck and rim, and horizontal wiping on the exterior neck. Comparable Terminal Formative ollas from the Valley of Morelos have poor burnishing in comparison to those at Venta de Carpio.

Early Teotihuacan Period Olla Forms

Subsample: 1 partial vessel, 33 rims
7% of sample; V-For 7 (Table 83)

Form. Olla forms exhibiting Early Teotihuacan characteristics have moderately to strongly everted rims typically flattened on the upper surface (see Fig. 252 R1, R2, R3, R4, R5, & R10). Rims range from 16 to 32 cm in diameter. Body sherds range between 0.3 and 1.3 cm in thickness.

Paste.

A Paste: 31 rims

Salt and Pepper Paste: 3 rims

Surface Treatment. Sherd surfaces are predominantly brown (5 YR 4/3 & 5/4, 7.5 YR 4/4, 4/6, 5/4 and 5/6), but light brown (7.5 YR 6/4), and dark brown (7.5 YR 4/2) are also represented. One sherd (10,632-31) has a red slip (2.5 YR 4/6). Smudged surfaces range from black (7.5 YR 2/0) to dark grey (10 YR2/1 & 3/1).

Similar to the Terminal Formative olla forms, more than 95% of the Teotihuacan style sherds have a low to high quality burnish on interior neck and upper rim surfaces. Most of those sherds (86%) with exterior neck surfaces intact were horizontally wiped with a stiff brush or cloth. All five of the 34 Early Teotihuacan style rim sherds with parts of their external bodies intact were burnished.

Comparable Material. Rattray (1973, Fig. 52 c, d, g, h) illustrates several Early Tlamimilolpa Burnished Ware olla rims that resemble rims R1, R2, R3, R4, and R10 (Fig. 6) identified in this sample. Hirth (1980, Fig. 19 a, e, f, l) has also placed similar rim forms in the Early Teotihuacan Phase. According to Rattray (1973:148), many Miccaotli and Early Tlamimilolpa affiliated rims are almost indistinguishable from the Tzacualli forms. In support of this notion, rim R2, while showing affinity to Early Teotihuacan forms, also looks like several Terminal Formative styles (Hirth 1980, Fig. 17 j, Rattray 1973, Fig. 18 b, Sanders et al. 1975, Fig. 68 f).

Rim R5 (sherds 10655-4, 10632-19, & 10615-26) has a sharply everted character (Fig. 252) and is similar to the rest of the Early Teotihuacan style sherds in the sample. However, its neck is not as high in relation to its rim diameter as the other examples. Rim R5 resembles some Late Teotihuacan olla rims (Hirth 1980, Fig. 21 d), but does not have the beaked, recurved morphology distinctive of Late Teotihuacan ollas. Because R5 has morphological characteristics intermediate between Early and Late Teotihuacan ollas, it may represent a distinct Middle Teotihuacan rim form.

Undated Olla Sherds

Subsample: 3 neck sherds
0.6% of sample; V-For 7 (Table 83)

Form. Three olla neck sherds lacking intact rim components make up this category. Two of the sherds (10636-30 & 10761-90) have neck diameters of 19 and 15 cm, burnished exterior bodies, burnished interior necks, and horizontally wiped exterior necks. Both sherds are composed of Paste A.

Sherd 10747-47 composed of Paste A is unique. Its neck diameter is 12 cm and the interior neck surface is horizontally wiped, gradually grading into a high burnish as the lip flares out. The exterior neck surface is poorly burnished with vertical strokes.

Discussion. Among the olla sherds in the sample, 70% of the rims have forms affiliated with the Miccaotli and Early Tlamimilolpa phases (Hirth 1980:107, Rattray 1973: Fig. 52). All but 3 of these rims are made of Paste A. The remaining 30% of the rims resemble Terminal Formative styles. However, many Terminal Formative rims may have persisted well into the Early Teotihuacan (Rattray 1973:148). Although 33% of the Terminal Formative rim forms were manufactured from the Tzacualli-like Salt and Pepper paste, this variety is slightly different from the Salt and Pepper paste described by Rattray (1973, see description in paste discussion above). It is possible that the variety of Salt and Pepper paste from Venta de Carpio was in use after the Tzacualli phase.

The Venta de Carpio olla rims also have surface treatment attributes common during Early Teotihuacan. Most examples are generally moderate-to well-burnished with a tendency to the latter condition. In contrast, both Rattray (1973) and Sanders et al. (1975) report a wide variation in burnishing treatment for Terminal Formative ollas. Furthermore, Rattray (1973:148) reports evenly striated rim exteriors resulting from wiping with a cloth or fiber on Miccaotli ollas. More than 90% of the Venta de Carpio sample has the wiped exterior rim attribute.

Rattray (1973:174) believes red-orange slipped ollas (2.5 YR 5/4, 6/6, 5 YR6/6) appeared during the Early Tlamimilolpa phase. She identified this attribute on 26% of her Early Tlamimilolpa ollas. The Venta de Carpio sample has one example (sherd 10,632-31) of red slipped surface treatment (2.5 YR 4/6). If the red-orange slip attribute is associated with the Early Tlamimilolpa, then the Venta de Carpio sample may date primarily to the Miccaotli period.

To conclude, most of the olla rims in the sample resemble Early Teotihuacan period forms. The sample contains Early Teotihuacan diagnostic olla attributes consisting of moderate to strongly everted high necked vessels, flat or outwardly bevelled lip forms, relatively well burnished interior neck, upper rim, and exterior body surfaces, and horizontally wiped exterior necks.

2. Hemispherical Bowls

Subsample: 14 rims, 2 bases
3% of sample; V-For 1 (Table 83)

Form. In this study, hemispherical bowls are defined as small to medium vessels with rounded bases. Some of these vessels have annular bases. The bowl may be either deep with the height of its sides one half to three fourths the length of its diameter, or shallow with very low sides. Sherds in the sample representing this vessel form exhibit great variation in morphology. The ideal hemispherical bowl with thin side walls (0.5 cm) and a direct round rim (Fig. 256 R30 & R34) are represented. Other examples have slightly outflaring rims (Fig. 256 R31, R36, & R37). Some of the sherds could almost be classified as shouldered bowl forms (Fig. 256 R32, R33, & R35), although with so slight an angle break they warranted placement in the hemispherical bowl group. One rim form has a small upturned rim (Fig. 256 R38). Like most of the shouldered bowls, three of the hemispherical bowl sherds (Fig. 256 R32, R33, & R34) had shallow rippled exterior profiles. Two of the sherds in the sample have intact portions of an annular base (Fig. 256 B7) resembling those often found on Thin Orange hemispherical bowls (Fig. 256 B14 & B17).

Two sizes of hemispherical bowls are distinguishable, regular and miniature bowls. Vessel diameter measures 18 to 28 cm for the regular bowls, and 12 to 14 cm for the miniature bowls. Sherds are 0.5 to 0.8 cm in thickness for the regular bowls, and 0.3 to 0.5 cm for the miniature bowls.

Paste.

A Paste: 1 rim
B Paste: 13 rims, 2 bases

Surface Treatment. Sherd surface color includes dark red (2.5YR 3/6), brown (5YR 5/4, 10YR 6/4, 10YR 5/3, 7.5YR 4/6), grey (19YR 3/1) and black (5YR 2.5/1). Most of the rim sherds have poor quality burnishing on both their interiors and exteriors. A few have higher quality burnishing but only on interior surfaces. One exception is a miniature bowl (sherd 10747-90) with a relatively high quality dark burnish (10YR 3/1) on both its interior and exterior surfaces. The two annular base examples have badly deteriorated external surfaces that may have had low quality burnishing. The interior of the best preserved annular base sherd is well burnished.

Comparable Material and Discussion. Hemispherical bowl rims R30 and R34 from Venta de Carpio (Fig. 256) resemble what Rattray (1973) has classified as a simple Dense Ware bowl affiliated with the Miccaotli phase (Fig. 42 e). However, these rims also resemble two Burnished Ware simple bowl forms affiliated with the Early Tlamimilolpa subphase (Fig. 57 n & p). Vessels with these rims and annular bases appear as early as the Miccaotli and Early Tlamimilolpa (Muller 1978, fila y 10 & 11). The slightly outflaring rim R36 in the sample (Fig. 256) somewhat resembles an Early Tlamimilolpa Polished Ware rim illustrated in Rattray (1973, Fig. 57 v). Rims R31, R37, & R39 (Fig. 256) look like an Early Tlamimilolpa Polished Ware outflaring rim also illustrated in Rattray (1973, Fig. 57 w). A Terminal Formative rim style from Morelos (Hirth 1980, Fig. 18 l) morphologically resembles Venta de Carpio rims R32 and R33 (Fig. 256), but the surface treatment differs in that it is red on buff instead of burnished. Rim R38 (Fig. 256) looks like a Tzacualli phase rim reported by Rattray (1973. Fig. 13 e).

The Venta de Carpio hemispherical bowl sample does not exhibit any firmly documented diagnostic attributes. Tentatively, rims R30, R31, R34, R36, R37, & R39 resemble Early Teotihuacan forms and rims R32, R33, and R38 resemble Terminal Formative forms. Overall, the sherds from the bowl sample are poorly to moderately burnished coinciding well with Rattray's (1973:149) characterization of Miccaotli and Early Tlamimilolpa bowls. The external rippling attribute found on the sherds with rims R32, R33, and R34 is the same rippling feature found on some of the Venta de Carpio shouldered bowl sherds (see discussion below). Because the rippling attribute was not encountered in the comparative literature, its temporal affiliation is unknown. Comparative data for the for the miniature bowl rim R35 were also not encountered.

3. Tecomates

Subsample: 1 rim
0.2% of sample; V-For 11 (Table 83)

Form. A tecomate is defined as a bowl with a constricting rim. The tecomate rim sherd from Venta de Carpio (Fig. 253 R43) came from a vessel (Sherd 10615-24) with 9 cm mouth diameter. This rim sherd is 0.6 cm in thickness.

Paste.

Paste B: 1 rim

Surface Treatment. The surface is brown (7.5YR 5/2) and dark brown (7.5YR 4/4). The lower exterior rim surface is very well burnished, almost polished, with fainthly visible individual burnishing marks, multi-directional in orientation. The rest of the sherd surface is well burnished with strokes oriented parallel to the rim.

Comparable Material and Discussion. Rim R43 (Fig. 257) looks like an Early Tzacualli phase tecomate rim classified as Teotihuacan Polished Ware by Smith (1989:283, Fig. 9 m). Patlachique phase examples in Blucher (1971, Fig. 50 a & b) and Cuanalan phase examples in Sanders et al. (1975:511, Fig. 35) show thicker tecomates with squared off or elaborated rims. According to Blucher (1971:313) the tecomate tradition ends sometime during the Patlachique phase. Smith (1989:47) reports a drastic reduction in the frequency of the tecomate vessel form between the Early and Late Tzacualli subphases. The single tecomate sherd in the Venta de Carpio sample could be a Terminal Formative sherd mixed in with an Early Teotihuacan Period assemblage. Alternatively, it could represent the late holdover of an earlier vessel form no longer commonly used by Early Teotihuacan times.

4. Flat Bottomed Vessels

Several flat bottomed vessel forms including incurved, outcurved, deep, and large thick-walled flat bottomed bowls were identified in the sample. The incurved, outcurved, and deep flat bottomed bowls often have similar wall and base profiles as well as nubbin supports. As a result, both a flat bottomed vessel rim and a flat bottomed vessel base category have been designated for those sherds not attributed to a specific form.

Incurved Flat Bottomed Bowls

Subsample: 1 partial vessel, 6 rims
1.5% of sample; V-For 3 (Table 83)

Form. Incurved bowls have everted, outflaring upper walls which curve in towards the center of the vessel, become vertical, then curve slightly out again before articulating with the base (see Fig. 253 R11 & Fig. 264). Sherd 10747-26 is an incurved flat bottomed bowl that is nearly 50% complete. It has a 24 cm rim diameter and a 19 cm base diameter. Among the other incurved vessel sherds, two have 24 cm rim diameters and two have 22 cm rim diameters. Sherd 10660-13 came from a miniature bowl with a 14 cm rim diameter.

The Incurved bowl sherds had a range of 0.5 to 0.7 cm in body thickness.

Sherds 10747-26 (Fig. 264) and 10747-99 (Fig. 266 a) exhibit parallel incised lines applied prior to firing on their exterior surfaces. Sherd 10761-26 has a single scratched incised line probably applied after firing (Fig. 266 b), or conceivably the result of excavation damage.

Specimen 10747-26 was part of a vessel with 3 nubbin supports, 2 of these present. These supports are blunted cones of clay measuring 1.7 cm in diameter and 0.5 cm in height (see Fig. 260 B2), and are recessed 0.3 cm from the vessel edge.

Paste.

Paste B: 1 partial vessel, 6 rims

Surface Treatment. Surface colors range from very dark grey (10YR 3/1 & 2/1) to very dark greyish brown (10YR 3/2). The smallest incurved bowl sherd is reddish brown (5YR 4/3) to yellowish red (5YR 4/6). Most of the sherds are well burnished with a lustrous finish. All sherd interiors and exteriors have burnishing strokes parallel to their rims. Sherd 10747-26 has a faint criss-cross burnish pattern on its lower base. This lower surface does not have a high luster like the rest of the vessel.

Comparable Material and Discussion. Rattray (1973) considers highly burnished or "polished" incurved flat bottomed bowls as good Miccaotli and Early Tlamimilolpa diagnostics. Sherd 10747-26 (Fig. 253 R11, Fig. 264) resembles one of her incurved bowls classified as Miccaotli Polished Monochrome Ware (Rattray 1973, Fig. 42 d). Similar to the Venta de Carpio sample, Rattray's Miccaotli bowls ranged from 10 to 17 cm in base diameter and 12 to 24 cm in rim diameter. Incisions on sherds 10747-26 (Fig. 264) and 10747-99 (Fig. 266 a) resemble some single-line incised sherds (Rattray 1973, Fig. 56 c, d, & i).

The Venta de Carpio incurved bowl sample resembles flat bottomed vessels of the Miccaotli or Early Tlamimilolpa phases. Rattray (1973:179) indicates that the lustrous dark finish is an attribute characteristic of both phases. However, she contends that the incising patterns prevalent on these vessels appeared in the Early Tlamimilolpa phase (Rattray 1973:179). This notion is contradicted by Muller (1978:77) who believes this mode of incision appeared in the Miccaotli phase.

Outcurved Flat Bottomed Bowls

Subsample: 7 rims, 3 bases
2.1% of sample; V-For 14 (Table 83)

Form. The outcurved bowl is similar to the incurved bowl in that both have strongly everted or flared side walls. However, the side walls of Incurved bowls curve in to the vessel from the rim, then gradually out again before articulating with the base (Fig. 253 R11). In contrast, the outcurved bowl side wall-base articulation has two variants. One variant, represented by six sherds, is exemplified by rim R12 and base B3 (Figs. 253 & 260). This outcurved form has walls with everted lips that gradually curve down until they articulate with the base at a right angle. The other variant, exemplified by rims R13 and R14 and bases B4 and B5 (see Figs. 253 & 260), has side walls that flare off the base at 30 to 45 degrees and rim lips that are slightly everted.

Outcurved bowls measure 16 to 23 cm at the rim and 14 to 17 cm at the base. One exception, a miniature vessel (10747-21), measures 13 cm at the rim and 8 cm at the base. Sherds measure 0.4 to 0.7 cm in thickness.

Two sherds in the sample have intact nubbin supports. These supports are blunted cones of clay placed flush with the edge of the vessels. These sherds probably came from vessels with three nubbin supports.

Paste.

Paste B: 7 rims, 3 bases

Surface Treatment. Surface colors for these sherds include yellowish red (5YR 5/8), dark, medium, and light brown (7.5YR 4/4, 5/8, & 6/6; 10YR 4/2 & 4/3) and brownish grey (10YR 6/2). Surfaces are generally well burnished with individual burnishing strokes visible. One exception, sherd 10636-22, has a rough matte exterior that was probably once burnished but has since deteriorated. Sherd 10761-27 has one incised line curving down its side wall to the base (Fig. 266 d). The incision appears to have been applied after firing because the burnished surface looks scratched off.

Comparable Material and Discussion

The outcurved variant with rim R12 and base B3 (Fig. 253, Fig. 260) resembles some Miccaotli bowls in Rattray (1973, Fig. 42 c, Fig. 43 f), two Miccaotli bowls in Muller (1978, Fig. 13 & 14) an Early Teotihuacan basal break bowl in Hirth (1980, Fig. 20 a). The Miccaotli nubbin support profiles from Rattray (1973, Fig. 43 r-v) are also similar, especially the blunt solid cone examples placed flush with the basal edge (Fig. 260). The Venta de Carpio rims R13 and R14 (Fig. 253) resemble Miccaotli phase brown to black outcurved bowls in Rattray (1973 Fig. 43 g & h).

Rims R13 and R14 also look like some examples of Early Tlamimilolpa bowls including a wide outflaring bowl from Smith (1989:305, Fig. 47 h), and outcurving bowls with everted rims in Rattray (1973 Fig. 54 a, b, & g). The miniature vessel sherd 10747-21 with rim R13 looks like an Early Tlamimilolpa Polished Monochrome bowl in Rattray (1973, Fig. 57 v).

These outcurved vessel sherds resemble predominantly Early Teotihuacan material. The outcurved bowl sherds with rim R12 and base B3 (Figs. 253 & 260) and the incurved bowl sherds with rim R11 and base B2 all have a lustrous burnished surface treatment. The incised designs on the incurved bowl sherds in the sample, though absent from the outcurved bowl sherds, are stylistically affiliated with the Miccaotli phase (Muller 1978, Fig. 13 & 14, Smith 1989:305). Based on the literature, the incurved and outcurved bowls (especially those with R12 & B3) are considered good Miccaotli diagnostics.

Deep Flat Bottomed Bowls

Sample: 1 partial vessel
0.2% of sample; V-For 13 (Table 83)

Form. This vessel form, sometimes referred to as a vase (Rattray 1973, Hirth 1980), is a vessel with side walls that are almost the same height as the base diameter (Fig. 268, No. 13). The vase form I have defined (see below) has side walls which are higher than the base diameter.

The Deep Flat Bottomed Bowl form is represented by one partial vessel (sherd 10636-5) nearly 75% complete. This form has three nubbin supports flush with the basal edge, and flaring side walls ending in an everted lip about 11 cm high (Fig. 253 R16). At the rim it measures 22 cm in diameter. At the base it measures 12 cm in diameter. The sherds comprising the vessel are 0.7 cm in thickness.

Paste.

B Paste: 1 partial vessel

Surface Treatment. Surface color ranged from yellowish red (5YR 5/6) to brown (10YR 5/3). In contrast to the rest of the sample, this vessel has a poor surface burnish. The exterior was initially scraped then poorly burnished with strokes running at horizontal and oblique angles to the rim. The brush strokes underneath the burnishing treatment are still visible over much of the exterior. The exterior surface of the base is coarse matte. The interior wall and base exhibit better quality burnishing with strokes oriented horizontally to the rim.

Comparable Material and Discussion. The poor surface treatment found on this vessel is not a commonly reported attribute on similar forms of this type in the literature. Hirth (1980, Fig. 20 h) illustrates an Early Teotihuacan vase profile that is morphologically similar but its surface treatment is red-on-buff. In addition, Smith (1989, Fig. 28 a) illustrates an Early Tzacualli polished vase that resembles the deep flat bottom bowl in this sample.

Because of its side wall angle, the deep flat bottomed bowl from Venta de Carpio resembles some Early Tzacualli vessels (Smith 1989, Fig. 28 a), However, it also resembles early Teotihuacan vessels because of the nubbin support placement on the base (Hirth 1980, Fig. 20 l, Rattray 1973, Fig. 43 r, v, & aa, Fig. 57 k & m).

Vases

Subsample: 8 rims, 2 bases
2.1% of total sample; V-For 8 (Table 83)

Form. The vase form is defined as a vessel with higher side walls than its base diameter, slightly to moderately flared side walls, and an everted or direct straight lip (Rattray 1973, Fig. 42 a, Fig. 60 a, c, d). Though none of the sherds in this category had intact side walls, to their rim forms and surface treatment indicate vases as defined above. However, some may also have come from Deep Flat Bottomed bowls.

Present in the Venta de Carpio sample are the everted rim forms R17 and R18 (Fig. 253), and the direct rim forms R19 and R20 (Fig. 253). The mouths of these vessels measure 16 to 28 cm in diameter, and the sherds measure 0.4 to 0.9 cm in thickness. The variation in thickness is probably a result of variation in mouth diameter. One of the bases has a blunted cone nubbin support set flush with the base edge (Fig. 260 B9).

Paste.

A Paste: 2 rims

B Paste: 6 rims, 2 bases

Surface Treatment. Surface color includes yellowish red (7.5YR 5/8), reddish brown (10YR 4/3) light brown to dark brown (7.5YR 4/2, 4/4, 5/6, 5/8, 6/4; 10YR 5/4) dark greyish brown (10YR 3/2, 4/2) dark grey (10YR 3/1 & 4/1) and black (7.5YR 3/0). All sherds have high quality burnishing except some exterior body and rim surfaces and the lower surface of both base sherds. Five sherds have vertical burnished strokes on their exteriors.

Surface decoration among the vase sherds includes both red paint and incision. Sherd 10747-45 has a thin (0.7 cm) band of red paint (10YR 3/6) around its rim, but most of the paint is on the interior. Sherds 10655-19 and 10636-31 have red paint on their exterior side walls (10YR 3/6) and post-fired incised lines oriented horizontally to their base edges (Fig. 262 a & c). Sherds 10732-6 and 10747-15 have post-fired incised lines on their exterior surfaces (Fig. 262 d & e). A vertical flute on sherd 10639-9 decorates its exterior surface (Fig. 16 f).

Comparable Material and Discussion. Though smaller in mouth diameter, a Miccaotli vase illustrated by Rattray (1973, Fig. 42) resembles everted rims R17 and R18 (Fig. 253). Rim R18 also resembles an Early Teotihuacan vase from Hirth (1980, Fig. 20 a). Rattray's (1973) Early Tlamimilolpa vases with everted rims (Fig. 57 a, b, c, d) and direct rim (Fig. 57 f) are very similar to rims R17, R18, and R19, respectively. Vase body sherds with vertical polishing and burnishing are described as common attributes in Rattray's vase sample (Fig. 57 c, d, e, g, h, & i).

The double line incisions like those on sherds 10732-6 and 10747-15 (Fig. 262 e) are stylistically affiliated with the Early Tlamimilolpa (Rattray 1973, Fig. 55 e & h). However, these could be earlier because of their resemblance to similar incisions found on Altica-Chiconautla phase (1050 - 650 B.C.) vases from Sanders et al. (1975:332, plate 14 b 7 g). Vase sherds with exterior surface post-fired incisions over red or specular red paint are affiliated with the Early Tlamimilolpa (Rattray 1973 Fig. 59 g, Fig. 60). Similar decoration is found on sherds 10636-31 and 10655-19 (see Fig. 262 a, c, where the incisions run horizontal to the base of the vessel). Miccaotli phase vase sherds with exterior fluting like that on sherd 10639-9 (Fig. 262 f) are reported in Rattray (1973, Fig. 44 d, e).

In general, the Vase sherds from Features 1 and 4 look like Miccaotli and Early Tlamimilolpa phase (A.D. 150-400) material. According to Rattray (1973), during both phases, vases had either direct or everted lips and vertical burnishing on their exterior side walls. These attributes are represented on four of the sherds. The other sherds in the sample may have come from vertically burnished vases but were too small to exhibit this attribute.

Large Thick-walled Flat Bottom Bowls

Subsample: 1 rim
0.2% of sample; V-For 15 (Table 83)

Form. The side walls of this bowl are upright and the lip of the rim is direct and rounded (R15, Fig. 253). Because the base is missing, it is possible this vessel was basin shaped. However, one of the edges appears to have fractured where the side wall would have articulated with a base (Fig. 260 B6). This edge has a small portion that angles inward toward the center of the vessel. With an estimated mouth diameter of 37 cm, and the sherd thickness of 1.0 cm, its hard to imagine this belonged to anything but a flat bottomed vessel.

Paste.

A Paste: 1 rim

Surface Treatment. The surface color of this vessel is reddish brown (5YR 4/4 & 5/4). The side walls appear to have been wiped horizontally with a cloth or brush and then poorly burnished. The wiping striations are still visible underneath the faint evidence of burnishing strokes. The rim is well burnished and the lower 1.5 cm of the exterior side wall moderately burnished. These well burnished zones have decorative bands of specular red paint (Fig. 263 a). On the rim, the paint extends down from the lip about 1.4 cm on the exterior and 0.5 cm on the interior. The painted band along the base is a little over 1 cm in wide, but its full width is unknown because the sherd is broken along its proposed basal length.

Comparable Material. This vessel form was not identified in the literature. One rim in Blucher (1971, Fig. 50 e), from a Patlachique basin, may have come from a similar vessel. However, the Patlachique rim form is straight and lacks decorative red paint. Since specular red paint does not appear at Teotihuacan period Teotihuacan until the Early Tlamimilolpa phase (Rattray 1973:70), this vessel probably dates to the Early Teotihuacan.

Flat Bottomed Vessel Rims and Bases

These categories include rim and base sherds that may have come from any of the flat bottomed vessel forms described above. These artifacts could not be confidently assigned to a specific vessel form because they were too incomplete and lacked key attributes.

Flat Bottomed Vessel Rims
Subsample: 8 rims
1.7% of sample; V-For 20 (Table 83)

Form. Among the rims in this category, five were classified as rim R11, two were classified as rim R12, and one was classified as rim R18 (Fig. 253). Measurements range from 12 to 26 cm in rim diameter, 0.4 to 0.7 cm in sherd thickness.

Paste.

B Paste: 8 rims

Surface Treatment. Surface color includes strong brown (10YR 5/6), dark brown (10YR4/3), and dark grey (10YR 3/1). Most surfaces are highly burnished. One exception is sherd 10674-6 with its exterior lower rim wiped horizontally to the lip. Sherd 10747-0 has a post-fired incised line on its exterior surface (Fig. 266 c).

Comparable Material and Discussion. The highly burnished surface treatment and rim form of these sherds bear close resemblance to Miccaotli or Tlamimilolpa phase vessels (see discussions of incurved and outcurved flat bottomed bowls, and vases above). The post-fired incised design on sherd 10747-0 (Fig. 266 c) ha also been reported for an Early Tlamimilolpa vessel in Rattray (1973, Fig. 56 e).

Flat Bottomed Vessel Bases
Sample: 15 bases
3.2% of sample; V-For 21 (Table 83)

Form. Among these artifacts, three have base B3, four have base B8, two have base B9, three have base B10, two have base B11, and one has base B12 (Fig. 260). The differences among these bases are the angles created by side wall-base articulations. These bases measure between 7 and 16 cm in diameter, and sherds vary between 0.4 and 0.6 cm in thickness.

Eight of these sherds had nubbin supports. All but two of the supports are solid blunted cones (Fig. 260). The other two (10747-58 & 10747-49) are solid cones slightly rounded at their tips. Six of the nubbin supports were placed flush with their vessel edges, while two of them were slightly inset from the edge. Sherd 10674-3, classified as base form B12, probably had nubbin supports because its base is not flat.

Paste B: 15 bases

Surface Treatment. Surface colors include yellowish red (7.5YR 5/6), reddish yellow (7.5YR 7/6), yellowish brown (7.5YR 5/4 & 10YR 6/4), reddish brown (7.5YR 5/4), dark brown (7.5YR 4/2 & 10YR 4/3), and dark grey (7.5YR 4/0 & 10YR 3/2). Most of these sherds are burnished though some have poorer quality burnishing on their lower exterior basal portions. Three sherds (10648-24, 10761-54, 10636-6) have wiped interior surfaces and, therefore, may have come from ollas with tripod nubbin supports (Fig. 260 B10).

Sherd 10674-3 (Fig. 260 B12) may have a post-fired incised line on the side wall running horizontally to the base, or, alternatively this line may be the result of excavation damage. Sherd 10639-19 has two faint bands of specular red paint that extend to the base (Fig. 266 e). Though only a small fragment, sherd 10761-15 contains red paint on its exterior surface.

Comparable Material and Discussion. In general, these base forms resemble Miccaotli or Early Tlamimilolpa affiliated vessels. Rattray (1973) suggests that basal nubbins did not appear until the Miccaotli phase. The Venta de Carpio sherds with nubbin supports (Fig. 260 B8, B9, B11) resemble other Early Teotihuacan bases with blunt or truncated cone supports (Hirth 1980, Fig. 20 b, k, l, Muller 1978, Fig. 14, Rattray 1973, Fig. 43 m, n, o, r, s, t, v, aa, bb, Fig. 57 j, k, m, x, Smith 1989, Fig. 47 h). Sherds 10747-58 and 10747-49 with rounded tip nubbins also look like other Early Teotihuacan vessels cited elsewhere (Hirth 1980, Fig. 20 e, Rattray 1973, Fig. 43 u).

5. Shouldered Bowls

Subsample: 20 rims, 2 body sherds
9.4% of sample; V-For 2 (Table 83)

Form. Shouldered bowls are hemispherical vessels with an exterior angle break below the rim (Fig. 259). These vessels have also been referred to as composite silhouettes, basal break bowls with round bases (Sanders et al. 1975), or rim-shouldered bowls (Blucher 1971:318). Rim sherds from Venta de Carpio classified as shouldered bowls have upper segments measuring 1.4 and 2 cm from the angle break to the lip of the rim. Most of the upper segments measure 1.7 cm in height (Fig. 259).

Morphologically, rims R53, R55, and R56 (Fig. 259) are the same except for their upper segment heights. Rim R57 is similar to R53, R55, and R56, but with two lateral angle breaks on its exterior surface (Fig. 259). Rim R54 differs from the other shouldered rim forms in that its exterior upper segment does not slightly constrict before flaring up to the lip (Fig. 259). Rim R58 is atypical because its upper segment measures 4.3 cm in height from the lateral angle break to the lip (Fig. 259).

An extremely shallow but unmistakable rippled exterior profile can be seen on thirteen sherds in the sample. This external surface rippling consists of wide grooves separated by low ridges (Fig. 259, illustration of rim 55). The shouldered bowl rims measure an estimated 18 to 32 cm in diameter. The sherds measure 0.5 and 0.9 cm in thickness.

Paste.

B Paste: 19 rims, 2 body sherds
Dense Paste: 1 rim

Surface Treatment. These vessels fall into two broad surface color groups. One group includes yellowish-red (5YR 5/6 & 5/8, 7.5YR 5/8, 10YR 5/4 & 6/4), and the other group includes dark grey to brown (7.5YR 5/6, 10YR 3/3, 4/2, 5/1, & 5/3). Some of the sherds had light colored interiors with dark exteriors. Most dark zones (10YR 3/3 & 4/2) probably resulted from smudging. Rim and body interiors and exteriors have poor quality horizontal burnishing. Only five sherds exhibited high quality burnishing on either their interior rim or body surface. Some sherds still have visible striations from wiping the vessel prior to burnishing.

Comparable Material and Discussion. Shouldered bowl rims R53, R55, and R56 (Fig. 259) are common forms during the Patlachique (250 to 100 B.C.) and Tzacualli (100 B.C. to A.D. 150) phases. These rims resemble a shouldered form dating to the Early Tzacualli from Pueblo Perdido (Rattray 1973, Fig. 13 f) and an outcurving shouldered form dating to the Late Tzacualli (Rattray 1973, Fig. 35 o). Other Tzacualli phase shouldered forms can be found in Sanders et al. (1975, Fig. 71 f, g, h) and Smith (1989, Fig. 28 l, m, n, Fig. 48 g, Fig. 57 b). Rim R57 with the double angle break resembles a Tzacualli form illustrated in Smith (1989, Fig. 46 j).

Rims R53, R55, and R56 (Fig. 259) resemble some Patlachique phase shouldered bowl forms from the site of Tlachinolpan (Blucher (1971, Fig. 51 a & b). They also show affinity for some even earlier Late Cuanalan (550 to 300 B.C.) and Tezoyuca (300 to 250 B.C.) phase examples (Sanders et al. 1975, Fig. 32 i, Fig. 53 c, f, h, & i).

The exterior rippled surface treatment is not an attribute explicitly described for this form in the literature. Similar exterior rippling is evident on some Late Formative shouldered bowls from Cuanalan (Sanders et al. 1975). However, these bowls have rippling only on their upper segments. The same rippling attribute was also observed on an unspecified Formative sherd from a flat bottomed vessel lacking an intact rim (Sanders et al. Fig. 44 f).

The short upper segment shouldered bowl form described here closely resembles comparable forms common during the Patlachique and Tzacualli phases. According to Blucher (1971:321), shouldered bowls with tripod bases first appeared during the Cuanalan phase but persisted through the Tzacualli in a supportless form. Their is no evidence of tripod supports on any shouldered bowl sherds from Venta de Carpio. Rattray (1973:154) contends that the shouldered bowl form is not present after the Tzacualli phase.

Distinct from the rest of the sample, rim R58 resembles vessel forms from the Late Cuanalan (Sanders et al. 1975, Fig. 30 b & d) and Patlachique phases (Blucher 1971, Fig. 50 j). Blucher (1971:318) calls this vessel form a weak shouldered bowl and believes it may be a marker for the Late Patlachique phase.

6. Comals

Subsample: 29 rims
6.2% of sample; V-For 10 (Table 83)

Form. The Venta de Carpio comals are large shallow basin plates with slightly upturned borders. Seven rim forms were identified in the sample from Features 1 and 4 (Fig. 258). Like their modern counterparts, comals were probably used for cooking and heating tortillas. Most comal rims in the sample appear to have been formed on a mold. During manufacture, the clay extending beyond the edges of the mold was trimmed and formed into a border averaging 3 cm in width. Most comal sherds (24 or 92%) have a border slightly thicker (0.1 to 0.2 cm) than the rest of the body. The rims have estimated diameters of 34 and 52 cm and measure between 0.5 and 0.8 cm in thickness.

Paste.

B Paste: 25 rims
A Paste: 2 rims
Salt and Pepper Paste: 2 rims

Surface Treatment. Surface colors include light brown (10YR 7/4), grey (10YR 5/1 & 6/2), and dark grey (10YR 4/1). Several rims have lighter colors including light red (2.5YR 4/6), orange (5YR 5/6 & 5/8), and brown (5YR 4/4). Twenty-two of the upper comal surfaces are highly burnished, and four are poorly burnished. All lower border surfaces are wiped parallel to the rim. All but three rims in the sample have matte lower surfaces. The three exceptions, like the rim borders in the sample, are wiped parallel to the rim.

Comparable Material and Discussion. Rims R46, R47, R48, R49, R50, and R59 (Fig. 258) resemble Miccaotli (Rattray 1973, Fig. 40 i & j) and Early Tlamimilolpa phase (Smith 1980, Fig. 46 l) comal rim forms. Muller (1978) describes similar slightly basin shaped comals with upturned and thickened borders but does not identify any temporally diagnostic attributes.

The Miccaotli and Early Tlamimilolpa comals described in Rattray (1973:152 & 175) have well burnished upper surfaces, raised wiped rims, and an average measurement of 42 cm in diameter. The Venta de Carpio examples are similar with an average measurement of 45 cm in diameter. In contrast to the Venta de Carpio sample, Rattray's comals are described as completely flat and average 1 to 2 cm in thickness. The Venta de Carpio comals are slightly basin shaped and average 0.58 cm in thickness.

A comal form similar to rim R51 (Fig. 258) was not identified in the literature. This comal sherd (sherds 10632-24 and 10674-16) has a poorly burnished upper surface and a completely wiped inferior surface. A deliberate groove separates the thickened border from the remaining interior lower surface. In addition, sherd 10632-24 measures 0.8 cm in thickness and is made of the Salt and Pepper paste. Rim R52 (sherd 10660-28) has a poorly burnished upper surface and a completely wiped lower surface. This rim (Fig. 258) becomes thicker near the edge of the comal body then tapers to the rim. Sherd 10660-28 is 0.8 cm thick and is made of Salt and Pepper paste. A similar Patlachique phase rim form is illustrated in Blucher (1971, Fig. 50 f). Like rim R52, Blucher's Patlachique comal has a relatively well burnished upper surface and a wiped lower surface.

7. Shouldered Platter

Subsample: 4 rims, 1 body sherd
1.1% of sample; V-For 9 (Table 83)

Form. The shouldered platter is a wide shallow bowl with an everted rim. It is called a shouldered form because of a slight angle break on its lower surface. The angle break, not visible on the interior, is probably a mold impression resulting from the vessel's method of manufacture. The everted rim is 2 cm wide (Fig. 257 R40). The upper surface of the rim has a slight depression that runs around the rim. The rim measures an estimated 30 cm in diameter and the sherds measure between 0.6 and 0.8 cm in thickness.

Paste.

B Paste: 4 rims, 1 body sherd

Surface Treatment. Surface color includes light yellowish brown (10YR 6/4), though a few smudged portions are very dark grey (10YR 3/1). The upper surface is well burnished with strokes running horizontally to the rim. The upper rim surface is less burnished with wiping striations especially visible in the slightly depressed groove. The lower rim has wiping striations oriented horizontally to the rim. The lower surfaces, except for the horizontally wiped condition of sherd 10747-42, are poorly burnished.

Comparable Material and Discussion. Similar vessel forms were not identified in the literature. An Early Tlamimilolpa shallow bowl from Rattray (1973, Fig. 61) has a similar basin shape but lacks the exterior angle break and everted rim. The relatively well burnished condition of the sherds in this category are reminiscent of general Early Teotihuacan surface treatment.

8. Cazuelas and Craters

Cazuela Sample: 7 rims, 1 base, 1 body sherd
1.9% of sample; V-For 4 (Table 83)

Crater Sample: 9 rims
1.9% of sample; V-For 5 (Table 83)

Form. These vessels, probably similar in function, are described together because the decline of the cazuela form is thought to be concurrent with the rise of the crater form, and therefore, a useful chronological diagnostic (Rattray 1973). Both forms are large basin shaped containers with relatively high side walls. However, they are distinct in that the cazuela rims are more everted (Fig. 254 R21 & R25) than the less pronounced eversion of the crater rims (Fig. 254 R22, R24, & R26, R23 is an exception). Another distinguishing attribute is the orientation of the side walls, more vertical for the cazuelas than for the craters. Some of the crater forms from the Teotihuacan period may have been more basin-like than crater-like.

The cazuela sherds measure an estimated 34 to 43 cm in diameter (averaging 40.5 cm). The crater sherds measure an estimated 33 to 50 cm in diameter (averaging 40 cm). Even though the cazuelas have a greater diameter, the actual container size for both vessels is probably similar because the cazuela rims are strongly everted (Fig. 254). The cazuela sherds measure 0.8 and 1 cm in thickness, and the crater sherds measure between 0.7 and 0.9 cm in thickness.

Judging from their thickness and surface treatment, sherds 10761-16 and 10761-7 probably came from cazuelas. Sherd 10761-7 is part of a flat-bottomed cazuela base that gradually curves up into a side wall (Fig. 254 B13).

Paste.

Cazuelas

A Paste: 1 rim

B Paste: 4 rims, 1 base, 1 body sherd

T Paste: 2 rims

Craters

B Paste: 9 rims

Surface Treatment. Cazuela surface colors include reddish brown (5YR 4/4), dark brown (7.5YR 4/2), reddish yellow (7.5YR 6/6), light yellowish brown (10YR 6/4), and dark grey (10YR 3/1 & 3/2). Crater surface colors include light red (2.5YR 5/6), reddish brown (5YR 4/4), reddish yellow (7.5YR 6/6), yellowish red (5YR 5/6), light brown (7.5YR 6/4), and dark brown (7.5YR 4/2).

Cazuela rim R21 sherds have poor horizontal or multi-directional burnishing on both interior and exterior surfaces. The extreme edges of these rims are wiped parallel to the lip. In addition, the lower rims have wiping striations partially obliterated by burnishing. Rim R21 sherd 10761-7 also has partially obliterated wiping striations on its interior. The Cazuela rim R25 sherds are well burnished on their interiors and exteriors, and exhibit wiping striations on their lower exteriors.

Crater rim R22 sherds have well burnished interiors and poorly burnished exteriors. Rim R22 sherd 10660-1 has wiping striations on its lower exterior lip surface. Crater rim R23 has poor burnishing on its interior and exterior. Rim R23 also has wiping striations on its lower rim.

Crater rim R24 sherds are moderately to well burnished on their interiors and poorly burnished on their exteriors. Rim R24 sherd 10660-2 has wiping striations on its lower exterior rim, and rim R24 sherd 10632-13 has matte treatment on its lower exterior rim. Rim R24 sherd 10632-11 has low quality burnishing on its lower exterior rim.

Crater rim R26 sherds have poor burnishing on all surfaces. Burnishing strokes run horizontal to the rim except for multi-directional strokes on the exterior bodies. A matte surface shows through in areas missed by the burnishing strokes.

Comparable Material and Discussion. Cazuela forms affiliated with the Tzacualli and Miccaotli phases in Rattray (1973:117 & 150) are similar to those from Venta de Carpio. Her cazuela forms have poor to well burnished interior and exterior surfaces. Like the rim R25 sherds, Rattray's Miccaotli examples often have matte or wiped lower exterior rims. Rattray's Tzacualli and Miccaotli rims are strongly everted like Venta de Carpio rims R21 and R25 (see Rattray 1973, Fig. 32 g, s, Fig. 40 k, l, m). Similar forms illustrated in Smith (1989, Fig. 8 a & b, Fig. 26 b) are affiliated with the Early Tzacualli subphase. However, the Venta de Carpio cazuelas seem to have side walls oriented more perpendicular to the base than these comparative examples.

Early Tlamimilolpa craters described by Rattray (1973:176) have horizontal burnishing strokes which are more prominent and evenly spaced on the interior than the exterior. Rims R22, R24, and R26 closely resemble Rattray's (1973, see Fig. 52 l, m, n, o, Fig. 53) Early Tlamimilolpa forms. However, rim R24 sherds 10660-2, 10632-11, and 10632-13 all have a better surface finish than the craters in Rattray's description. A similar form to rim R23 (sherd 10648-3) was not found in the comparative literature.

Rattray describes some of her Early Tlamimilolpa craters with a break or shoulder on the vessel exterior near the base. This attribute may result from a basal mold comparable to those used in the manufacture of later Early Xolalpan San Martin Orange craters (Sheehy 1992). The Rim R26 sherds look similar to some of the San Martin craters. However, the Venta de Carpio examples have a better surface finish and no exterior wiping striations that are common on the later San Martin craters (Sheehy, pers comm). The vessel form represented by rim R26 may be a precursor to the Early Xolalpan San Martin Orange craters.

9. Censers

Subsample: 1 body sherd
0.2% of sample; V-For 12 (Table 83)

Form. The sample included one hourglass censer fragment (sherd 10747-12, Fig. 261 S2, Fig. 265) with its central portion measuring 11 cm in diameter. The sherd, except for the thick decorated section, measures 0.8 cm in thickness. The decorated section measures about 2.5 cm in thickness.

Paste.

A Paste: 1 body sherd

Surface Treatment. The surface color is reddish brown (5YR 5/4). The surface treatment is predominantly matte with some wiping striations visible on the vessel interior and the exterior. A band of punctate impressions encircles the central exterior of the censer sherd (Fig. 265 a) These impressions appear to have been made with a semicircular implement, perhaps a reed stem or shaped wooden tool. Some of the impressions are faintly perceptible while others are more deeply (0.25 cm) impressed. These punctations are not randomly placed, but rather comprise distinct upper and lower bands, applied in separate segments each measuring about 5 cm in length. The artist probably rotated the vessel to the right, impressing the surface with first one band, then the other. The impression of the next double row segment was initiated slightly to the right of where the last ended. This decorative process created numerous overlapping punctated impressions at the transition zones from one double row segment to the next. Since the central part of the vessel has an estimated diameter of 11 cm, if all segments measured 5 cm in length, the design consisted of 7 double rowed segments.

Comparable Material and Discussion. Rattray (1973:69 & 80) claims that deeply impressed overlapping half reed punctation is diagnostic of the Early Tzacualli Subphase. However, she reports no hourglass censer forms for this time period. Basin censers with half reed punctation have been reported from Late Tzacualli, Miccaotli, and Early Tlamimilolpa contexts (Rattray 1973, Fig. 30, Fig. 50 a-c). An hourglass censer with half reed punctation is illustrated in Smith (1989, Fig. 44 f) but its punctate design encircles the base of the vessel. Based on the literature, this censer was probably manufactured sometime between the Tzacualli and early Tlamimilolpa phases.

10. Composite Silhouettes

Subsample: 2 body sherds
0.2% of sample; V-For 16

Form. The composite silhouette is also defined by Sanders et al. (1975:54) as subtype A of their Formative outflaring basal break bowls. Distinct from the shouldered bowl category described above, the composite silhouette is a shouldered vessel with an upper segment greater than 6.5 cm in height (Fig. 268, No. 16).

Neither composite silhouette sherd in my sample consists of base or rim portions. All that remains is a shouldered angle break (Fig. 261 S1) with an upper wall segment oriented perpendicular to the proposed base. The upper wall may have flared out closer to the rim. At the angle break, the sherds have an estimated diameter of 20 cm, and measure 0.6 cm in thickness.

Paste.

B Paste: 2 body sherds

Surface Treatment. The surface colors are black (7.5YR 3/0) and dark greyish brown (7.5YR 3/2). The sherd exteriors have a zone burnished pattern (Fig. 265) The lower wall segments have relatively good quality horizontal burnishing. On the upper wall segment, the horizontal burnishing extends about 1.5 cm above the angle break. Above the of horizontal burnishing, a rectangular field of poor quality vertical burnishing is framed by a field of high quality vertical burnishing (Fig. 265). The vessel undoubtedly had a zoned pattern of low burnished rectangular fields surrounded by high burnished background. The interior of the vessel has low quality horizontal burnishing.

Comparable Material and Discussion. This vessel most closely resembles a Late Cuanalan subphase (550 to 300 B.C.) rim sherd of a subtype A basal break bowl (Sanders et al. 1975, Fig. 30 b). There is no mention of zone burnishing for these basal break forms although some were painted with solid geometric designs (Sanders et al. 1975:55). The Venta de Carpio composite silhouette form has Teotihuacan period B Paste. However, its vessel form is usually associated with Late or Early Terminal Formative contexts (650 to 100 B.C.).

11. Miscellaneous Painted Sherds

Subsample: 11 body sherds
2% of sample; V-For 22 & 23 (Table 83)

None of the specific vessel forms for any of these sherds was identified but most of them probably came from ollas or bowls. Eight sherds have dark red paint (10R 3/6), and three sherds have dark red specular hematite paint (10R 3/6). Two of the dark red painted sherds have distinctive designs on their exteriors; one (sherd 10648-43) is also incised (Fig. 263 b & c). One specular red sherd was a small rim fragment (Fig. 257 R42) that may have come from a flat bottomed bowl or vase. These painted sherds are chronological diagnostics according to Rattray (1973:70) who believes red and specular red painted decoration did not appear until the Early Tlamimilolpa phase.

12. Copa Ware

Subsample: 3 sherds
0.6% of sample; V-For 6 (Table 83)

The Venta de Carpio sample contained three Copa Ware sherds. All of these sherds have the fine Copa Ware paste (see description of pastes above). Sherd 10747-50 probably comes from a bowl or large-mouthed goblet (Fig. 257 R41, Fig. 262 i). Its vessel mouth has an estimated diameter of 14 cm, and it measures 0.3 cm in thickness. Both the interior and exterior of the sherd exhibit high horizontal burnishing. All of the interior and half of the exterior (extending down from the rim 1.5 cm) is painted brown (5YR 4/6). The unpainted portion is reddish yellow (7.5YR 6/6).

Sherd 10636-8 probably comes from a small flat bottomed cup or bowl base. It has an estimated diameter of 8 cm (Fig. 257 B18, Fig. 262 g) and measures 0.4 cm in thickness. The surface is yellowish brown (10YR 5/4), and both the interior and exterior have high quality horizontal burnishing. The exterior is incised with a single curved line (Fig. 262 g).

Sherd 10632-4 probably comes from a goblet or cup. It measures 0.3 cm in thickness. The surface is greyish brown (10YR 5/2) and dark grey (10YR 4/1), and the interior and exterior has high quality burnishing. The exterior surface has a double incised line oriented horizontal to the rim (Fig. 262 h).

Discussion. The earliest evidence for Copa Ware comes from Early Xolalpan deposits excavated at the Teotihuacan Mapping Project's Excavation 23 (Rattray unpublished manuscript). The Venta de Carpio Copa sherds may be early precursors of the Xolalpan Copa Ware. They may also have resulted from very limited Late Teotihuacan use of the site.

13. Foreign Ceramics

Thin Orange Ware

Thin Orange vessels identified in the sample include the hemispherical bowl, goblet/cup, olla, cylindrical vase, and box forms. All but one of the Thin Orange sherds were found in Trench 1 (for a description of the paste see paste discussion section above).

Thin Orange Hemispherical Bowls
Subsample: 14 rims, 4 bases, 4 body sherds
5% of sample; V-For 1 (Table 83)

Hemispherical bowl rim forms include rim R27, a direct square blunted variety, and rim R28, a direct rounded variety (Fig. 255). Estimates of rim diameter varies between 15 and 24 cm (averaging 19.5 cm) with the sherds measuring 0.3 to 0.5 cm in thickness.

The Thin Orange annular base sherds (Fig. 255 B14 & B17) are not as thick as the paste type B annular base (Fig. 256 B7) in the sample. Three of these bases have annular elements that measure 0.9 cm high (Fig. 255 B14). The other base has an annular element that measures 1.1 cm high (Fig. 255 B17). Two of the bases have annular elements measuring 7 cm in diameter. The other two bases measure 8 cm and 9 cm in diameter, respectively. The basal portions of the sherds measure between 0.4 cm and 0.6 cm in thickness.

Thin Orange Goblet/Cup
Subsample: 1 base
0.2% of sample; V-For 17 (Table 83)

Goblet/cup sherd 10615-11 consists of a small portion of an annular base. This sherd is probably a goblet/cup because its estimated basal diameter measures 6 cm, and its annular profile (B15) is distinct from the hemispherical bowl bases B14 and B17 (Fig. 255). The remaining portion of the base measures 0.4 cm in thickness.

Thin Orange Olla
Subsample: 1 rim
0.2% of sample; V-For 7 (Table 83)

The Thin Orange olla sherd (10655-2) has a moderately everted rim (sherd 10655-2) with a rounded lip (Fig. 255 R29). The mouth diameter is estimated at 26 cm, and the sherd measures 0.3 cm in thickness. This sherd may be from an outflaring flat bottomed bowl. However, the distinct angle break where the body becomes the rim is not characteristic of flat bottomed bowls.

Thin Orange Cylindrical Vase
Subsample: 1 base
0.2% of sample; V-For 18 (Table 83)

The cylindrical vase sherd is a flat basal piece (sherd 10660-18) with a small upturned edge where it would have articulated with the vessel side wall (Fig. 255 B16). Not enough of the sherd remains to estimate base diameter. On its lower surface a small portion of a support edge remains. Judging from the faint burnishing marks that encircle this edge, the support was probably a solid nubbin. The sherd measures 0.3 cm in thickness.

Thin Orange Box
Subsample: 1 Sherd
0.2% of sample; V-For 19 (Table 83)

Sherd 10615-23 probably came from a box lid (Fig. 267 a). The lateral edge of the box sherd has a straight incised line along its length. Both sides of the sherd are well finished with faint burnishing strokes. This sherd may have come from a hollow rectangular cylindrical vase support, but both sides have well finished surfaces, a condition not expected for the interiors of hollow rectangular supports. The sherd measures 0.3 cm in thickness.

Surface Treatment of Thin Orange Sherds. The surfaces of the Thin Orange sherds are reddish yellow (5YR 6/8, 7/8; 7.5YR 6/6, 6/8, 7/6, 7/8) and brown (10YR 5/3). The latter color is apparent on only two sherds and probably resulted from smudging during the firing process. One of these brown sherds (10636-28), an annular base bowl fragment, has a round smudging stain on its interior surface. This stain is commonly found on Thin Orange hemispherical bowls, and reflects the firing practice whereby these vessels were stacked one on top of the other in the kiln (Sheehy pers. comm.).

The surface finish of these sherds is a thin slip or well done burnish. When visible, burnishing strokes are faint. Sherd surfaces are occasionally broken by protruding particles of the white aplastic material typical of Thin Orange paste. Though the finish is good, the sherds lack a lustrous polished condition. Incising, probably applied prior to slipping vessel surfaces (Kolb 1973), occurs on four sherds (Fig. 267). These shallow lines are either straight or gently curved.

Discussion. The hemispherical bowl rim forms resemble the direct rounded lip and the direct tapered lip forms in Kolb (1973:348, Fig. III). The olla rim resembles Kolb's (1973:348, Fig. III) moderate everted lip form. Schematic illustrations of the box, cylindrical vase, and goblet cup vessel forms can be found in Fig. 22 and in Kolb (1973).

Kolb's (1973) report on Thin Orange pottery at Teotihuacan describes chronological information for the vessel forms from this sample. The most common Thin Orange vessel form is the hemispherical bowl, with a temporal span encompassing the Late Tzacualli through Oxtotipac phases. The hemispherical ring or annular base may be diagnostically significant. Kolb (1973) distinguishes between a ring base and an annular base. Ring bases (Fig. 9 B14) have a support profile measuring less than 0.9 cm in height (Sanders pers. comm.). Annular bases have a support profile measuring greater than 1.0 cm in height. According to Kolb, the annular base was not produced until Early Tlamimilolpa times. According to these defining characteristics, only one base in the sample can be considered an annular form (Fig. 255 B17).

Another attribute with diagnostic value is the decorative form of preslip incision (Fig. 267). Parallel incised lines appeared during the Miccaotli and lasted until the Late Xolalpan (Kolb 1973:351). Sherd 10615-41 has a double set of curved parallel lines (Fig. 267 c) that probably represent an incised type known as the multiple scallop. This form of incision lasted from the Early Tlamimilolpa to the Early Xolalpan.

The Goblet/cup form appeared during the Late Tlamimilolpa and lasted until the Late Xolalpan. As a popular vessel form, the goblet/cup peaked during the Early Xolalpan then rapidly declined in frequency. Interestingly, Kolb reports that the goblet/cup form was not common in rural contexts.

Kolb (1973:334) indicates that high necked ollas are restricted to the Late Tlamimilolpa and Early Xolalpan Subphases. The cylindrical vase form lasted from the Early Tlamimilolpa until the Metepec phase. The cylindrical vase sherd (10660-18) probably came from a vessel with solid nubbin supports, a form which Kolb (1973:332) reports as manufactured only during the Early Tlamimilolpa. The box form is extremely rare (Kolb 1973:331), and may have been manufactured only during the Early Xolalpan phase.

The Thin Orange decorative forms in the sample resemble Teotihuacan period attributes. Based on vessel form and decorative techniques, much of the sample is similar to vessels manufactured during the Late Tlamimilolpa and Xolalpan phases. However, 70% of the Thin Orange sherds in the sample are undecorated and therefore, could have been manufactured at any time during the Teotihuacan period.

Granular Ware

Subsample: 2 body sherds
0.4% of sample; V-For 22 (Table 83)

Both granular ware body sherds probably came from the common Granular Ware vessel form known as the amphora. These sherds measured 0.6 cm in thickness. The interior and exterior surfaces are matte with a pink color (5YR 7/4). The sherd exteriors also have portions painted red (10R 4/6). Granular sherds at Teotihuacan could date to any time after the Patlachique phase (Rattray 1973:55).

Possible Gulf Coast Cream Ware

Subsample: 1 body sherd
0.2% of sample; V-For 23 (Table 83)

This sherd is too small to identify what vessel form it came from. The sherd measures 0.4 cm in thickness. The exterior is covered with a light grey slip (10YR 7/2) and is highly burnished. The interior is matte with a grey color (10YR 6/1). Its atypical light grey slip and paste are the best indicators that this sherd is not indigenous. The temporal affiliation for this sherd is unknown.

G. SUMMARY

Before proceeding with this summary and the following conclusions, three cautionary notes must be made explicit. First, no absolute dates from Venta de Carpio were available so the chronological placement of this sample is based solely on the comparative ceramic literature. Second, only the ceramic material recovered from Features 1 and 4 has been described. Therefore, these descriptions may not reflect the composition of the Teotihuacan period ceramic sample from Venta de Carpio as a whole. Third, the sample size examined is small (n = 470). Future analysis of the remaining Teotihuacan component ceramics will be necessary to confirm whether Features 1 and 4 represent the sample as a whole, and provide a larger data set amenable to statistical examination.

Among the sample, 248 (53%) of the 470 sherds are considered diagnostically valuable based on attributes such as vessel form, paste type, surface treatment, and decoration (see Fig. 268 and Table 77). Including non-diagnostics, there were 268 rim sherds in the sample. These rim sherds represent a maximum of 268 vessels from both features. A review of the comparative literature revealed that 71% (n = 176) of the diagnostic sherds resemble vessel forms thought to date after the end of the Tzacualli phase (A.D. 150). Among this post-Tzacualli subsample, only 1.6% (n = 4) resemble vessel forms found in post-Tlamimilolpa deposits (post A.D. 500). Therefore, 69.4% of the 248 diagnostic sherds from Features 1 and 4 reflect vessel forms commonly found in deposits beginning with the Miccaotli phase (A.D. 150) and lasting until the end of the Late Tlamimilolpa subphase (A.D. 500). Sherds from vessels resembling Terminal Formative (i.e., Patlachique and Tzacualli, 250 B.C. to A.D. 150) styles total 27.4% of the sample.

1. The Features

Feature 1 Midden. There are 136 identifiable diagnostic sherds from the Feature 1 midden assemblage (See Table 74). There are also 35 unidentifiable rim and 101 body sherds. This assemblage was probably a residential midden because it exhibits sherds from vessels associated with storage, cooking, and serving.

Feature 1 Burial. There are 39 identifiable diagnostic sherds from the Feature 1 burial assemblage (Table 75). There are also 11 unidentifiable rim and 12 body sherds. Because of the fragmentary condition of the sherds, it is improbable that any came from burial offerings, which should occur as whole vessels. None of the burial unit sherds represented even partially reconstructible vessels. It is likely that these sherds came from the Feature 1 midden and were introduced during the process of interment. The composition of the burial sample, like that for the Feature 1 midden, consists of sherds from vessels used for storage, cooking, and serving.

Feature 4 Midden. There are 73 identifiable diagnostic sherds from the Feature 4 midden assemblage (Table 76). There are also 19 unidentifiable rim and 44 body sherds. This assemblage was probably a residential midden because it exhibits sherds from vessels associated with storage, cooking, and serving.

2. The Ceramics

Early Teotihuacan Forms

The most important Early Teotihuacan diagnostic forms identified in the sample include ollas, flat bottomed bowls (incurved, outcurved, and deep bowls), vases, comals, cazuelas, and craters (see descriptions and figures). The Venta de Carpio ollas (n = 34) with Early Teotihuacan forms have relatively high necks, moderate to strongly everted rims with flattened upper surfaces (Fig. 6 rims 1, 2, 3, 4, & 10), and horizontally wiped neck exteriors (Rattray 1973, Hirth 1980). In addition, these ollas have moderate to high quality burnishing on their interior neck, upper rim, and exterior body surfaces. The Early Teotihuacan olla sherds are made from A paste (n = 33) and Salt and Pepper paste (n = 1).

Both the incurved (Fig. 253 R11, Fig. 264) and outcurved (Fig. 253 R12, R13, & R14) Early Teotihuacan style flat bottomed bowls have outflaring side walls with highly burnished surfaces (Rattray 1973, Muller 1978, Hirth 1980, Smith 1989). Sometimes the exterior side walls of these vessels are accompanied by curving parallel post-fired incised lines. Another important diagnostic for these vessels in the blunted solid cone nubbin supports that are either slightly recessed or flush with the basal edge. The deep flat bottomed bowl in the sample also has outflaring side walls and nubbin supports set flush with the vessel edge (Fig. 253, R16). All sherds representing these vessel forms are made from B paste.

Vases with Early Teotihuacan forms have slightly to moderately flared side walls, direct or everted lips (Fig. 253 R17, R18, R19, & R20), and high quality burnishing (Rattray 1973, Hirth 1980). Some of the exterior walls have high quality vertical burnishing. Like the flat bottomed vessels, some of the vases have blunted solid cone nubbin supports set flush with their basal edges. The vase sherds are made of B paste (n = 8) and A paste (n = 2).

The Feature 1 comals with Early Teotihuacan form are shallow basin like plates with highly burnished upper surfaces. The lower surfaces of these vessels are matte with horizontally wiped borders. Rim forms exhibited in Fig. 258 (R46, R47, R48, R49, R50, R59) resemble other comal forms reported for the Early Teotihuacan (Rattray 1973, Muller 1978, Smith 1989). These comal sherds are all made of B paste.

The Venta de Carpio cazuelas exhibit strongly everted rims, vertical side walls, and poor burnishing (Fig. 254 R21 & R25). The craters have slightly outcurving or everted rims, slight to moderately flared side walls, well burnished interior surfaces and poorly burnished exterior surfaces (Fig. 254 R22, R23, R24, & R26). These sherds resemble forms reported for the Miccaotli and Early Tlamimilolpa subphases (Rattray 1973, Sheehy 1992). The cazuela sherds are made of A paste (n = 1), B paste (n = 6), and Salt and Pepper paste (n = 2). All the crater sherds are made of A paste.

Other vessel forms resembling Early Teotihuacan material include the large flat-bottomed bowl, the shouldered platter, and some of the hemispherical bowls. The large flat bottomed bowl, though questionable as a vessel form, has the Teotihuacan Period A paste and red paint along its rim and proposed base (Fig. 253 R15, Fig. 263 a). The shouldered platter sherds have the B paste and high quality burnishing characteristic of the Early Teotihuacan period (Fig. 257 R40). Neither the large flat bottomed form nor the shouldered platter form was specifically identified in the comparative literature. In addition, seven hemispherical bowl rim sherds resembling Early Teotihuacan styles were difficult to match in the comparative literature (Fig. 256 R30, R31, R34, R36, R37). These sherds exhibited relatively good quality surface burnishing and were made of B paste (n = 6) and A paste (n = 1).

Besides the large flat bottomed bowl sherd mentioned above, several Teotihuacan period red and specular red painted sherds were identified from Features 1 and 4 (4%, n = 11). Apparently red and specular red painted vessels appeared in the Early Tlamimilolpa, and became abundant in the Late Tlamimilolpa (Rattray 1973). The limited number of these sherds in the sample may indicate that Features 1 and 4 were deposited no later than the Tlamimilolpa phase, and probably no earlier than the Early Tlamimilolpa.

The Thin Orange sherds in the sample are primarily from hemispherical bowls with direct lips and ring or annular base supports. The majority of these sherds are devoid of surface decoration. Furthermore, three of the four base supports are the pre-Early Tlamimilolpa ring bases. These are common attributes for Thin Orange sherds affiliated with the Late Tzacualli and Early Tlamimilolpa subphases.

The sample includes four Thin Orange sherds with the shallow incised line decoration associated with the Early Tlamimilolpa subphase (Kolb 1973). One sherd apiece from the olla, cup/goblet, and cylindrical vase forms were found in the sample. Kolb (1973) believes these forms appeared sometime after the Early Tlamimilolpa subphase.

The only sherds that resemble post-Tlamimilolpa phase forms are a Thin Orange box sherd and three Copa Ware sherds. Kolb (1973) believes the Thin Orange box form appeared in the Early Xolalpan. This form is unreliable as a temporal diagnostic because very few have been found. The Copa Ware sherds in the sample were parts of what might have been goblets, cups or small bowls. Copa Ware vessels probably appeared during the Early Xolalpan subphase (Rattray unpublished manuscript).

Terminal Formative Forms

Sherds resembling Terminal Formative vessels are primarily ollas and shouldered bowls. The Formative style ollas have slightly to moderately everted rims with outwardly bevelled lips (Fig. 252 R6, R7, R8, R9), low to high quality burnishing on their interior neck and rim surfaces, wiped exterior neck surfaces, and burnished exterior body surfaces (Rattray 1973, Sanders et al. 1975, Hirth 1980). Paste types include A (7 sherds), B (1 sherd), and Salt and Pepper (6 sherds). Rim 44 (paste type unknown) is distinct from the rest of the Terminal Formative style ollas, more closely resembling ollas from the Late Formative Cuanalan phase (Blucher 1971).

Shouldered bowls (Fig. 259) are hemispherical vessels with a lateral angle break about 1.7 cm. below the rim. Surface treatment on these vessels consists of poor quality horizontal burnishing. A distinctive attribute found on these shouldered bowls is a horizontally grooved or rippled exterior surface. All of the shouldered bowls in the sample are made of B paste.

Three of the comal sherds in the Feature 1 and 4 sample resemble Patlachique and Tzacualli phase comals (Blucher 1971). These sherds have poorly burnished upper surfaces, wiped lower surfaces including borders, and a groove separating the border from the interior lower surface. Two of these sherds are made of Salt and Pepper paste, the third of A paste.

Other sherds with an affinity for Terminal Formative vessel styles include three hemispherical bowl sherds, one tecomate sherd, and two composite silhouette sherds (both from the same vessel). The hemispherical bowl sherds (Fig. 256 R32, R33, & R38) resembling Terminal Formative material (Rattray 1973, Hirth 1980) have moderately well burnished surfaces and exhibit the same exterior rippled condition as the shouldered bowls. These sherds are made of B paste.

The tecomate sherd exhibits high quality burnishing and is made of A paste. As a vessel form, the tecomate seems to disappear from the record after the Tzacualli phase (Blucher 1971, Sanders et al. 1975, Smith 1989). The composite silhouette vessel form (Fig. 261 S1) has a distinctive zone burnished pattern (Fig. 265), and is made of B paste. Vessels similar to the composite silhouette sherds in the sample are affiliated with the Late or Early Terminal Formative (Sanders et al. 1975).

Table 74; Quantity of Sherds, Percentage of Assemblage, and Stylistic Temporal Affiliation for Vessel Types found in Feature 1 Midden.

Vessel Number and Form	#	%	Teotihuacan	Trm Form
(1) Hemispherical Bowls	21	15.4	19	2
(2) Shouldered Bowls	34	25.0	0	34
(3) Incurved Bowls	1	0.7	1	0
(4) Cazuelas	2	1.5	2	0
(5) Craters	9	6.6	9	0
(6) Copa Ware	2	1.5	2	0
(7) Ollas	24	17.7	17	7
(8) Vase	5	3.7	5	0
(9) Shouldered Platters	0	0.0	0	0
(10) Comals	19	14.0	16	3
(11) Tecomates	0	0.0	0	0
(12) Censers	0	0	0	0
(13) Deep Flt Btm Bowls	1	0.7	1	0
(14) Outcurved Bowls	5	3.7	5	0
(15) Lg Flt Btm Bowls	1	0.7	1	0
(16) Composite Silhouettes	0	0.0	0	0
(17) Thn Orng Goblet/Cup	0	0.0	0	0
(18) Thn Orng Cyl Vase	1	0.7	1	0
(19) Thn Orng Box	0	0.0	0	0
(20) Flt Btm Vessel Rims	4	3.0	4	0
(21) Flt Btm Vessel Bases	7	5.2	7	0
Totals	136		90	46

Table 75; Quantity of Sherds, Percentage of Assemblage, and Stylistic Temporal Affiliation for Vessel Types found in Feature 1 Burial.

Vessel Number and Form	#	%	Teotihuacan	Trm Form
(1) Hemispherical Bowls	12	30.8	11	1
(2) Shouldered Bowls	2	5.1	0	2
(3) Incurved Bowls	0	0	0	0
(4) Cazuelas	1	2.6	1	0
(5) Craters	0	0	0	0
(6) Copa Ware	0	0	0	0
(7) Ollas	6	15.4	5	1
(8) Vase	1	2.6	1	0
(9) Shouldered Platters	0	0	0	0
(10) Comals	10	25.7	10	0
(11) Tecomates	1	2.6	0	1
(12) Censers	0	0	0	0
(13) Deep Flt Btm Bowls	0	0	0	0
(14) Outcurved Bowls	1	2.6	1	0
(15) Lg Flt Btm Bowls	0	0	0	0
(16) Composite Silhouettes	0	2.6	0	1
(17) Thn Orng Goblet/Cup	0	2.6	1	0
(18) Thn Orng Cyl Vase	0	0	0	0
(19) Thn Orng Box	1	2.6	1	0
(20) Flt Btm Vessel Rims	0	0	0	0
(21) Flt Btm Vessel Bases	2	5.1	2	0
Totals	39		33	6

Table 76; Quantity of Sherds, Percentage of Assemblage, and Stylistic Temporal Affiliation for Vessel Types found in Feature 4 Midden.

Vessel Number and Form	#	%	Teotihuacan	Trm Form
(1) Hemispherical Bowls	5	6.9	5	0
(2) Shouldered Bowls	8	11	0	8
(3) Incurved Bowls	6	8.2	6	0
(4) Cazuelas	6	8.2	6	0
(5) Craters	0	0	0	0
(6) Copa Ware	1	1.4	1	0
(7) Ollas	23	32	16	7
(8) Vase	4	5.5	4	0
(9) Shouldered Platters	5	6.9	5	0
(10) Comals	0	0	0	0
(11) Tecomates	0	0	0	0
(12) Censers	1	1.4	0	1
(13) Deep Flt Btm Bowls	0	0	0	0
(14) Outcurved Bowls	4	5.5	4	0
(15) Lg Flt Btm Bowls	0	0	0	0
(16) Composite Silhouettes	0	0	0	0
(17) Thn Orng Goblet/Cup	0	0	0	0
(18) Thn Orng Cyl Vase	0	0	0	0
(19) Thn Orng Box	0	0	0	0
(20) Flt Btm Vessel Rims	4	5.5	4	0
(21) Flt Btm Vessel Bases	6	8.2	6	0
Totals	73		57	16

Table 77; Quantity and Stylistic Temporal Affiliation of Sherds from Venta de Carpio Features 1 and 4.

Vessel Number and Form	Trm Form	E Teoti.	E Xol	Unknown
(1) Hemispherical Bowls	3	35	0	0
(2) Shouldered Bowls	44	0	0	0
(3) Incurved Bowls	0	7	0	0
(4) Cazuelas	0	9	0	0
(5) Craters	0	9	0	0
(6) Copa Ware	0	0	3	0
(7) Ollas	15	38	0	0
(8) Vase	0	10	0	0
(9) Shouldered Platters	0	5	0	0
(10) Comals	3	26	0	0
(11) Tecomates	1	0	0	0
(12) Censers	1	0	0	0
(13) Deep Flt Btm Bowls	0	1	0	0
(14) Outcurved Bowls	0	10	0	0
(15) Lg Flt Btm Bowls	0	1	0	0
(16) Composite Silhouettes	1	0	0	0
(17) Thn Orng Goblet/Cup	0	1	0	0
(18) Thn Orng Cyl Vase	0	1	0	0
(19) Thn Orng Box	0	0	1	0
(20) Flt Btm Vessel Rims	0	8	0	0
(21) Flt Btm Vessel Bases	0	15	0	0
Granular Ware	0	0	0	2
Cream Ware	0	0	0	1
Totals	68	176	4	3

H. CONCLUSIONS

The primary objective of this ceramic description was to examine whether Venta de Carpio's Teotihuacan component is temporally affiliated, as Sanders (1994), suggests, with the Early Teotihuacan Phase. The determination was based on analysis of the ceramic material from the excavation of Features 1 and 4 at Venta de Carpio. Corresponding with the primary objective, two alternatives concerning the origin of Features 1 and 4 were evaluated. The first was that both features were deposited by different occupations over a long period of time; the second, that these features were the result of a single temporally discrete occupation.

If the features were the result of deposits laid down intermittently over a long period of time, they would contain assemblages from two or more temporal components. Assuming that these features represent household refuse, the ceramic material from each component would include the whole range of service, cooking, and storage vessels expected in a household assemblage. If Features 1 and 4 were the result of a single household occupation, the collective assemblage should include service, cooking, and storage vessels from a relatively short period of time.

In support of the earlier conclusion of Sanders (1994), the results presented here demonstrate a clear predominance of Miccaotli and Early Tlamimilolpa phase ceramic material (A.D. 150-400). More importantly, the evidence supports the notion that Features 1 and 4 resulted from a single temporally discrete Early Teotihuacan occupation. The figurine data employed as a cross-check of the ceramic vessel data did not prove useful. The figurine typology developed by Kolb (1994) is specific only enough to conclude that perhaps 75% of the figurines recovered from the features were produced between 100 B.C. and A.D. 400 (Tzacualli to Tlamimilolpa phases).

In general, both midden assemblages have about the same number of sherds with Teotihuacan period attributes (Feature 1 midden = 66%; Feature 4 midden = 78%). The ceramic material found with the Feature 1 burial cannot be reliably associated with the skeletal material. The likelihood that any of these sherds came from offerings is low because there were no reconstructible vessels found in the burial. However, its stratigraphic provenience adjacent to the Feature 1 midden indicates that either the burial was deposited during the midden's use-life or that it was intrusive at some later date.

The next largest proportion of the sample (27%) reflects diagnostic attributes commonly associated with the Terminal Formative (250 B.C. to A.D. 150). However, there are several good reasons why it is unlikely that this earlier-looking material represents an isolated component. First, none of the features per se exhibits a predominantly Terminal Formative-style assemblage. The Terminal Formative-style material comprises 34% (n = 46), 15% (n = 6), and 22% (n = 16) of the sherds from the Feature 1 midden, Feature 1 burial, and the Feature 4 midden, respectively.

Second, the composition of this part of the sample does not demonstrate enough range in vessel types to represent a distinct occupational component. The Terminal Formative-looking sherds from both Features combined consist of shouldered bowls (n = 44), ollas (n = 15), comals (n = 3), tecomates (n = 1), censers (n = 1), and composite silhouettes (n = 2). Nearly 89% (n = 59; shouldered bowls and ollas) of this assemblage comes from two vessel categories. Clearly the Terminal Formative-looking assemblage has a very restricted range of vessel types and, depending on the use of the shouldered bowl form, may lack service ware altogether. Although shouldered bowls could have functioned as service ware, their relatively poor surface finish and large size suggest a more probable function as food preparation and cooking vessels. In addition, Tzacualli service ware is often made of Salt and Pepper paste (Rattray 1973, Kolb nd). The sample's Terminal Formative-style Salt and Pepper sherds came from ollas (n = 6; used for storage and cooking) and comals (n = 2; used for cooking).

The most revealing aspect of the Terminal Formative-style assemblage is the total absence of Tzacualli period polychrome and resist wares (Sejourne 1966, Rattray 1975, Smith 1989). The resist forms, considered a Tzacualli diagnostic, have been found in nearly all Tzacualli deposits excavated from Teotihuacan period Teotihuacan contexts (Millon 1973, Millon and Bennyhoff 1961, Noguera 1935). Rattray (1973:99) reports that resist ware constitutes five to eight percent of the Tzacualli deposits from Ostoyahualco. Sanders (pers. comm.) claims resist ware should comprise between five and ten percent of Tzacualli component assemblages.

The ceramic sample from Features 1 and 4 contained little evidence of a significant post-Early Tlamimilolpa occupation. One post-Early Tlamimilolpa attribute encountered in the sample was the use of red and specular red paint for decoration. This trait appeared first during the Early Tlamimilolpa and became common by the Late Tlamimilolpa. Only 12 sherds from the diagnostic portion of the sample (n = 251) had red or specular red paint, suggesting an Early Tlamimilolpa date for the assemblage.

Thin Orange decorative traits common after the Early Tlamimilolpa subphase, most notably shallow incised lines (Kolb 1973), are also low in frequency. Shallow incised lines were found on four Thin Orange sherds in the sample. Moreover, the olla, cup or goblet, and cylindrical vase Thin Orange vessel forms are represented by one sherd apiece. Kolb (1973) believes these forms appeared sometime after the Early or Late

Tlamimilolpa subphases. These sherds are either early examples of these Thin Orange attributes or stray Late Teotihuacan sherds mixed in with the sample.

The only possible material resembling Early Xolalpan ceramics includes one Thin Orange box sherd and three Copa Ware sherds. The Thin Orange box form (Kolb 1973) is so rare that it cannot be considered a reliable diagnostic marker. The Copa Ware sherds could be early precursors of post-Tlamimilolpa Copa Ware, being composed of a fine paste distinct from the later variety. Detailed analysis of the paste from these sherds would resolve this issue. The composition of the assemblages from both Features 1 and 4 support the hypothesis of a single short term occupation. The high frequency of Terminal Formative-looking material probably represents the persistence of earlier forms in the Early Teotihuacan period. For any ceramic sample at any period in time, the presence of earlier material "floating" in the sample is expected (Kenneth Hirth pers. comm.). Rattray (1973:15) admits to being uncertain about the integrity of her Miccaotli "control" sample. Although her sample contains 1,956 sherds identified as Miccaotli, she also has 758 sherds that correlate well with styles classified as Tzacualli. Rattray is unsure whether the Tzacualli forms entered the sample as redeposited fill, or if they were Tzacualli vessel forms still being produced during the Miccaotli phase.

The inference of a short-term Early Teotihuacan occupation is also supported by the small sample size recovered from both features. The plan view maps of Trench 1 and Trench 2 indicate that probably 100% of Feature 1, and 75% of Feature 4 were excavated (Sanders 1994: Fig. 33 & 34). From these deposits, a total of 203 rim sherds were recovered. Taking into account the unexcavated portion of Feature 4, both middens probably contain sherds representing no more than about 300 broken vessels. Under the conservative assumption that only one household produced both middens, how much time would it take to discard 300 vessels? According to Foster (1960:608), it is reasonable to suppose that at any given moment a prehistoric household may have been using about 40 vessels for storage, cooking, and serving (50 to 75 vessels for modern households). Ethnographic data indicate that most household ceramic inventories are replaced in less than ten years (Foster 1960).

If the household at Venta de Carpio had an average of 40 vessels at any given time, it would take about 75 years to discard 300 vessels. This estimate is extremely conservative because most household vessels have use-lives much shorter than ten years (Foster 1960). In addition, if more than one household contributed to the Feature 1 and 4 refuse, the time estimate could be even shorter.

To conclude, this work contributes most by establishing a solid baseline for determining the presence of Early Teotihuacan Miccaotli and Early Tlamimilolpa occupations in the Teotihuacan Valley outside the city limits, and the Basin of Mexico as a whole. Moreover, with a predominance of Miccaotli and Early Tlamimilolpa ceramic attributes deposited over a short period of time, this assemblage was likely the product of an occupation spanning the Miccaotli-Early Tlamimilolpa transition. These descriptions will assist the chronological ordering of ceramics from urban and rural excavations as well as surface collected material. Detailed analysis of the sherds from Features 1 and 4 has functioned to refine and reinforce what we know about the chronological history of ceramics in the Teotihuacan Valley of Mexico.

A useful future endeavor would be the analysis of samples from other midden features encountered during the Teotihuacan Valley Project field excavations. Descriptive analysis of similar single component samples from the area could substantially augment our knowledge of the ceramic chronology in the Teotihuacan Valley. Furthermore, statistical comparisons of rural assemblages with those from the city of Teotihuacan could potentially reveal quantitative and qualitative similarties and differences between urban and rural household assemblages and thereby shed light on regional economic patterning of production and distribution.

Table 78: Key to Sherd Munsell Color Codes Used in Table 83

Code No.	Color Designation	Munsell Codes	Munsell Names
1	Red	2.5YR 4/6, 5/6, 5/8	Red
3	White	5YR 7/4	Pink
5	Orange	5YR 5/6, 5/8, 6/6, 6/8	Yellowish Red
6	Brown	5YR 4/3, 4/4, & 5/4 7.5YR 4/4 7.5YR 4/6, 5/6 7.5YR 5/4 10YR 5/3 10YR 5/4	Reddish Brown Brown-Dark Brown Strong Brown Brown Brown Yellowish Brown
7	Light Brown	7.5YR 6/4 7.5YR 6/6, 6/8, 7/6 7.5YR 7/4 10YR 7/4 10YR 7/6 10YR 6/4	Lt. Brown Reddish Yellow Pink Very Pale Brown Yellow Lt. Yellowish Brown
8	Dark Brown	7.5YR 4/2 10YR 4/3	Dark Grayish Brown Dark Brown-Brown
9	Light Gray	10YR 7/1, 7/2	Lt. Gray
10	Gray	10YR 5/1 10YR 6/2	Gray Lt. Brownish Gray
11	Dark Gray	10YR 2/1 10YR 3/1 10YR 4/1 10YR 4/2	Black Very Dark Gray Dark Gray Dark Grayish Brown
12	Black	5YR 2.5/1 7.5YR 2/0 7.5YR 3/0	Black Black Very Dark Gray

Table 79

List of catalog numbers assigned to deposits recovered from Feature 1 of Trench 1 and Feature 4 of Trench 2.

Feature 1, Trench 1, Midden Portion

Unit	Cat. No.	Depth
4-5E, 0-1S	10,632	50-70cm
	10,764	70-80cm
4-5E, 0-1N	10,636	50-70cm
	10,648	70-80cm
	10,765	70-80cm
4-5E, 1-2N	10,660	50-70cm
	10,674	70-80cm
	10,756	70-80cm
	10,759	80-90cm
3-4E, 0-1N	10,732	50-70cm
	10,760	70-80cm
5-6E, 0-1N	10,639	50-70cm
	10,768	70-80cm

Feature 1, Trench 1, Burial Portion

Unit	Cat. No.	Depth
5-6E, 0-1S	10,615	50-70cm
	10,769	70-80cm
	10,655	80-90cm

Feature 4, Trench 2, Midden

Unit	Cat. No.	Depth
2-3N, 0-1W	10,747	60-80cm
3-4N, 0-1W	10,761	60-80cm

Table 80

Figurine Fragments from Venta de Carpio

List of Figurine Fragments by Category Recovered From Venta de Carpio (adapted from Kolb 1994).

Figurine Types	Quantity
Handmade Head Fragments (HH)	25
Handmade Body Fragments (HB)	80
Handmade Appendage Fragments (HA)	282
Moldmade Head Fragments (MH)	9
Moldmade Body Fragments (MB)	13
Moldmade Appendage Fragments (MA)	2
	411

Temporal Affiliation of Handmade Head Fragments from Venta de Carpio (adapted from Kolb 1994).

Key to Columns:

ETz = Early Tzacualli
LTz = Late Tzacualli
Mic = Miccaotli
ETl = Early Tlamimilolpa
LTl = Late Tlamimilolpa
EX = Early Xolalpan
LX = Late Xolalpan
Met = Metepec

Fig Type	Quantity	ETz	LTz	Mic	ETl	LTl	EX	LX	Met
HH-2	1	X							
HH-6	1				X				
HH-8	1				X				
HH-12	3			X					
HH-14	7			X					
HH-15	1			X					
HH-17	2				X				
HH-18	2			X	X				
HH-32	3			X					
HH-33	1	X	X	X	X				
HH-41	3				X				
Total	25								

Temporal Affiliation of Handmade Body Fragments from Venta de Carpio (adapted from Kolb 1994).

Fig Type	Quantity	ETz	L	Mic	ETl	LTl	EX	LX	Met
HB-4	2			X					
HB-6	2	X	X	X	X				
HB-8	12					X	X	X	
HB-13	13			X	X	X			
HB-16	1				X	X			
HB-19	1		X	X	X				
HB-24	40		X	X	X	X			
HB-30	9			X	X				
Totals	80								

Temporal Affiliation of Handmade Appendage Fragments from Venta de Carpio (adapted from Kolb 1994).

Fig Type	Quantity	ETz	LTz	Mic	ETl	LTl	EX	LX	Met
HA-1	1			X	X				
HA-7	21						X	X	
HA-8	6						X		
HA-9	10						X	X	
HA-11	7					X	X	X	X
HA-13	11					X			
HA-15	29	X	X	X	X	X	X	X	X
HA-16	24		X	X	X				
HA-18	7					X	X		
HA-20	22	X	X	X	X	X	X	X	X
HA-21	10						X		
HA-24	134	X	X	X	X	X	X	X	
Totals	282								

Temporal Affiliation of Moldmade Head Fragments from Venta de Carpio (adapted from Kolb 1994).

Fig. Type	Quantity	ETz	LTz	Mic	Etl	Ltl	EX	LX	Met
MH-1	1						X	X	
MH-4	2				X	X	X		
MH-5	1				X	X	X		
MH-10	2						X	X	
MH-22	2						X	X	
MH-45	1				X	X			
Totals	9								

Temporal Affiliation of Moldmade Body Fragments from Venta de Carpio (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
MB-15	1					X	X	X	
MB-36	4							X	X
MB-45	4					X	X	X	
MB-48	4					X	X	X	
Totals	13								

Temporal Affiliation of Moldmade Appendage Fragments from Venta de Carpio (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
MA-1	2					X			
Totals	2								

Table 81

Figurine Fragments from Feature 1 at Venta de Carpio

Temporal Affiliation of Handmade Head Fragments from Feature 1 (adapted from Kolb 1994). For Key to Columns See Appendix 2.

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
HH-8	1				X				
HH-14	4			X					
HH-15	1			X					
HH-17	1				X				
HH-18	2			X	X				
HH-41	3				X				
Totals	12								

Temporal Affiliation of Handmade Body Fragments from Feature 1 (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
HB-4	2			X					
HB-6	1	X	X	X	X				
HB-8	4				X	X	X	X	
HH-13	7			X	X	X			
HB-19	1		X	X	X				
HB-24	20		X	X	X	X			
HB-30	3			X	X				
Totals	38								

Temporal Affiliation of Handmade Appendage Fragments from Feature 1 (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
HA-7	11						X	X	
HA-8	4						X		
HA-9	8						X	X	
HA-11	4					X	X	X	X
HA-13	6					X			
HA-15	17	X	X	X	X	X	X	X	X
HA-16	12		X	X	X				
HA-18	1					X	X		
HA-20	3	X	X	X	X	X	X	X	X
HA-21	5						X		
HA-24	67	X	X	X	X	X	X	X	
Totals	138								

Temporal Affiliation of Moldmade Head Fragments from Feature 1 (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
MH-4	1				X	X	X		
MH-10	1						X	X	
Totals	2								

Temporal Affiliation of Moldmade Body Fragments from Feature 1 (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
MB-15	1					X	X	X	
MB-36	2							X	X
MB-45	1					X	X	X	
MB-48	1					X	X	X	
Totals	5								

Temporal Affiliation of Moldmade Appendage Fragments from Feature 1 (adapted from Kolb 1994).

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
MA-1	1					X			
Totals	1								

Table 82

Figurine Fragments from Feature 4 at Venta de Carpio

Temporal Affiliation of Handmade Head Fragments, Handmade Appendage Fragments, and Moldmade Head Fragments from Feature 4 (adapted from Kolb 1994). For Key to Columns See Appendix 2.

Fig. Type	Quantity	Etz	Ltz	Mic	Etl	Ltl	EX	LX	Met
HH-14	1			X					
HA-24	4	X	X	X	X	X	X	X	
MH-1	1						X	X	
Totals	6								

Appendix F

This appendix Contains the attribute codes for the Table 83 spreadsheet recorded for the sherds from Feature 1 and 4 at Venta de Carpio. Each column in the spreadsheet designates a different attribute coded for each sherd. Where a sherd could not be coded for a given attribute, it was assigned a value of zero.

Num Number of the sherd as coded on the spreadsheet form.

Op Designates one of two excavation operations at Venta de Carpio. A value of 1 corresponds to Trench 1. A value of 2 corresponds to Trench 2.

Cat# Collection unit number assigned to artifacts obtained from a given excavation level or lot. At Venta de Carpio the collection unit numbers were in the 10,000's. However, the spreadsheet only contains the last three digits of these collection numbers (e.g., number 10636 will read 636 on the spreadsheet).

Sherd# The number written beside each collection number on each sherd in the sample (e.g., 10636-6, the last 6 is the Sherd#).

Paste Paste type of a sherd (pastes described in paste description section of the text). The alphabetic values correspond to;

A = A paste
B = B paste
T = Salt and Pepper paste
O = Thin Orange paste
C = Copa Ware paste
G = Granular Ware paste

CerCode General color and surface treatment of a sherd. This column has a three digit number. The first digit numeral corresponds to surface color;

1 = brown
2 = black or dark grey
3 = tan
4 = red
5 = orange

The middle numeral is a zero and is a filler. The last numeral corresponds to overall surface treatment;

1 = coarse matte
2 = fine matte
3 = low burnish
4 = high burnish

Surface treatment designations are defined as,

<u>coarse matte</u>: untreated surface of a sherd made of a heavy coarse paste (large inclusions).
<u>fine matte</u>: untreated surface of a sherd made of a medium to fine paste (medium sized to no inclusions in paste).
<u>low burnish:</u> surface rubbed with a burnishing instrument (smooth stick or stone), burnishing strokes still apparent to the touch.
<u>high burnish:</u> surface rubbed with a burnishing instrument, burnishing strokes visible but not apparent to the touch.

V-For General form of the vessel that a sherd is a part. These vessel forms are schematically drawn in Fig. 22. Numerals coded in this column correspond to;

1 = hemispherical bowl
2 = shouldered bowl
3 = incurved flat bottomed bowl
4 = cazuela
5 = crater
6 = Copa Ware cup/goblet/small bowl
7 = olla
8 = vase
9 = shouldered platter
10 = comal
11 = tecomate
12 = censer
13 = deep flat bottomed bowl
14 = outcurved flat bottomed bowl
15 = large flat bottomed bowl
16 = composite silhouette
17 = Thin Orange cup/goblet
18 = Thin Orange cylindrical vase
19 = Thin Orange box
20 = flat bottomed vessel rims
21 = flat bottomed vessel bases
22 = unidentifiable rim sherd
23 = body sherd

R-For Number designating form of rim. All rim forms are drawn in Figs. 6 - 13.

L-Ed Shape of the lip edge (Fig. 23). Numerals in this column refer to;

1 = round lip.
2 = blunt square lip.
3 = flat rounded bevel.
4 = rounded exterior bevel.

S-Prof Second profile or angle break sometimes found in vessel forms. The only sherd that coded positive for this attribute was the composite silhouette sherd 10615-14 (Num = 222 on spreadsheet). This second profile is drawn in Fig. 15 (S1).

M-Diam Vessel mouth diameter estimated in cm.

N-Diam Vessel neck diameter estimated in cm.

B-Dia Base diameter estimated in cm.

V-Th Sherd thickness estimated in cm.

Oxid Extent of oxidation visible in the cross-section of the sherd. The numbers coded in this column correspond to;

1 = fully oxidized (one color visible in sherd x- section).
2 = incomplete oxidation (two colors visible in sherd x- section, contrast not marked).
3 = incomplete oxidation (two colors visible in sherd x- section, contrast marked).

B-Prof Form of the base. All base forms are drawn in Figs. 9, 10, & 14.

SP-CL Type of support exhibited on a sherd. Numbers coded in this column correspond to;

1 = hollow support
2 = solid support

SP-Prof Form of a support in profile (Fig. 23). Numerals coded in this column refer to;

1 = rounded shallow truncated cone slab nubbin.
2 = rounded cone nubbin.
3 = annular base.

SP-Pl Placement of nubbin supports in relation to the edge of the vessel base (Fig. 23). Numerals coded in this column refer to;

1 = on base where base and side wall meet.
2 = on base inset from where base and side wall meet.
3 = straddling base and side wall.
4 = on side wall.

R-Tr-De Surface treatment on the surface of the rim. The spreadsheet has five single digit numerical values that correspond to the different surface treatments listed below.
1 = matte
3 = low burnish
4 = high burnish
7 = polished
8 = wiped

The spreadsheet categories of Up/Int-Rt through Ext-Nec have a two digit number that provides information on surface treatment. The first numeral in this two digit number corresponds to the surface treatment designations outlined for the category of R-Tr-De. The first digits 3 (low burnish), 4 (high burnish), and 8 (wiped) are followed by a second numeral indicating the direction in which the sherd was burnished or wiped. These numbers correspond to;

1 = burnished or wiped horizontally on the vessel (parallel to the rim).
2 = burnished or wiped vertically on the vessel (perpendicular to the rim).
3 = burnished or wiped in multiple directions.

The first digits 1 (matte) and 7 (polished) are followed by a 1 which is meaningless but had to be entered to keep the spreadsheet balanced.

Up/Int-Rt Upper interior rim surface treatment.

Lw/Ext-R Lower exterior rim surface treatment.

Int-Body Interior body surface treatment.

Int-Neck Interior neck surface treatment.

Ext-Body Exterior body surface treatment.

Ext-Neck Exterior neck surface treatment.

Des Designates whether a sherd had any decorative attributes. If not (the majority of sample), this column was assigned a value of 1. If a sherd did have decoration, this column received a value of 2. All sherds with decoration were drawn (Figs. 16 - 21).

C-R1 & C-R2:
C-R1 (color range 1) and CR2 (color range 2) bracket the range of color, according to Munsell values, present on a sherd. The numbers on the spreadsheet correspond to groups of similar Munsell color shades. These groups are listed in Table 10.

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	D-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
1	1	B	615	27	B	303	1	0	0	0	0	0	11	0.5	1	7	2	3	0	0	0	0	43	0	31	0	1	7	7
2	1	B	615	5	B	303	1	32	1	0	0	0	0	0.6	2	0	0	0	0	3	31	31	31	0	31	0	1	7	11
3	1	B	615	31	B	104	1	35	1	0	14	0	0	0.3	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
4	1	B	615	2	B	104	1	35	1	0	13	0	0	0.3	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
5	1	B	615	9	B	303	1	35	1	0	19	0	0	0.4	1	0	0	0	0	3	31	31	31	0	31	0	1	1	11
6	1	B	615	20	O	504	1	0	0	0	0	0	0	0.3	1	0	0	0	0	4	43	43	43	0	43	0	1	5	5
7	1	B	615	41	O	504	1	0	0	0	0	0	0	0.2	1	0	0	0	0	0	0	0	43	0	43	0	2	5	7
8	1	B	615	37	O	504	1	0	0	0	0	0	9	0.4	1	17	2	3	0	0	0	0	43	0	43	0	1	5	5
9	1	B	655	11	O	504	1	28	1	0	0	0	0	0.3	1	0	0	0	0	4	43	43	43	0	43	0	1	5	7
10	1	B	655	22	O	504	1	28	1	0	0	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	6	6
11	1	B	615	38	O	504	1	28	1	0	15	0	0	0.3	1	0	0	0	0	4	43	43	43	0	43	0	1	7	5
12	1	B	615	21	O	504	1	28	1	0	24	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	7
13	1	M	632	30	B	302	1	0	0	0	0	0	11	0.5	1	7	2	3	0	0	0	0	11	0	31	0	1	7	7
14	1	M	636	25	B	303	1	30	1	0	18	0	0	0.5	3	0	0	0	0	3	31	31	31	0	31	0	1	7	11
15	1	M	648	28	B	304	1	33	1	0	28	0	0	0.8	2	0	0	0	0	3	41	31	41	0	31	0	1	7	11
16	1	M	648	14	B	304	1	34	1	0	20	0	0	0.5	2	0	0	0	0	3	31	31	31	0	31	0	1	7	7
17	1	M	639	16	B	104	1	35	1	0	14	0	0	0.3	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
18	1	M	632	3	B	103	1	36	1	0	22	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	6	7
19	1	M	732	4	B	203	1	38	1	0	14	0	0	0.5	2	0	0	0	0	3	41	41	41	0	41	0	1	11	11
20	1	M	660	36	O	504	1	0	0	0	0	0	8	0.5	1	14	2	3	0	0	0	0	43	0	43	0	1	5	7
21	1	M	660	12	O	504	1	0	0	0	0	0	7	0.5	1	14	2	3	0	0	0	0	43	0	43	0	1	7	7
22	1	M	660	27	O	504	1	0	0	0	0	0	0	0.2	1	0	0	0	0	0	0	0	43	0	43	0	2	5	5
23	1	M	636	28	O	504	1	0	0	0	0	0	7	0.6	1	14	2	3	0	0	0	0	43	0	43	0	1	6	6
24	1	M	636	37	O	504	1	27	2	0	20	0	0	0.3	1	0	0	0	0	4	43	43	43	0	43	0	1	5	7
25	1	M	674	1	O	504	1	27	2	0	18	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	5	5
26	1	M	639	11	O	504	1	27	2	0	20	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	5	5
27	1	M	636	35	O	504	1	27	2	0	18	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	7
28	1	M	636	33	O	504	1	27	2	0	22	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	5	5
29	1	M	648	32	O	504	1	28	1	0	20	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	5
30	1	M	648	37	O	504	1	28	1	0	0	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	7
31	1	M	632	26	O	504	1	28	1	0	18	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	7
32	1	M	632	37	O	504	1	28	1	0	22	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	2	5	5
33	1	M	632	35	O	504	1	28	1	0	20	0	0	0.5	1	0	0	0	0	4	43	43	43	0	43	0	1	5	5
34	2	M	747	90	A	204	1	37	1	0	12	0	0	0.4	1	0	0	0	0	3	41	31	41	0	31	0	1	12	6
35	2	M	747	66	B	304	1	30	1	0	20	0	0	0.5	2	0	0	0	0	4	41	41	41	0	31	0	1	7	11
36	2	M	761	14	B	304	1	30	1	0	0	0	0	0.6	3	0	0	0	0	3	31	31	31	0	31	0	1	7	11
37	2	M	747	77	B	104	1	31	3	0	20	0	0	0.5	1	0	0	0	0	4	41	41	41	0	31	0	1	6	7
38	2	M	747	44	O	504	1	0	0	0	0	0	0	0.4	1	0	0	0	0	4	43	43	43	0	43	0	1	7	7
39	1	B	655	13	B	103	2	55	1	0	26	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	5	10
40	1	B	655	13	B	103	2	55	1	0	26	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	5	10
41	1	M	639	12	?	104	2	58	2	0	18	0	0	0.5	1	0	0	0	0	4	41	41	41	0	41	0	1	6	6
42	1	M	639	12	?	104	2	58	2	0	18	0	0	0.5	1	0	0	0	0	4	41	41	41	0	41	0	1	6	6
43	1	M	636	20	B	303	2	53	1	0	28	0	0	0.5	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
44	1	M	660	6	B	304	2	53	1	0	26	0	0	0.7	1	0	0	0	0	4	41	31	43	0	31	0	1	11	6
45	1	M	660	6	B	304	2	53	1	0	26	0	0	0.7	1	0	0	0	0	4	41	31	43	0	31	0	1	11	6
46	1	M	636	20	B	303	2	53	1	0	28	0	0	0.5	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
47	1	M	648	7	B	303	2	54	1	0	28	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	11	11
48	1	M	648	7	B	303	2	54	1	0	28	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	11	11
49	1	M	660	33	B	304	2	55	1	0	32	0	0	0.9	3	0	0	0	0	3	31	31	43	0	31	0	1	5	10
50	1	M	660	5	B	303	2	55	1	0	28	0	0	0.8	1	0	0	0	0	3	31	31	41	0	31	0	1	5	10
51	1	M	648	1	B	103	2	55	1	0	32	0	0	0.7	3	0	0	0	0	3	31	31	34	0	31	0	1	5	10
52	1	M	674	11	B	303	2	55	1	0	0	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	7	7
53	1	M	639	1	B	303	2	55	1	0	32	0	0	0.6	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
54	1	M	639	1	B	303	2	55	1	0	32	0	0	0.6	1	0	0	0	0	3	31	31	31	0	31	0	1	6	6
55	1	M	648	8	B	303	2	55	1	0	26	0	0	0.7	3	0	0	0	0	3	31	31	31	0	31	0	1	6	7
56	1	M	660	5	B	303	2	55	1	0	28	0	0	0.8	1	0	0	0	0	3	31	31	41	0	31	0	1	5	10
57	1	M	648	8	B	303	2	55	1	0	26	0	0	0.7	3	0	0	0	0	3	31	31	31	0	31	0	1	6	7
58	1	M	636	7	B	303	2	55	1	0	28	0	0	0.8	2	0	0	0	0	0	31	31	31	0	31	0	1	5	10
59	1	M	648	1	B	103	2	55	1	0	32	0	0	0.7	3	0	0	0	0	3	31	31	34	0	31	0	1	5	10
60	1	M	674	11	B	303	2	55	1	0	0	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	7	7
61	1	M	636	9	B	103	2	55	1	0	28	0	0	0.7	3	0	0	0	0	3	31	31	31	0	31	0	1	5	11
62	1	M	636	9	B	103	2	55	1	0	28	0	0	0.7	3	0	0	0	0	3	31	31	31	0	31	0	1	5	11

Table 83: Spreadsheet of Sherd Attributes

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
63	1	M	660	33	B	304	2	55	1	0	32	0	0	0.9	3	0	0	0	0	3	31	31	43	0	31	0	1	5	10
64	1	M	636	7	B	303	2	55	1	0	28	0	0	0.8	2	0	0	0	0	0	31	31	31	0	31	0	1	5	10
65	1	M	732	1	B	303	2	56	1	0	0	0	0	0.8	3	0	0	0	0	0	31	31	31	0	31	0	1	8	8
66	1	M	636	17	B	303	2	56	1	0	0	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	7	7
67	1	M	660	24	B	103	2	56	1	0	26	0	0	0.8	2	0	0	0	0	3	31	31	31	0	31	0	1	6	7
68	1	M	639	8	B	303	2	56	1	0	26	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	6	11
69	1	M	660	24	B	103	2	56	1	0	26	0	0	0.8	2	0	0	0	0	3	31	31	31	0	31	0	1	6	7
70	1	M	636	13	B	103	2	56	1	0	30	0	0	0.8	1	0	0	0	0	3	31	31	31	0	31	0	1	5	11
71	1	M	636	17	B	303	2	56	1	0	0	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	7	7
72	1	M	732	1	B	303	2	56	1	0	0	0	0	0.8	3	0	0	0	0	0	31	31	31	0	31	0	1	8	8
73	1	M	639	8	B	303	2	56	1	0	26	0	0	0.7	2	0	0	0	0	3	31	31	31	0	31	0	1	6	11
74	1	M	636	13	B	103	2	56	1	0	30	0	0	0.8	1	0	0	0	0	3	31	31	31	0	31	0	1	5	11
75	2	M	761	29	B	103	2	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	31	0	31	0	1	7	11
76	2	M	761	29	B	103	2	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	31	0	31	0	1	7	11
77	2	M	747	1	B	103	2	55	1	0	30	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	5	5
78	2	M	761	42	B	303	2	55	1	0	24	0	0	0.6	1	0	0	0	0	4	31	31	31	0	41	0	1	7	7
79	2	M	747	1	B	103	2	55	1	0	30	0	0	0.7	1	0	0	0	0	3	31	31	31	0	31	0	1	5	5
80	2	M	761	42	B	303	2	55	1	0	24	0	0	0.6	1	0	0	0	0	4	31	31	31	0	41	0	1	7	7
81	2	M	761	32	B	104	2	57	1	0	26	0	0	0.6	1	0	0	0	0	3	41	31	41	0	31	0	1	5	11
82	2	M	761	32	B	104	2	57	1	0	26	0	0	0.6	1	0	0	0	0	3	41	31	41	0	31	0	1	5	11
83	1	M	660	13	B	104	3	11	1	0	14	0	0	0.6	1	0	0	0	0	3	41	41	41	0	41	0	1	6	6
84	2	M	747	35	B	204	3	11	1	0	22	0	0	0.5	2	0	0	0	0	4	41	41	41	0	31	0	1	11	11
85	2	M	747	40	B	204	3	11	1	0	22	0	0	0.5	2	0	0	0	0	4	41	31	41	0	31	0	1	11	11
86	2	M	747	99	B	204	3	11	1	0	24	0	0	0.7	2	0	0	0	0	4	41	41	41	0	41	0	2	11	11
87	2	M	761	45	B	204	3	11	1	0	24	0	0	0.7	3	0	0	0	0	4	41	41	41	0	41	0	1	11	11
88	2	M	761	26	B	204	3	11	1	0	0	0	0	0.7	3	0	0	0	0	4	41	41	41	0	41	0	2	11	11
89	2	M	747	26	B	204	3	11	1	0	24	0	19	0.6	2	2	2	1	2	4	41	41	41	0	41	0	2	11	11
90	1	B	615	15	A	103	4	25	1	0	40	0	0	0.8	1	0	0	0	0	3	41	81	41	0	41	0	1	6	6
91	1	M	632	16	T	104	4	25	1	0	0	0	0	0.8	1	0	0	0	0	4	41	81	41	0	41	0	1	6	8
92	1	M	636	4	T	104	4	25	1	0	34	0	0	0.8	2	0	0	0	0	4	41	81	41	0	41	0	1	6	8
93	2	M	761	7	B	303	4	0	0	0	0	0	0	0.9	3	7	0	0	0	0	0	0	33	0	33	0	1	7	11
94	2	M	761	16	B	303	4	0	0	0	0	0	0	0.9	3	0	0	0	0	0	0	0	31	0	33	0	1	7	8
95	2	M	761	14	B	303	4	21	1	0	42	0	0	1	3	0	0	0	0	8	31	31	0	0	0	0	1	7	7
96	2	M	761	1	B	303	4	21	1	0	43	0	0	0.8	3	0	0	0	0	8	31	31	31	0	33	0	1	7	11
97	2	M	747	73	B	303	4	21	1	0	42	0	0	0.8	3	0	0	0	0	8	31	31	0	0	0	0	1	7	7
98	2	M	761	4	B	303	4	21	1	0	42	0	0	0.8	3	0	0	0	0	8	31	31	33	0	33	0	1	7	11
99	1	M	639	99	B	303	5	22	1	0	38	0	0	0.7	3	0	0	0	0	3	41	31	41	0	31	0	1	1	7
100	1	M	660	1	B	303	5	22	1	0	33	0	0	0.7	1	0	0	0	0	3	41	81	41	0	31	0	1	7	7
101	1	M	648	3	B	303	5	23	1	0	36	0	0	0.8	1	0	0	0	0	3	31	81	31	0	31	0	1	7	7
102	1	M	632	11	B	303	5	24	1	0	48	0	0	0.7	3	0	0	0	0	3	41	31	41	0	31	0	1	7	7
103	1	M	632	13	B	103	5	24	1	0	50	0	0	0.9	3	0	0	0	0	3	31	11	41	0	31	0	1	6	6
104	1	M	660	2	B	303	5	24	1	0	40	0	0	0.8	1	0	0	0	0	3	41	81	43	0	33	0	1	7	7
105	1	M	660	26	B	103	5	26	1	0	38	0	0	0.7	3	0	0	0	0	3	31	31	31	0	33	0	1	5	6
106	1	M	636	19	B	103	5	26	1	0	38	0	0	0.7	3	0	0	0	0	3	31	31	31	0	33	0	1	5	6
107	1	M	636	2	B	103	5	26	1	0	38	0	0	0.7	2	0	0	0	0	3	31	31	31	0	33	0	1	5	6
108	1	M	636	8	C	104	6	0	0	0	0	0	8	0.4	1	18	0	0	0	0	0	0	41	0	41	0	2	6	6
109	1	M	632	4	C	304	6	0	0	0	0	0	0	0.3	1	0	0	0	0	0	0	0	43	0	41	0	2	11	7
110	2	M	747	50	C	104	6	41	1	0	14	0	0	0.3	1	0	0	0	0	4	41	41	41	0	41	0	1	7	7
111	1	B	655	3	A	103	7	4	1	0	28	0	0	1.3	3	0	0	0	0	3	81	31	0	81	0	31	1	6	6
112	1	B	655	7	A	104	7	4	1	0	32	25	0	0.8	2	0	0	0	0	3	41	31	0	41	0	31	1	8	8
113	1	B	655	4	A	104	7	5	1	0	30	23	0	1.3	1	0	0	0	0	4	41	81	81	41	41	81	1	6	6
114	1	B	615	26	A	103	7	5	1	0	28	0	0	0	2	0	0	0	0	3	31	81	0	0	0	0	1	6	6
115	1	B	615	25	A	104	7	9	1	0	18	0	0	0.5	1	0	0	0	0	3	41	41	0	41	0	41	2	8	6
116	1	B	655	2	O	504	7	29	1	0	26	0	0	0.3	1	0	0	0	0	4	43	43	43	0	43	0	1	5	7
117	1	M	636	30	A	104	7	0	0	0	0	19	0	0.7	2	0	0	0	0	0	0	0	0	31	43	81	1	6	8
118	1	M	632	23	A	404	7	1	1	0	18	0	0	0.6	2	0	0	0	0	8	43	81	0	41	0	81	1	1	6
119	1	M	648	40	A	404	7	1	1	0	24	0	0	0.7	2	0	0	0	0	4	41	81	0	41	0	81	1	2	6
120	1	M	639	10	A	104	7	1	1	0	26	0	0	0.9	3	0	0	0	0	4	43	81	0	43	0	81	1	6	6
121	1	M	674	12	A	103	7	1	1	0	27	0	0	1.3	1	0	0	0	0	3	31	81	0	31	0	81	1	8	8
122	1	M	648	15	A	304	7	1	1	0	21	0	0	0.6	1	0	0	0	0	3	41	81	0	41	0	0	1	7	7
123	1	M	632	6	A	103	7	1	1	0	24	17	0	0.5	3	0	0	0	0	4	41	81	81	31	41	81	1	6	6
124	1	M	632	38	A	103	7	2	1	0	20	0	0	0	1	0	0	0	0	3	31	81	0	0	0	0	1	6	6

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
125	1	M	660	7	A	103	7	2	1	0	32	0	0	1.3	3	0	0	0	0	4	41	81	0	31	0	81	1	7	7
126	1	M	636	21	A	104	7	3	1	0	28	0	0	0.7	1	0	0	0	0	3	31	81	0	31	0	81	1	6	6
127	1	M	660	30	A	303	7	4	1	0	26	0	0	1.1	3	0	0	0	0	4	41	41	0	41	0	43	1	6	6
128	1	M	732	3	A	103	7	4	1	0	16	0	0	0.6	1	0	0	0	0	4	41	81	0	41	0	81	1	6	11
129	1	M	632	31	A	404	7	4	1	0	20	0	0	0.6	1	0	0	0	0	4	41	81	0	43	0	81	1	6	11
130	1	M	632	19	A	103	7	5	1	0	26	0	0	0.9	1	0	0	0	0	4	41	81	0	31	0	81	1	6	11
131	1	M	632	5	A	103	7	6	1	0	18	0	0	0.6	1	0	0	0	0	4	41	81	0	31	0	81	1	7	7
132	1	M	732	7	A	104	7	6	1	0	14	0	0	0.7	1	0	0	0	0	3	31	81	0	31	0	81	1	6	6
133	1	M	632	28	A	104	7	6	1	0	20	0	0	0.9	1	0	0	0	0	0	0	0	81	0	43	0	2	5	5
134	1	M	660	14	A	103	7	10	1	0	26	21	0	0.3	1	0	0	1	1	0	0	0	41	0	41	0	2	12	7
135	1	M	760	4	A	103	7	44	1	0	18	15	0	0.8	1	0	0	0	0	3	41	31	41	0	32	0	1	6	6
136	1	M	639	18	B	303	7	8	1	0	16	11	0	0.7	3	0	0	0	0	4	41	41	41	0	42	0	1	11	10
137	1	M	636	18	T	104	7	1	1	0	30	0	0	0	3	0	0	0	0	4	41	41	41	0	42	0	2	6	6
138	1	M	660	22	T	103	7	4	1	0	20	15	0	0.6	2	0	0	0	0	4	41	41	41	0	42	0	2	11	8
139	1	M	632	20	T	103	7	6	1	0	28	0	0	1.1	3	0	0	0	0	3	41	31	41	0	42	0	1	11	11
140	1	M	636	29	T	103	7	8	1	0	16	11	0	0.8	3	0	0	0	0	4	41	31	41	0	31	0	1	11	11
141	2	M	761	62	?	303	7	9	1	0	14	10	0	0.3	1	0	0	0	0	4	41	31	41	0	31	0	2	6	11
142	2	M	761	90	A	104	7	0	1	0	0	15	0	0.8	3	0	0	0	0	4	41	41	41	0	41	0	2	6	11
143	2	M	747	47	A	303	7	0	0	0	0	12	0	0.8	2	0	0	0	0	0	0	0	43	0	31	0	1	6	6
144	2	M	761	36	A	104	7	1	1	0	29	0	0	0.9	3	0	0	0	0	8	31	81	31	0	81	0	1	6	6
145	2	M	747	89	A	104	7	1	1	0	24	0	0	0.8	2	0	0	0	0	8	31	81	41	0	31	0	1	6	6
146	2	M	747	72	A	103	7	1	1	0	29	0	0	0.6	1	0	0	0	0	8	31	81	41	0	31	0	1	6	6
147	2	M	761	4	A	104	7	1	1	0	27	0	0	1	3	0	0	0	0	8	31	81	41	0	31	0	1	6	11
148	2	M	761	2	A	104	7	1	1	0	27	17	0	0.7	3	0	0	0	0	8	41	81	41	0	11	0	1	6	7
149	2	M	761	59	A	104	7	2	1	0	23	0	0	0.5	2	0	0	0	0	8	41	81	43	0	11	0	1	7	7
150	2	M	747	88	A	103	7	2	1	0	20	0	0	0.55	3	0	0	0	0	8	31	81	31	0	11	0	1	7	7
151	2	M	761	69	A	103	7	2	1	0	24	0	0	0.8	2	0	0	0	0	8	81	81	33	0	0	0	1	7	7
152	2	M	761	3	A	104	7	2	1	0	28	21	0	0.8	1	0	0	0	0	8	41	81	43	0	11	0	1	6	6
153	2	M	747	74	A	103	7	2	1	0	24	0	0	0.7	2	0	0	0	0	8	41	81	41	0	0	0	1	11	10
154	2	M	761	12	A	103	7	2	1	0	24	0	0	0.7	2	0	0	0	0	8	41	81	43	0	11	0	1	7	5
155	2	M	747	4	A	104	7	2	1	0	21	15	0	0.6	1	0	0	0	0	8	41	81	43	0	11	0	1	6	6
156	2	M	747	10	A	303	7	6	1	0	30	0	0	0.85	1	0	0	0	0	3	31	81	0	31	0	81	1	6	6
157	2	M	761	66	A	103	7	8	1	0	16	0	0	0.7	2	0	0	0	0	4	41	31	0	41	0	31	1	6	6
158	2	M	761	63	A	104	7	10	3	0	20	0	0	0.4	1	0	0	0	0	3	31	81	0	31	0	81	1	7	7
159	2	M	747	31	T	104	7	2	1	0	28	0	0	0.8	3	0	0	0	0	3	41	81	0	31	0	81	1	6	6
160	2	M	747	19	T	104	7	6	1	0	28	0	0	0.9	3	0	0	0	0	3	41	81	0	41	0	81	1	1	6
161	2	M	761	8	T	103	7	6	1	0	24	16	0	0.7	1	0	0	0	0	3	31	81	0	31	0	81	1	6	6
162	2	M	761	51	T	103	7	6	1	0	.26	0	0	0	1	0	0	0	0	3	41	81	0	31	0	81	1	6	6
163	2	M	761	50	T	103	7	7	1	0	28	0	0	1.3	3	0	0	0	0	3	41	41	0	41	0	43	1	8	6
164	1	B	655	19	B	104	8	0	0	0	0	0	5	0.5	1	9	0	0	0	8	41	81	0	41	0	81	1	6	6
165	1	M	636	31	B	204	8	0	0	0	0	0	12	0.6	3	9	2	0	0	3	41	81	0	41	0	31	1	6	11
166	1	M	648	10	B	104	8	18	1	0	18	0	0	0.7	1	0	0	0	0	3	31	31	0	31	0	31	1	8	6
167	1	M	636	10	B	204	8	19	1	0	16	0	0	0.6	3	0	0	0	0	3	31	81	83	31	31	81	1	7	7
168	1	M	639	9	B	304	8	20	1	0	20	0	0	0.5	2	0	0	0	0	3	41	81	0	41	0	0	1	6	8
169	1	M	732	6	B	204	8	20	1	0	20	0	0	0.5	1	0	0	0	0	3	31	81	0	31	31	81	1	6	8
170	2	M	761	47	A	204	8	17	1	0	26	0	0	0.8	3	0	0	0	0	3	41	81	0	31	0	81	1	6	8
171	2	M	761	43	A	204	8	18	1	0	26	0	0	0.9	1	0	0	0	0	3	31	81	83	31	33	81	1	6	6
172	2	M	747	45	B	304	8	19	1	0	28	0	0	0.8	2	0	0	0	0	1	41	81	0	31	0	81	1	7	7
173	2	M	747	15	B	104	8	20	1	0	18	0	0	0.4	2	0	0	0	0	0	1	0	0	31	43	81	1	6	11
174	2	M	747	48	B	304	9	0	0	0	0	0	0	0.8	1	0	0	0	0	0	41	81	0	81	0	32	1	7	7
175	2	M	747	42	B	304	9	40	1	0	30	0	0	0.7	1	0	0	0	0	4	41	81	0	41	0	81	1	6	6
176	2	M	761	30	B	304	9	40	1	0	30	0	0	0.8	1	0	0	0	0	4	41	81	0	41	0	81	1	6	11
177	2	M	747	9	B	304	9	40	1	0	30	0	0	0.7	1	0	0	0	0	3	41	81	0	31	0	81	1	6	6
178	2	M	747	8	B	304	9	40	1	0	30	0	0	0.6	1	0	0	0	0	4	41	81	0	43	0	81	1	6	11
179	1	B	655	1	B	304	10	46	2	0	46	0	0	0.6	1	0	0	0	0	4	41	81	83	41	41	81	1	6	11
180	1	B	615	19	B	304	10	47	1	0	46	0	0	0.6	1	0	0	0	0	4	41	81	0	43	0	81	1	6	11
181	1	B	655	10	B	303	10	47	1	0	52	0	0	0.5	1	0	0	0	0	3	31	81	0	31	0	81	1	6	11
182	1	B	655	17	B	304	10	47	1	0	52	0	0	0.5	2	0	0	0	0	3	31	81	0	31	0	81	1	6	11
183	1	B	615	35	B	104	10	47	2	0	52	0	0	0.6	1	0	0	0	0	4	41	81	0	43	0	81	1	6	11
184	1	B	615	6	B	304	10	47	2	0	46	0	0	0.7	1	0	0	0	0	8	31	81	0	0	0	0	1	6	11
185	1	B	655	5	B	304	10	48	2	0	51	0	0	0.5	1	0	0	0	0	3	31	81	0	31	0	81	1	6	11
186	1	B	615	30	B	104	10	48	1	0	38	0	0	0.6	2	0	0	0	0	4	41	81	81	31	43	81	1	6	11

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
187	1	B	615	8	B	304	10	48	2	0	51	0	0	0.5	1	0	0	0	0	8	31	81	43	0	11	0	1	7	7
188	1	B	615	16	B	304	10	49	1	0	46	0	0	0.5	1	0	0	0	0	8	41	81	43	0	0	0	1	6	8
189	1	M	639	14	A	104	10	47	1	0	34	0	0	0.7	2	0	0	0	0	3	41	81	43	0	11	0	1	6	6
190	1	M	674	16	A	104	10	51	1	0	38	0	0	0.7	1	0	0	0	0	3	41	81	43	0	81	0	1	6	6
191	1	M	632	21	B	304	10	46	2	0	42	0	0	0.6	1	0	0	0	0	3	41	81	41	0	11	0	1	7	7
192	1	M	660	3	B	304	10	47	2	0	40	0	0	0.6	2	0	0	0	0	8	31	81	43	0	11	0	1	7	7
193	1	M	732	5	B	304	10	47	1	0	46	0	0	0.5	1	0	0	0	0	8	31	81	43	0	11	0	1	7	7
194	1	M	639	6	B	104	10	47	2	0	48	0	0	0.6	1	0	0	0	0	8	41	81	43	0	11	0	1	6	7
195	1	M	660	20	B	304	10	48	2	0	48	0	0	0.5	2	0	0	0	0	8	41	81	43	0	11	0	1	10	7
196	1	M	632	32	B	304	10	48	2	0	44	0	0	0.5	1	0	0	0	0	3	41	81	43	0	11	0	1	7	10
197	1	M	632	25	B	304	10	48	2	0	46	0	0	0.5	2	0	0	0	0	8	41	81	43	0	11	0	1	6	6
198	1	M	660	19	B	304	10	48	1	0	46	0	0	0.5	1	0	0	0	0	1	41	81	41	0	11	0	1	11	7
199	1	M	636	26	B	304	10	48	2	0	50	0	0	0.5	1	0	0	0	0	8	31	81	43	0	11	0	1	8	7
200	1	M	632	17	B	304	10	48	2	0	46	0	0	0.6	1	0	0	0	0	8	41	81	43	0	11	0	1	7	7
201	1	M	636	34	B	304	10	48	1	0	46	0	0	0.6	1	0	0	0	0	8	41	81	43	0	11	0	1	7	7
202	1	M	732	9	B	304	10	48	2	0	46	0	0	0.5	2	0	0	0	0	8	41	81	43	0	11	0	1	7	7
203	1	M	632	15	B	304	10	50	2	0	46	0	0	0.5	1	0	0	0	0	8	41	81	43	0	0	0	1	7	7
204	1	M	632	1	B	304	10	59	4	0	48	0	0	0.5	2	0	0	0	0	3	41	81	41	0	0	0	1	7	7
205	1	M	639	15	B	303	10	60	1	0	35	0	0	0.7	1	0	0	0	0	3	31	31	31	0	11	0	1	7	7
206	1	M	632	24	T	103	10	51	1	0	36	0	0	0.8	2	0	0	0	0	3	31	81	31	0	81	0	1	1	6
207	1	M	660	28	T	103	10	52	1	0	38	0	0	0.8	1	0	0	0	0	3	31	81	33	0	81	0	1	6	6
208	1	B	615	24	B	104	11	43	1	0	9	0	0	0.6	2	0	0	0	0	4	41	43	41	0	41	0	1	6	7
209	2	M	747	12	A	101	12	0	0	0	0	11	0	0.8	1	0	0	0	0	0	0	0	81	0	81	0	2	6	6
210	1	M	636	5	B	303	13	16	1	0	22	0	12	0.7	3	8	2	1	1	3	33	33	33	0	33	0	1	5	6
211	1	B	615	4	B	104	14	14	1	0	18	0	0	0.5	1	0	0	0	0	4	41	41	41	0	41	0	1	6	7
212	1	M	660	29	B	304	14	0	0	0	0	0	17	0.6	2	3	0	0	0	0	0	0	41	0	41	0	1	8	10
213	1	M	636	22	B	304	14	0	0	0	0	0	17	0.7	1	5	0	0	0	0	0	0	41	0	0	0	1	10	10
214	1	M	636	3	B	304	14	12	1	0	22	0	16	0.8	2	3	2	1	1	4	41	41	41	0	41	0	1	11	6
215	1	M	660	15	B	304	14	12	1	0	16	0	0	0.4	1	0	0	0	0	3	41	41	41	0	41	0	1	6	10
216	1	M	660	11	B	304	14	12	1	0	23	0	0	0.6	1	0	0	0	0	4	41	41	41	0	41	0	1	8	6
217	2	M	761	27	B	304	14	0	0	0	0	0	15	0.6	3	3	2	1	1	0	0	0	41	0	41	0	2	8	10
218	2	M	747	14	B	304	14	12	1	0	21	0	14	0.7	1	0	0	0	0	3	41	41	41	0	41	0	1	11	5
219	2	M	747	21	B	104	14	13	1	0	13	0	8	0.5	1	4	0	0	0	4	41	31	41	0	31	0	1	6	8
220	2	M	761	61	B	304	14	14	1	0	17	0	0	0.6	2	0	0	0	0	4	41	41	41	0	41	0	1	7	7
221	1	M	639	4	A	103	15	15	1	0	37	0	0	1	1	6	0	0	0	4	41	41	31	0	31	0	2	6	6
222	1	B	615	14	B	204	16	0	0	1	0	20	0	0.6	1	0	0	0	0	0	0	0	31	0	43	0	2	12	11
223	1	B	615	11	O	504	17	0	0	0	0	0	6	0.4	1	15	2	3	0	0	0	0	43	0	43	0	1	5	5
224	1	M	660	18	O	504	18	0	0	0	0	0	0	0.3	12	16	2	0	0	0	0	0	43	0	43	0	1	5	7
225	1	B	615	23	O	504	19	0	0	0	0	0	0	0.3	1	0	0	0	0	0	0	0	43	0	43	0	2	7	7
226	1	M	632	14	B	104	20	11	1	0	12	0	0	0.5	1	0	0	0	0	3	41	41	41	0	41	0	1	11	6
227	1	M	674	2	B	104	20	11	1	0	18	0	0	0.5	3	0	0	0	0	4	41	41	41	0	41	0	1	6	6
228	1	M	674	6	B	104	20	12	1	0	26	0	0	0.6	1	0	0	0	0	3	41	81	41	0	81	0	1	6	6
229	1	M	674	36	B	204	20	18	1	0	20	0	0	0.6	1	0	0	0	0	4	41	41	41	0	41	0	1	11	6
230	2	M	761	39	B	104	20	11	1	0	22	0	0	0.5	2	0	0	0	0	4	41	41	41	0	41	0	1	6	6
231	2	M	747	0	B	104	20	11	1	0	20	0	0	0.5	1	0	0	0	0	3	41	41	41	0	41	0	2	6	6
232	2	M	761	31	B	204	20	11	1	0	0	0	0	0.4	3	0	0	0	0	4	41	31	41	0	41	0	1	11	6
233	2	M	747	20	B	104	20	12	1	0	26	0	0	0.7	1	0	0	0	0	4	41	41	41	0	41	0	1	6	6
234	1	B	615	7	B	203	21	0	0	0	0	0	14	0.6	1	9	2	1	1	0	0	0	31	0	31	0	1	11	6
235	1	B	615	13	B	303	21	0	0	0	0	0	14	0.5	2	3	2	1	2	0	0	0	31	0	31	0	1	6	6
236	1	M	639	3	B	103	21	0	0	0	0	0	12	0.4	3	11	2	1	2	0	0	0	41	0	31	0	1	6	6
237	1	M	636	6	B	204	21	0	0	0	0	0	14	0.6	2	10	0	0	0	0	0	0	81	0	41	0	1	11	6
238	1	M	639	19	B	104	21	0	0	0	0	0	15	0.7	2	8	0	0	0	0	0	0	41	0	43	0	2	6	6
239	1	M	674	3	B	304	21	0	0	0	0	0	15	0.5	1	12	0	0	0	0	0	0	41	0	41	0	2	6	6
240	1	M	648	41	B	304	21	0	0	0	0	0	12	0.5	1	3	0	0	0	0	0	0	41	0	41	0	1	7	6
241	1	M	648	24	B	303	21	0	0	0	0	0	10	0.5	2	10	2	1	1	0	0	0	81	0	31	0	1	8	6
242	1	M	674	15	B	303	21	0	0	0	0	0	7	0.5	3	8	0	0	0	0	0	0	31	0	31	0	1	6	6
243	2	M	761	24	B	203	21	0	0	0	0	0	14	0.6	2	9	2	1	1	0	0	0	31	0	33	0	1	11	6
244	2	M	761	54	B	204	21	0	0	0	0	0	10	0.6	3	10	2	1	1	0	0	0	81	0	41	0	1	11	6
245	2	M	747	58	B	304	21	0	0	0	0	0	10	0.5	2	8	2	2	1	0	0	0	41	0	31	0	1	6	6
246	2	M	747	49	B	304	21	0	0	0	0	0	16	0.4	3	11	2	2	1	0	0	0	41	0	31	0	1	8	6
247	2	M	761	15	B	104	21	0	0	0	0	0	16	0.5	3	8	0	0	0	0	0	0	31	0	41	0	2	6	6
248	2	M	747	50	B	304	21	0	0	0	0	0	15	0.5	3	3	0	0	0	0	0	0	43	0	41	0	1	8	8

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
249	1	B	615	10	A	103	22	0	0	0	0	0	0	0.6	1	0	0	0	0	3	31	81	0	0	0	0	1	8	6
250	1	B	615	40	B	104	22	0	0	0	0	0	0	0.7	1	0	0	0	0	4	41	31	0	0	0	0	1	6	6
251	1	B	615	3	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	3	31	31	31	0	31	0	1	6	7
252	1	B	615	18	B	303	22	0	0	0	0	0	0	0.4	1	0	0	0	0	3	31	31	31	0	31	0	1	7	7
253	1	B	615	36	B	103	22	0	0	0	0	0	0	0.5	2	0	0	0	0	3	31	31	31	0	31	0	1	6	7
254	1	B	615	32	B	303	22	0	0	0	0	0	0	0.6	1	0	0	0	0	3	31	11	0	0	0	0	1	7	7
255	1	B	615	33	B	304	22	0	0	0	0	0	0	0.4	1	0	0	0	0	3	41	31	41	0	31	0	1	7	11
256	1	B	615	39	B	103	22	0	0	0	0	0	0	0.8	3	0	0	0	0	3	31	31	0	0	0	0	1	6	6
257	1	B	655	6	B	103	22	0	0	0	0	0	0	0.7	3	0	0	0	0	3	31	81	0	0	0	0	1	8	6
258	1	B	615	42	B	304	22	0	0	0	0	0	0	0.5	2	0	0	0	0	3	33	33	0	0	0	0	1	9	10
259	1	B	615	1	T	104	22	0	0	0	0	0	0	0.9	2	0	0	0	0	0	0	0	43	0	43	0	2	1	6
260	1	M	648	89	?	304	22	0	0	0	0	0	0	0.4	2	0	0	0	0	0	0	0	11	0	41	0	1	9	10
261	1	M	636	12	A	303	22	0	0	0	0	0	0	0.5	1	0	0	0	0	3	31	81	0	0	0	0	1	6	7
262	1	M	636	32	A	104	22	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	43	0	43	0	2	1	1
263	1	M	732	2	A	203	22	0	0	0	0	0	0	0.8	1	0	0	0	0	3	31	31	31	0	31	0	1	11	11
264	1	M	636	14	A	103	22	0	0	0	0	0	0	0.8	2	0	0	0	0	3	31	81	31	0	31	0	1	8	6
265	1	M	764	15	A	103	22	0	0	0	0	0	0	0.6	3	0	0	0	0	3	31	81	0	0	0	0	1	6	6
266	1	M	636	23	A	104	22	0	0	0	0	0	0	1	2	0	0	0	0	4	41	31	0	0	0	0	1	6	5
267	1	M	632	36	A	103	22	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	6	6
268	1	M	764	27	A	101	22	0	0	0	0	0	0	0.7	2	0	0	0	0	1	11	11	11	0	0	0	1	6	6
269	1	M	648	23	A	104	22	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	41	0	31	0	1	6	6
270	1	M	674	5	B	103	22	0	0	0	0	0	0	0.3	1	0	0	0	0	3	31	81	31	0	11	0	1	5	6
271	1	M	660	35	B	303	22	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	31	0	11	0	1	6	7
272	1	M	648	43	B	304	22	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	41	0	41	0	2	1	11
273	1	M	732	8	B	303	22	0	0	0	0	0	0	0.5	1	0	0	0	0	3	31	31	0	0	0	0	1	10	11
274	1	M	660	34	B	304	22	0	0	0	0	0	0	0.4	1	0	0	0	0	3	31	31	41	0	31	0	1	6	6
275	1	M	732	13	B	301	22	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	11	0	1	6	6
276	1	M	732	14	B	301	22	0	0	0	0	0	0	0.6	1	0	0	0	0	1	11	11	0	0	0	0	1	6	6
277	1	M	760	7	B	103	22	0	0	0	0	0	0	0.8	1	0	0	0	0	3	31	31	0	0	0	0	1	6	6
278	1	M	674	23	B	303	22	0	0	0	0	0	0	0.7	1	0	0	0	0	8	31	31	31	0	31	0	1	7	7
279	1	M	660	31	B	304	22	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	81	0	41	0	2	1	6
280	1	M	660	38	B	104	22	0	0	0	0	0	0	0.5	1	0	0	0	0	4	41	81	41	0	42	0	1	6	6
281	1	M	660	9	B	103	22	0	0	0	0	0	0	0.7	1	0	0	0	0	3	41	81	31	0	31	0	1	7	6
282	1	M	674	42	B	303	22	0	0	0	0	0	0	0.5	1	0	0	0	0	1	31	31	0	0	0	0	1	7	7
283	1	M	674	19	B	303	22	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	0	0	0	0	1	6	7
284	1	M	632	22	B	304	22	0	0	0	0	0	0	0.5	1	0	0	0	0	3	41	31	0	0	0	0	1	7	9
285	1	M	636	11	B	204	22	0	0	0	0	0	0	0.6	1	0	0	0	0	3	41	81	0	0	0	0	1	10	11
286	1	M	632	7	B	303	22	0	0	0	0	0	0	0.5	2	0	0	0	0	3	31	31	31	0	11	0	1	7	7
287	1	M	632	9	B	303	22	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	31	0	2	1	6
288	1	M	639	13	B	204	22	0	0	0	0	0	0	0.4	3	0	0	0	0	4	41	41	0	0	0	0	1	11	11
289	1	M	632	8	B	103	22	0	0	0	0	0	0	0.6	1	0	0	0	0	3	31	31	31	0	31	0	1	6	7
290	1	M	648	26	B	304	22	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	41	0	33	0	2	1	6
291	1	M	648	27	B	102	22	0	0	0	0	0	0	0.5	1	0	0	0	0	8	81	81	0	0	0	0	1	6	5
292	1	M	648	2	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	43	0	31	0	2	1	6
293	1	M	648	4	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	41	0	31	0	2	1	6
294	1	M	632	29	T	103	22	0	0	0	0	0	0	1.2	2	0	0	0	0	3	31	81	0	0	0	0	1	6	5
295	2	M	761	65	A	403	22	0	0	0	0	0	0	0.7	3	0	0	0	0	3	33	31	31	0	31	0	1	1	11
296	2	M	747	46	A	103	22	0	0	0	0	0	0	1.4	1	0	0	0	0	3	81	31	81	0	31	0	1	6	6
297	2	M	761	40	B	301	22	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	11	0	1	7	7
298	2	M	747	33	B	104	22	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	11	0	41	0	2	6	1
299	2	M	761	29	B	304	22	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	41	0	31	0	1	7	7
300	2	M	761	21	B	304	22	0	0	0	0	0	0	0.6	1	0	0	0	0	3	41	41	41	0	41	0	1	7	7
301	2	M	747	16	B	304	22	0	0	0	0	0	0	0	2	0	0	0	0	3	41	41	41	0	41	0	1	7	11
302	2	M	747	59	B	304	22	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	41	0	41	0	1	7	7
303	2	M	761	68	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	8	41	41	41	0	41	0	1	7	11
304	2	M	747	76	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	3	41	41	41	0	41	0	1	7	7
305	2	M	747	98	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	3	41	41	41	0	41	0	1	7	7
306	2	M	761	53	B	301	22	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	83	0	83	0	1	7	7
307	2	M	747	34	B	404	22	0	0	0	0	14	0	0.5	3	0	0	0	0	0	0	0	0	43	0	43	2	1	1
308	2	M	761	70	B	304	22	0	0	0	0	0	0	0	1	0	0	0	0	4	41	41	41	0	0	0	1	7	7
309	2	M	747	98	B	304	22	0	0	0	0	0	0	0.6	2	0	0	0	0	3	41	41	41	0	41	0	1	7	7
310	2	M	761	70	B	304	22	31	1	0	0	0	0	0	1	0	0	0	0	40	41	41	41	0	0	0	1	7	7

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-Dc	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
311	2	M	747	70	B	404	22	42	1	0	0	0	0	0.6	3	0	0	0	0	4	41	41	43	0	41	0	2	1	1
312	2	M	761	48	G	301	22	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	11	0	2	3	3
313	2	M	747	2	G	301	22	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	11	0	2	3	3
314	1	B	655	9	A	103	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	11	0	33	0	1	7	7
315	1	B	655	18	A	103	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	83	0	32	0	1	6	6
316	1	B	655	21	A	303	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	81	0	33	0	1	7	7
317	1	B	655	20	A	304	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	41	0	43	0	1	8	8
318	1	B	615	29	A	102	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	11	0	1	6	6
319	1	B	615	22	B	104	23	0	0	0	0	0	0	0.5	3	0	0	0	0	0	0	0	43	0	81	0	1	6	6
320	1	B	655	11	B	303	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	33	0	33	0	1	7	7
321	1	B	655	16	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	41	0	33	0	1	7	7
322	1	B	615	17	B	103	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	81	0	81	0	1	8	8
323	1	B	655	14	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	41	0	31	0	1	6	6
324	1	B	655	15	B	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	41	0	43	0	1	6	6
325	1	B	655	8	B	304	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	43	0	43	0	1	7	7
326	1	M	674	18	A	104	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	41	0	31	0	1	6	6
327	1	M	674	30	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	11	0	43	0	1	6	6
328	1	M	674	2	A	103	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	31	0	31	0	1	6	7
329	1	M	764	11	A	103	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	11	0	31	0	1	6	11
330	1	M	764	49	A	103	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	33	0	1	6	6
331	1	M	648	31	A	104	23	0	0	0	0	0	0	0.9	2	0	0	0	0	0	0	0	81	0	41	0	1	6	8
332	1	M	764	9	A	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	41	0	1	8	6
333	1	M	764	48	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	41	0	1	8	8
334	1	M	764	1	A	103	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	33	0	1	8	6
335	1	M	764	17	A	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	31	0	1	6	6
336	1	M	764	29	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	43	0	1	6	6
337	1	M	764	31	A	103	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	33	0	1	6	6
338	1	M	764	14	A	103	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	41	0	1	6	6
339	1	M	764	39	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	33	0	43	0	1	6	5
340	1	M	764	35	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	43	0	1	6	6
341	1	M	648	29	A	104	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	81	0	41	0	1	8	6
342	1	M	764	10	A	103	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	11	0	41	0	1	8	6
343	1	M	764	43	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	43	0	1	6	6
344	1	M	764	28	A	104	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	11	0	41	0	1	6	6
345	1	M	764	47	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	41	0	1	8	6
346	1	M	764	45	A	104	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	41	0	1	5	6
347	1	M	764	34	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	41	0	1	6	6
348	1	M	764	20	A	104	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	43	0	1	6	6
349	1	M	764	5	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	41	0	1	8	8
350	1	M	764	46	A	104	23	0	0	0	0	0	0	0.5	3	0	0	0	0	0	0	0	43	0	43	0	1	8	8
351	1	M	764	4	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	81	0	41	0	1	6	8
352	1	M	764	13	A	103	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	31	0	1	6	8
353	1	M	764	44	A	103	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	33	0	1	5	5
354	1	M	764	25	A	103	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	33	0	1	5	5
355	1	M	764	7	A	103	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	31	0	1	8	8
356	1	M	764	19	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	33	0	1	6	8
357	1	M	764	32	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	41	0	1	6	6
358	1	M	764	8	A	103	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	32	0	1	8	6
359	1	M	760	5	A	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	31	0	1	6	6
360	1	M	732	11	A	104	23	0	0	0	0	0	0	0.9	1	0	0	0	0	0	0	0	83	0	43	0	1	6	6
361	1	M	648	13	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	31	0	43	0	1	6	8
362	1	M	764	50	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	41	0	1	8	11
363	1	M	760	10	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	31	0	1	6	6
364	1	M	632	18	A	104	23	0	0	0	0	0	0	0.9	2	0	0	0	0	0	0	0	11	0	41	0	1	8	8
365	1	M	760	6	A	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	33	0	1	6	6
366	1	M	732	15	A	103	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	31	0	31	0	1	6	8
367	1	M	764	41	A	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	43	0	1	6	6
368	1	M	764	40	A	104	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	41	0	1	6	6
369	1	M	674	14	A	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	31	0	1	6	6
370	1	M	764	24	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	41	0	1	6	8
371	1	M	648	33	A	103	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	11	0	31	0	1	8	6
372	1	M	648	18	A	103	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	81	0	33	0	1	6	6

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
373	1	M	648	36	A	104	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	11	0	41	0	1	6	8
374	1	M	648	16	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	81	0	41	0	1	6	11
375	1	M	636	1	A	103	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	83	0	33	0	1	6	5
376	1	M	760	8	A	103	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	33	0	1	6	6
377	1	M	636	27	A	104	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	81	0	43	0	1	8	11
378	1	M	760	11	A	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	43	0	1	8	6
379	1	M	636	15	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	32	0	41	0	1	6	11
380	1	M	648	20	A	104	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	11	0	41	0	1	11	6
381	1	M	760	2	A	104	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	11	0	43	0	1	6	8
382	1	M	760	9	A	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	31	0	1	6	6
383	1	M	660	37	A	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	41	0	1	6	6
384	1	M	760	12	A	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	43	0	1	6	6
385	1	M	660	32	A	102	23	0	0	0	0	0	0	0.5	3	0	0	0	0	0	0	0	81	0	11	0	1	6	7
386	1	M	764	22	B	104	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	11	0	43	0	2	6	6
387	1	M	760	3	B	103	23	0	0	0	0	0	0	0.5	3	0	0	0	0	0	0	0	31	0	31	0	1	7	11
388	1	M	764	12	B	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	43	0	1	8	6
389	1	M	764	52	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	41	0	31	0	1	7	6
390	1	M	732	2	B	304	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	43	0	33	0	1	7	7
391	1	M	760	4	B	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	33	0	1	6	6
392	1	M	764	16	B	104	23	0	0	0	0	0	0	0.67	1	0	0	0	0	0	0	0	11	0	41	0	1	8	6
393	1	M	764	18	B	304	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	43	0	33	0	1	7	7
394	1	M	674	17	B	204	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	81	0	41	0	1	11	10
395	1	M	674	8	B	303	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	81	0	31	0	1	6	7
396	1	M	732	12	B	204	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	33	0	42	0	1	11	11
397	1	M	732	10	B	101	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	11	0	1	6	6
398	1	M	648	30	B	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	41	0	1	7	11
399	1	M	660	16	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	42	0	1	6	6
400	1	M	674	7	B	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	43	0	1	6	6
401	1	M	674	10	B	204	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	41	0	41	0	1	11	11
402	1	M	639	2	B	104	23	0	0	0	0	0	0	0.4	3	0	0	0	0	0	0	0	41	0	33	0	1	5	11
403	1	M	660	10	B	304	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	41	0	33	0	1	11	6
404	1	M	674	4	B	102	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	11	0	1	5	6
405	1	M	660	23	B	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	82	0	41	0	1	6	6
406	1	M	632	10	B	303	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	31	0	33	0	1	7	7
407	1	M	632	12	B	304	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	43	0	32	0	1	7	8
408	1	M	636	24	B	304	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	41	0	41	0	1	6	11
409	1	M	632	34	B	304	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	11	0	41	0	1	7	7
410	1	M	660	17	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	41	0	1	10	7
411	1	M	648	21	B	304	23	0	0	0	0	0	0	0.5	2	0	0	0	0	0	0	0	82	0	42	0	1	7	11
412	1	M	660	25	B	304	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	41	0	31	0	1	7	8
413	1	M	648	5	B	104	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	43	0	33	0	1	6	6
414	1	M	764	21	B	102	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	81	0	81	0	1	6	6
415	1	M	764	3	B	104	23	0	0	0	0	0	0	0.4	1	0	0	0	0	0	0	0	11	0	41	0	1	6	6
416	1	M	648	22	B	204	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	41	0	41	0	1	11	11
417	1	M	648	25	B	104	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	41	0	31	0	1	6	8
418	1	M	648	9	B	303	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	31	0	31	0	1	7	6
419	1	M	660	21	B	303	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	31	0	31	0	1	7	11
420	1	M	648	12	B	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	41	0	31	0	1	5	6
421	1	M	648	19	B	304	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	41	0	33	0	1	7	7
422	1	M	660	8	B	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	43	0	1	8	6
423	1	M	648	6	B	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	41	0	1	6	10
424	1	M	648	38	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	43	0	33	0	1	7	11
425	1	M	648	35	T	103	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	11	0	33	0	1	8	11
426	1	M	764	37	T	104	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	41	0	1	6	11
427	2	M	747	93	A	104	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	83	0	43	0	1	6	11
428	2	M	747	32	A	104	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	11	0	43	0	1	6	8
429	2	M	761	41	A	104	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	83	0	41	0	1	6	7
430	2	M	761	34	A	104	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	83	0	41	0	1	8	6
431	2	M	747	13	A	104	23	0	0	0	0	0	0	1.2	1	0	0	0	0	0	0	0	43	0	43	0	1	6	6
432	2	M	747	11	A	103	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	83	0	31	0	1	7	6
433	2	M	747	92	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	43	0	1	6	8
434	2	M	747	29	A	104	23	0	0	0	0	0	0	0.9	3	0	0	0	0	0	0	0	31	0	31	0	1	6	6

Table 83: Spreadsheet (Continued)

Num	Op	B/M	Cat#	Sherd#	Paste	CerCod	V-For	R-For	L-Ed	S-Prof	M-Dia	N-Dia	B-Dia	V-Th	Oxid	B-Prof	Sp-Cl	Sp-Prof	Sp-Pl	R-Tr-De	Up/Int-Rt	Lw/Ext-R	Int-Body	Int-Neck	Ext-Bod	Ext-Nec	Des	C-R1	C-R2
435	2	M	761	37	A	104	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	81	0	41	0	1	6	8
436	2	M	761	13	A	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	81	0	42	0	1	7	6
437	2	M	761	58	A	303	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	83	0	33	0	1	7	7
438	2	M	761	33	A	304	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	81	0	42	0	1	6	7
439	2	M	761	57	A	104	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	81	0	42	0	1	6	6
440	2	M	761	22	A	103	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	81	0	33	0	1	8	11
441	2	M	761	46	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	83	0	43	0	1	8	11
442	2	M	761	60	A	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	83	0	43	0	1	7	6
443	2	M	761	25	A	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	81	0	42	0	1	7	7
444	2	M	747	51	A	104	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	11	0	43	0	1	8	11
445	2	M	747	91	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	81	0	41	0	1	8	8
446	2	M	747	7	A	104	23	0	0	0	0	0	0	0.7	3	0	0	0	0	0	0	0	11	0	43	0	1	6	11
447	2	M	747	62	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	43	0	1	6	8
448	2	M	747	30	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	83	0	42	0	1	6	6
449	2	M	761	6	A	104	23	0	0	0	0	0	0	0.65	3	0	0	0	0	0	0	0	41	0	41	0	1	8	11
450	2	M	761	38	A	304	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	81	0	42	0	1	7	7
451	2	M	747	25	A	104	23	0	0	0	0	0	0	0.6	2	0	0	0	0	0	0	0	81	0	42	0	1	8	11
452	2	M	747	38	A	304	23	0	0	0	0	0	0	0.8	1	0	0	0	0	0	0	0	83	0	43	0	1	7	6
453	2	M	747	94	A	104	23	0	0	0	0	0	0	0.5	3	0	0	0	0	0	0	0	11	0	43	0	1	8	11
454	2	M	747	52	A	104	23	0	0	0	0	0	0	0.8	2	0	0	0	0	0	0	0	81	0	42	0	1	8	11
455	2	M	747	53	A	104	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	11	0	43	0	1	6	8
456	2	M	747	63	B	204	23	0	0	0	0	0	0	0.4	2	0	0	0	0	0	0	0	43	0	43	0	1	7	11
457	2	M	747	68	B	304	23	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0	11	0	43	0	1	7	11
458	2	M	747	61	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	43	0	41	0	1	7	11
459	2	M	747	24	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	43	0	31	0	1	7	11
460	2	M	747	67	B	204	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	41	0	1	11	11
461	2	M	747	43	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	41	0	31	0	1	7	7
462	2	M	747	37	B	402	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	81	0	1	1	1
463	2	M	747	75	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	43	0	11	0	1	7	7
464	2	M	747	18	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	43	0	11	0	1	7	11
465	2	M	747	71	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	81	0	43	0	1	7	7
466	2	M	747	60	B	304	23	0	0	0	0	0	0	0.6	3	0	0	0	0	0	0	0	43	0	11	0	1	7	7
467	2	M	761	55	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	43	0	33	0	1	7	7
468	2	M	747	36	B	304	23	0	0	0	0	0	0	0.7	2	0	0	0	0	0	0	0	81	0	43	0	1	7	7
469	2	M	761	44	B	304	23	0	0	0	0	0	0	0.6	1	0	0	0	0	0	0	0	43	0	33	0	1	5	7
470	2	M	761	11	B	304	23	0	0	0	0	0	0	0.7	1	0	0	0	0	0	0	0	43	0	33	0	1	7	11

Table 83: Spreadsheet (Continued)

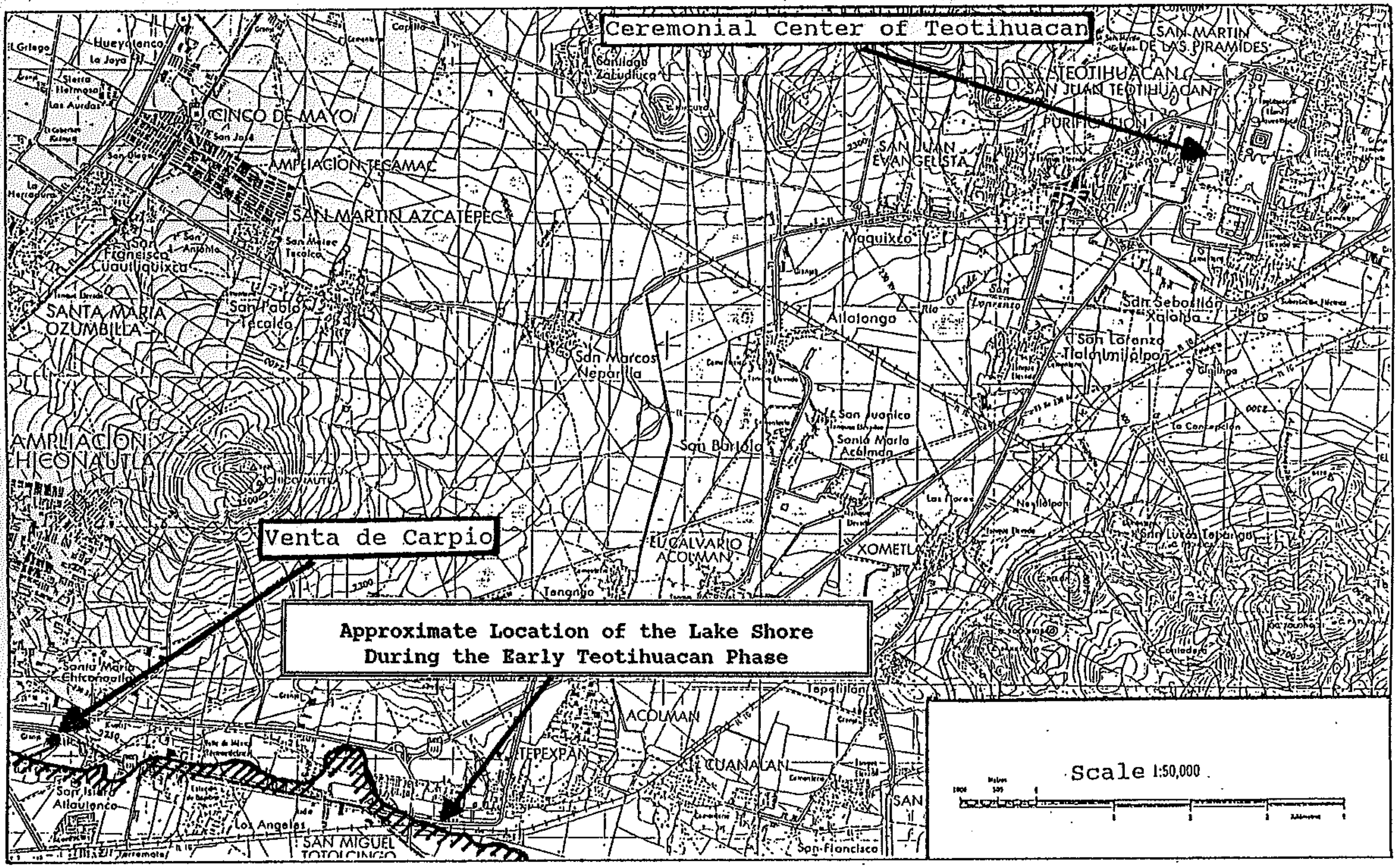

Ceremonial Center of Teotihuacan
Venta de Carpio
Approximate Location of the Lake Shore
During the Early Teotihuacan Phase
Scale 1:50,000
CINCO DE MAYO
AMPLIACION TECAMAC
SAN MARTIN AZCATEPEC
SANTA MARIA OZUMBILLA
AMPLIACION CHICONAUTLA
SAN MARTIN DE LAS PIRAMIDES
TEOTIHUACAN
SAN JUAN TEOTIHUACAN
PURIFICACION
SAN JUAN EVANGELISTA
Maquixco
Atlatongo
San Marcos Nepantla
San Bartolo
San Juanico
Santa Maria Acolman
San Sebastian Xolalpa
San Lorenzo Tlalmimilolpan
La Concepcion
Nexquipayac
XOMETLA
EL CALVARIO ACOLMAN
Tenango
ACOLMAN
TEPEXPAN
CUANALAN
SAN MIGUEL TOTOLCINGO
Los Angeles
San Isidro Atlautenco
Santa Maria Chiconautla
San Pablo Tecalco
San Francisco Cuautliquixca
Hueyotenco
La Joya
Sierra Hermosa
Las Aurdas
San Francisco
Tepetitlan

Figure 247

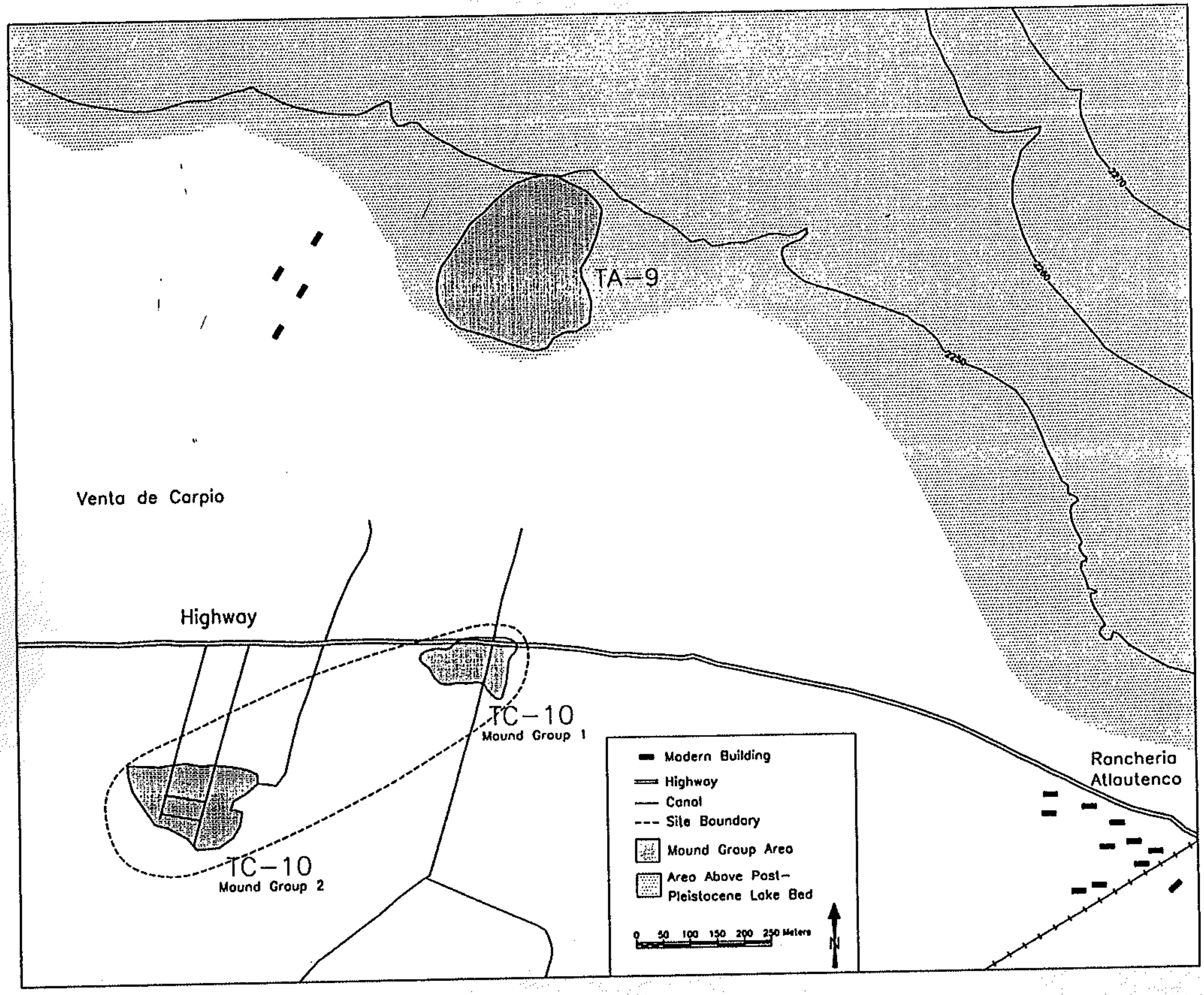

TA-9
Venta de Carpio
Highway
TC-10
Mound Group 1
TC-10
Mound Group 2
Rancheria
Atlautenco
Modern Building
Highway
Canal
Site Boundary
Mound Group Area
Area Above Post-
Pleistocene Lake Bed
0 50 100 150 200 250 Meters
N
2270
2260
2250

Figure 248

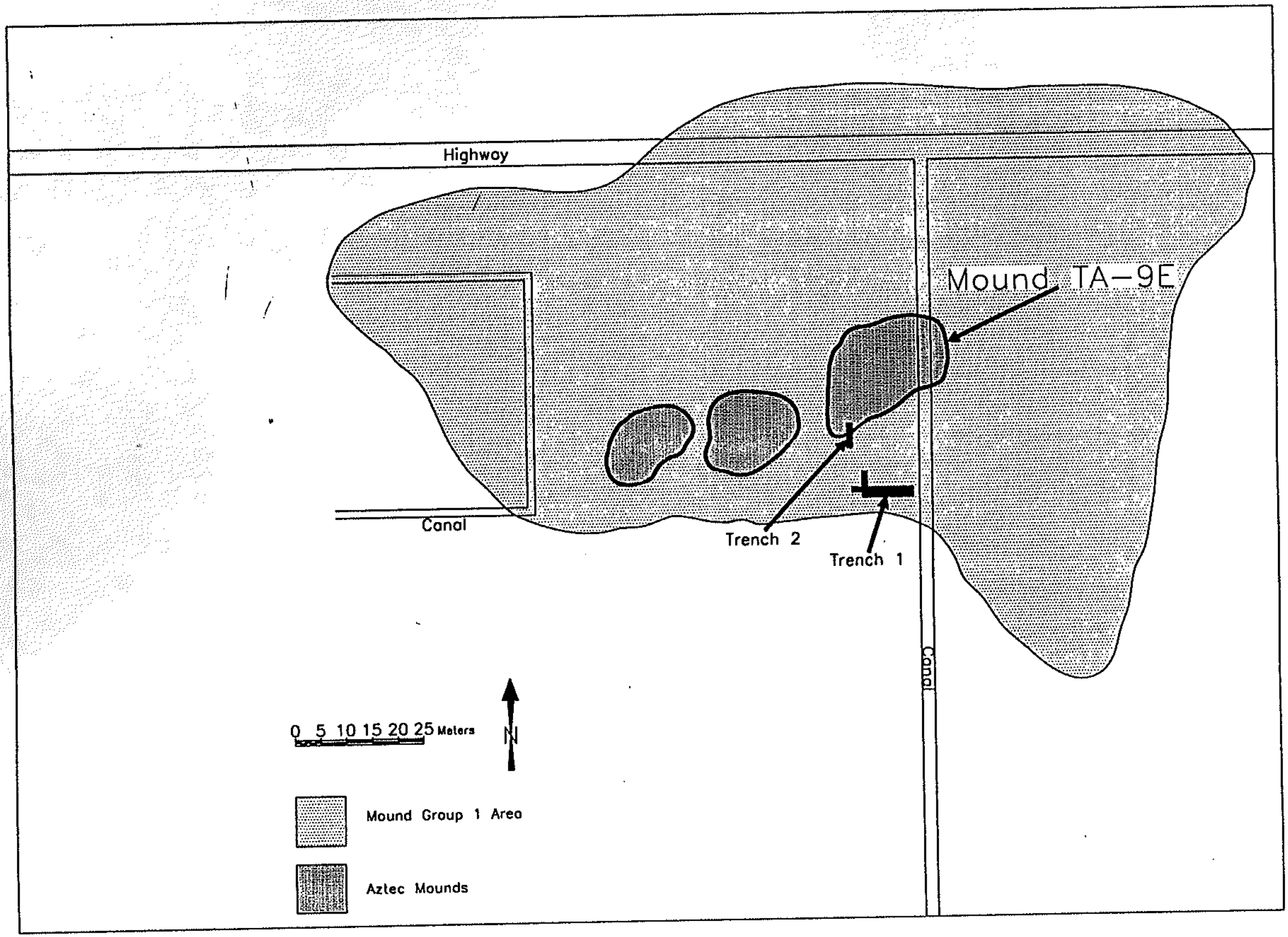

Highway
Mound TA-9E
Canal
Trench 2
Trench 1
Canal
0 5 10 15 20 25 Meters
N
Mound Group 1 Area
Aztec Mounds

Figure 249

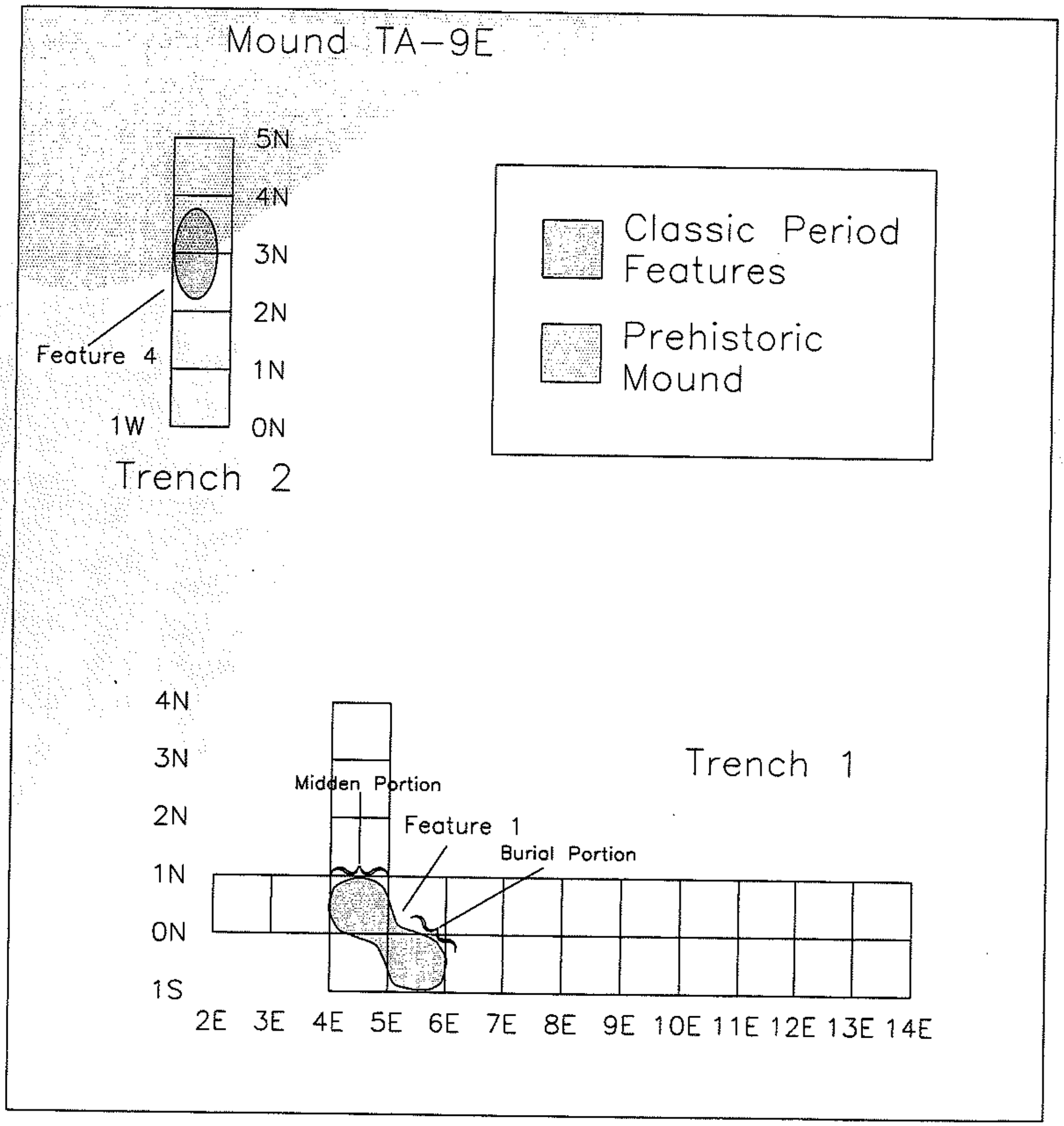


Figure 250, Location of Venta de Carpio Teotihuacan Period Features

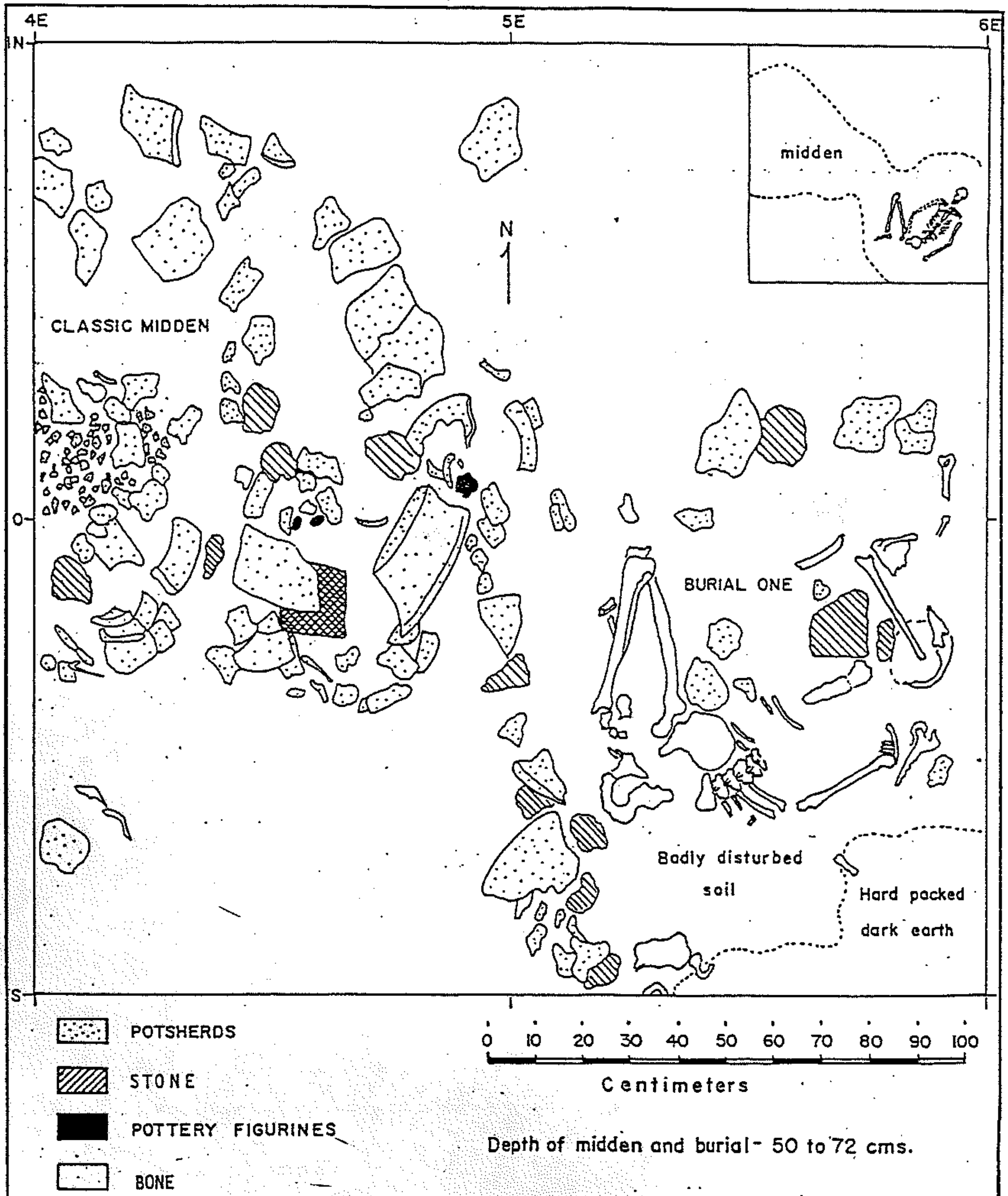
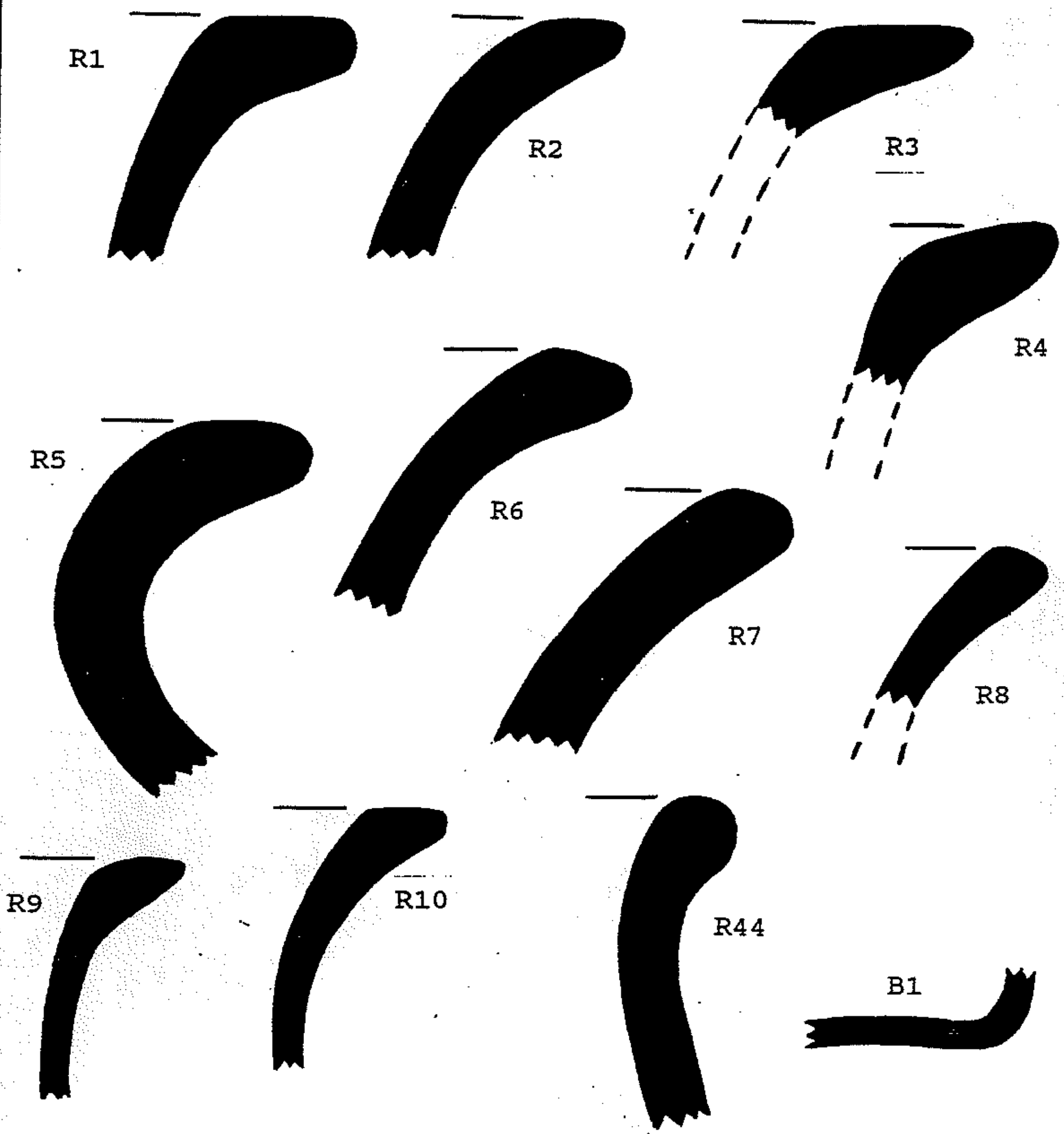
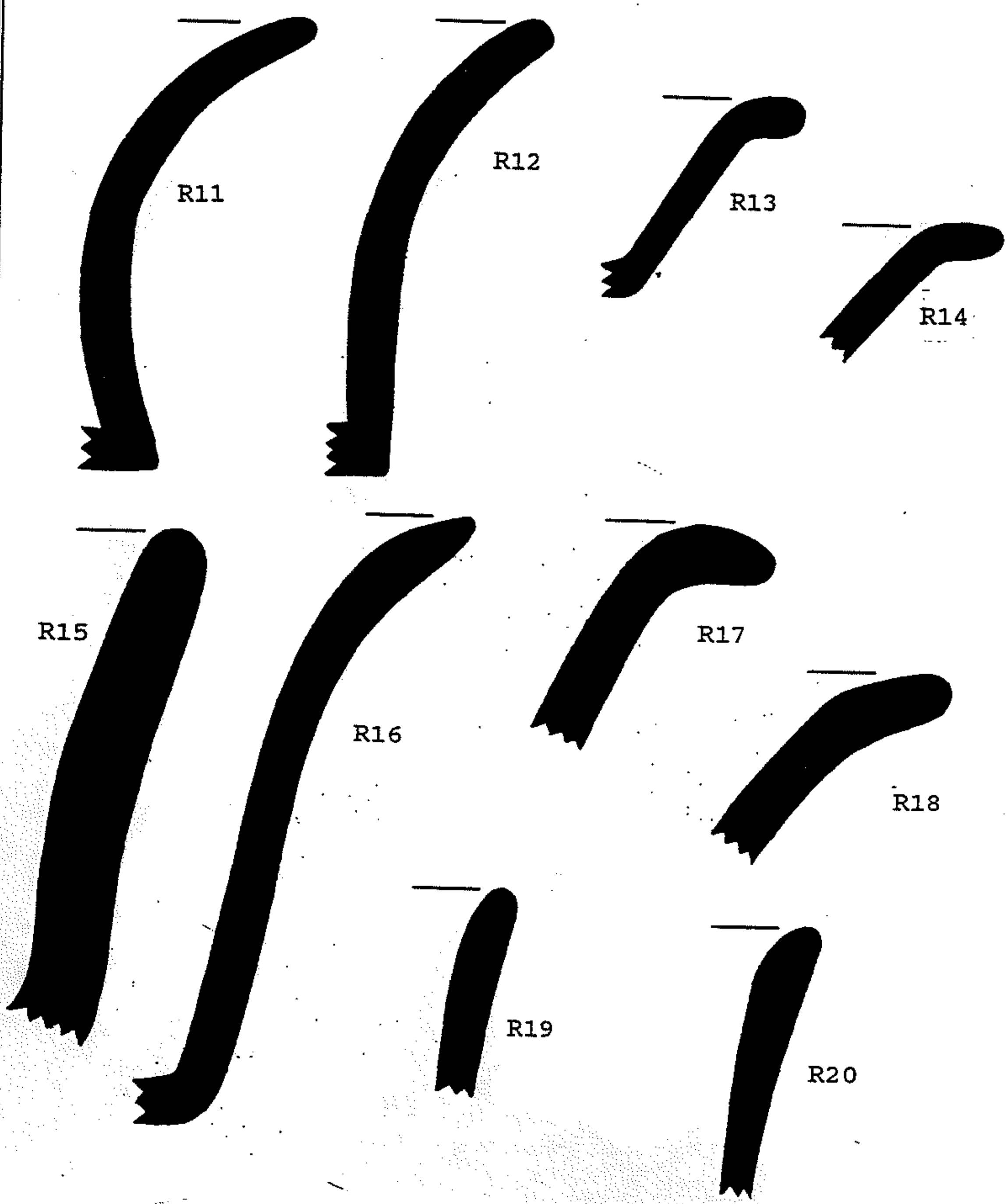

4E
5E
6E
N
S
0
midden
CLASSIC MIDDEN
BURIAL ONE
Badly disturbed soil
Hard packed dark earth
POTSHERDS
STONE
POTTERY FIGURINES
BONE
0 10 20 30 40 50 60 70 80 90 100
Centimeters
Depth of midden and burial - 50 to 72 cms.

Figure 251



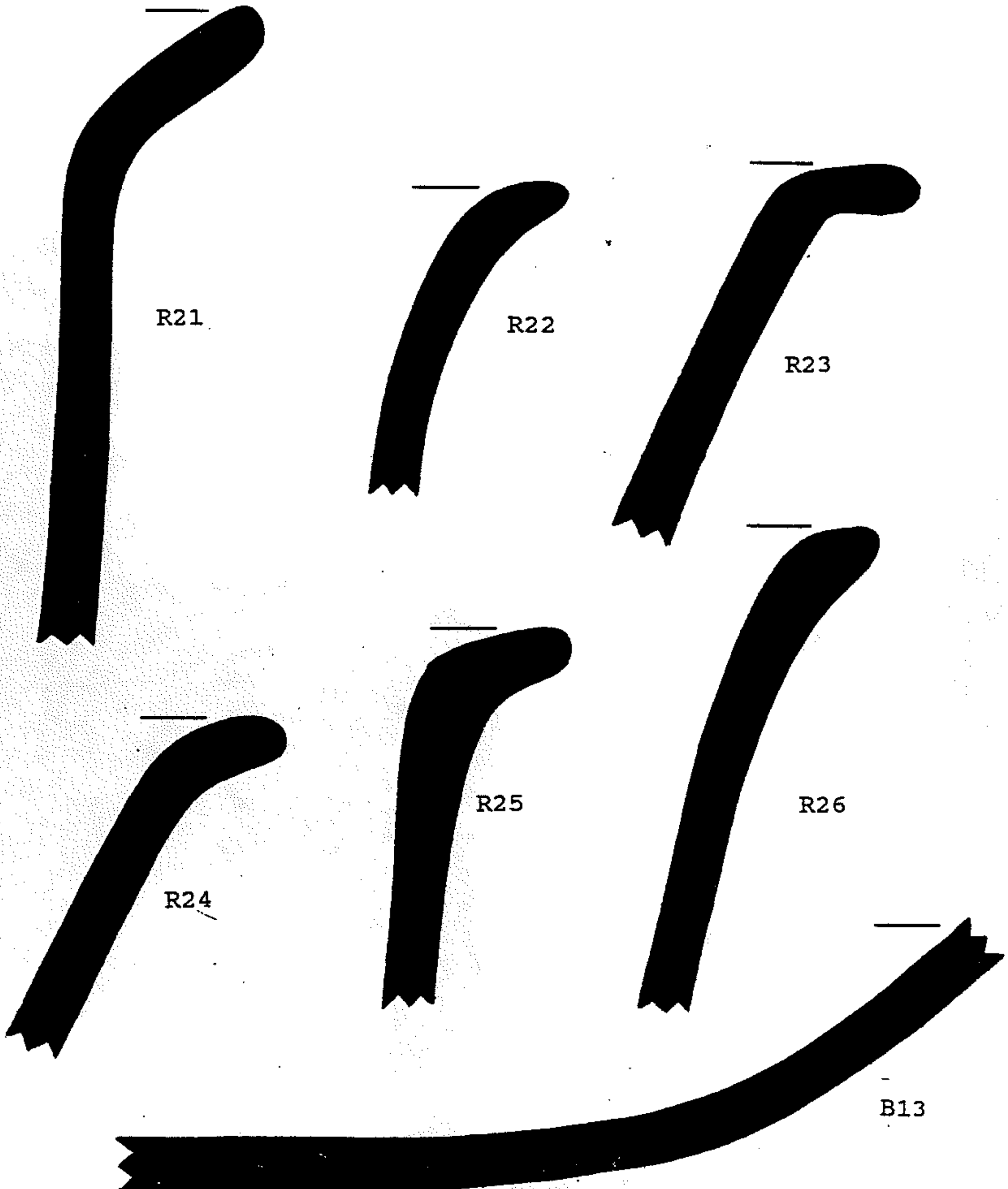
Olla Rim and Base Forms From Venta de Carpio
(R = rim, B = base)

Figure 252



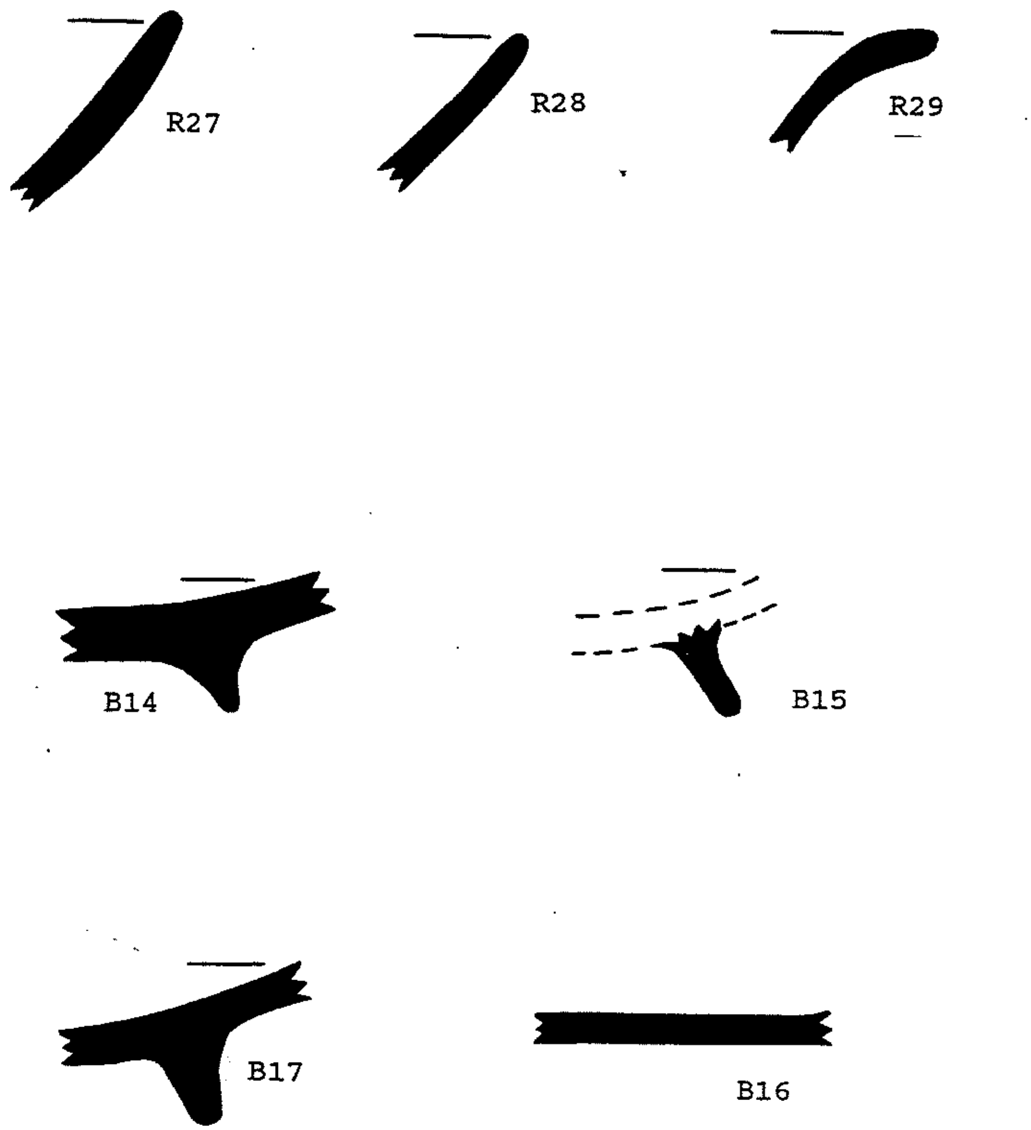
Flat Bottomed Vessels and Vase Rim Forms from Venta de Carpio
(R = rim)

Figure 253



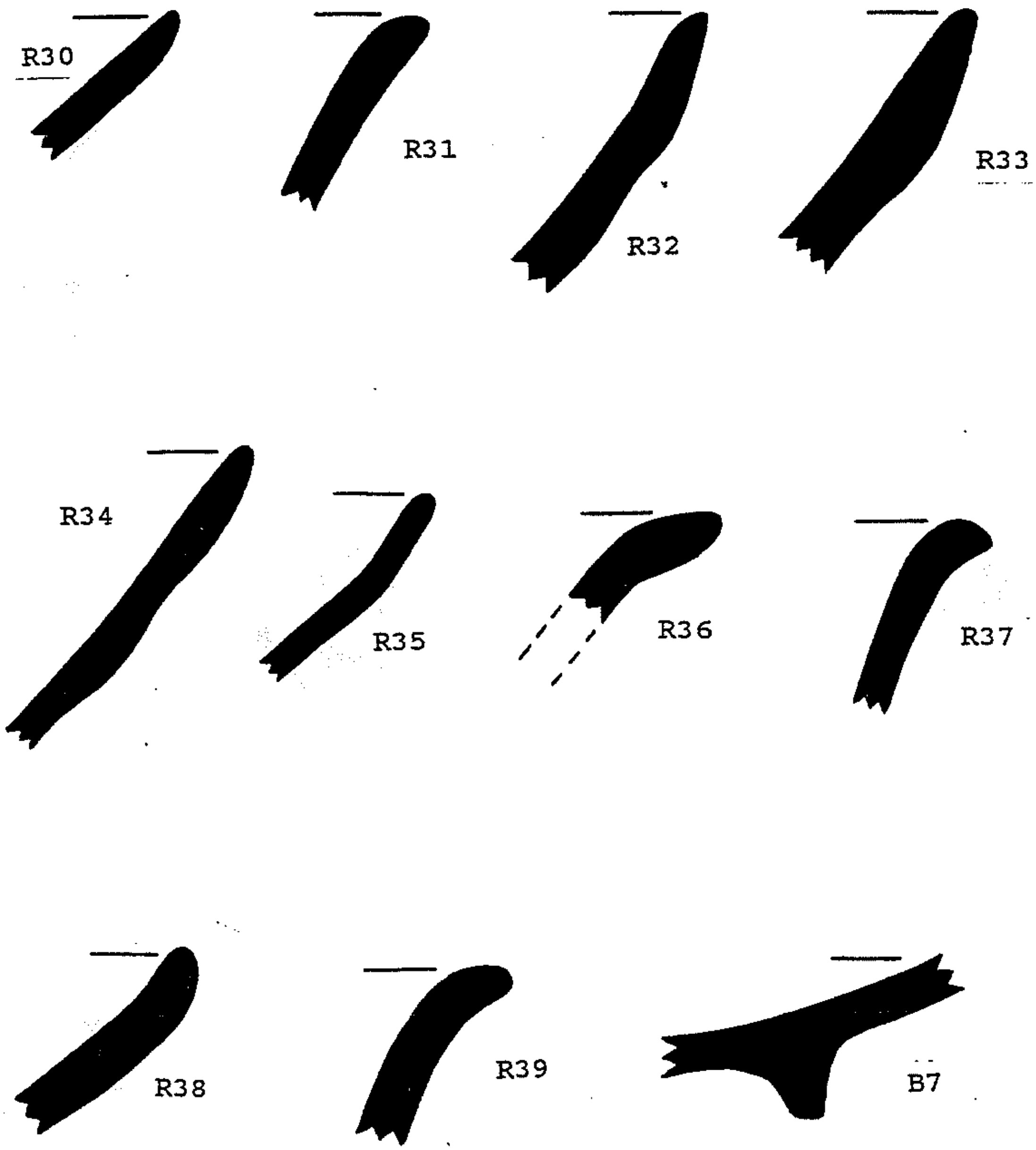
Cazuela and Crater Rim and Base Forms from Venta de Carpio
(R = rim, B = base)

Figure 254



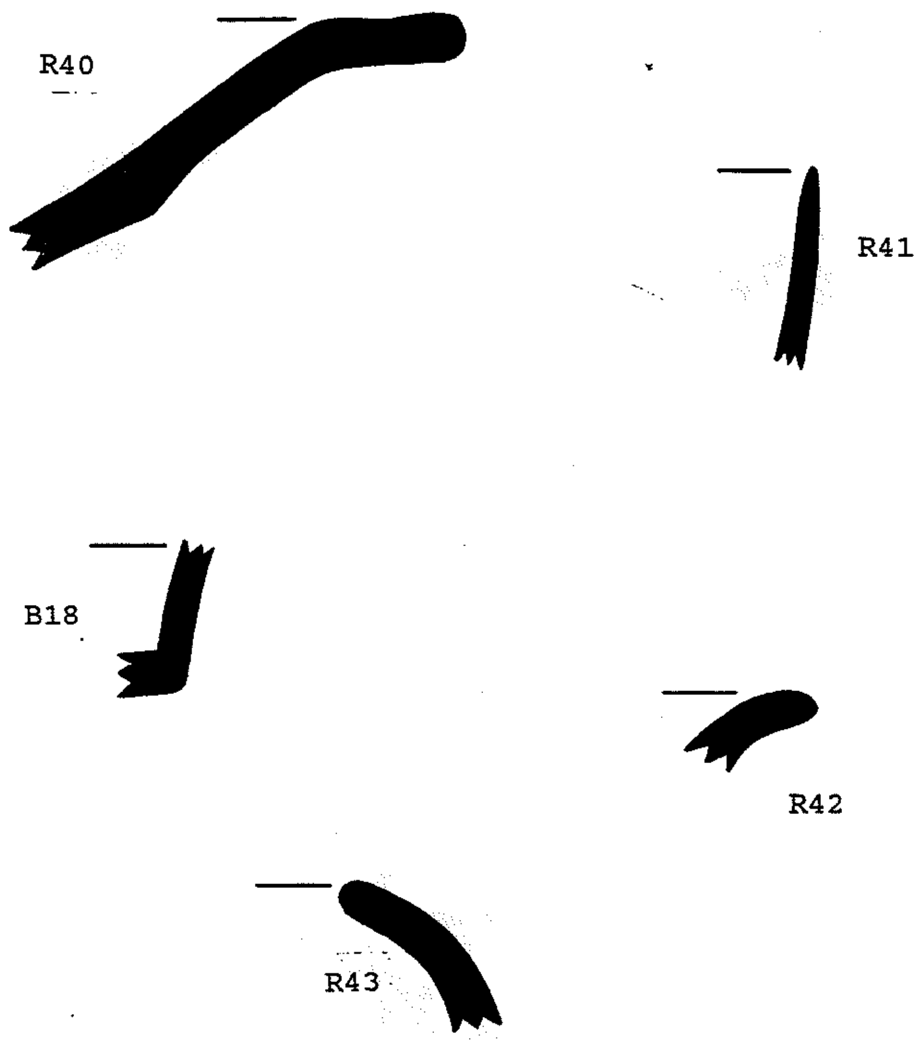
Thin Orange Ware Rim and Base Forms from Venta de Carpio
(R = rim, B = base)

Figure 255

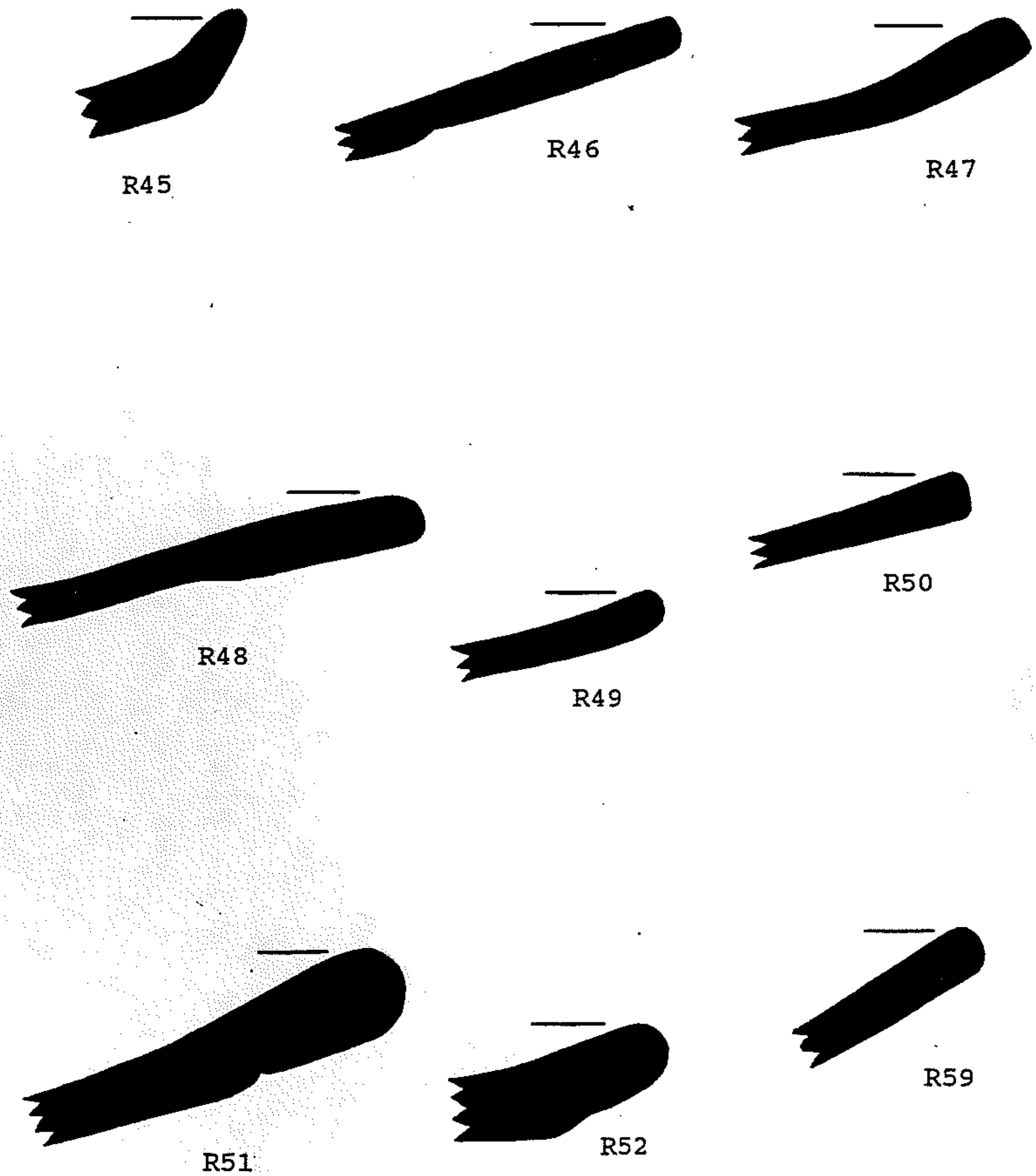


Hemispherical Bowl Rim and Base Forms from Venta de Carpio
(R = rim)

Figure 256

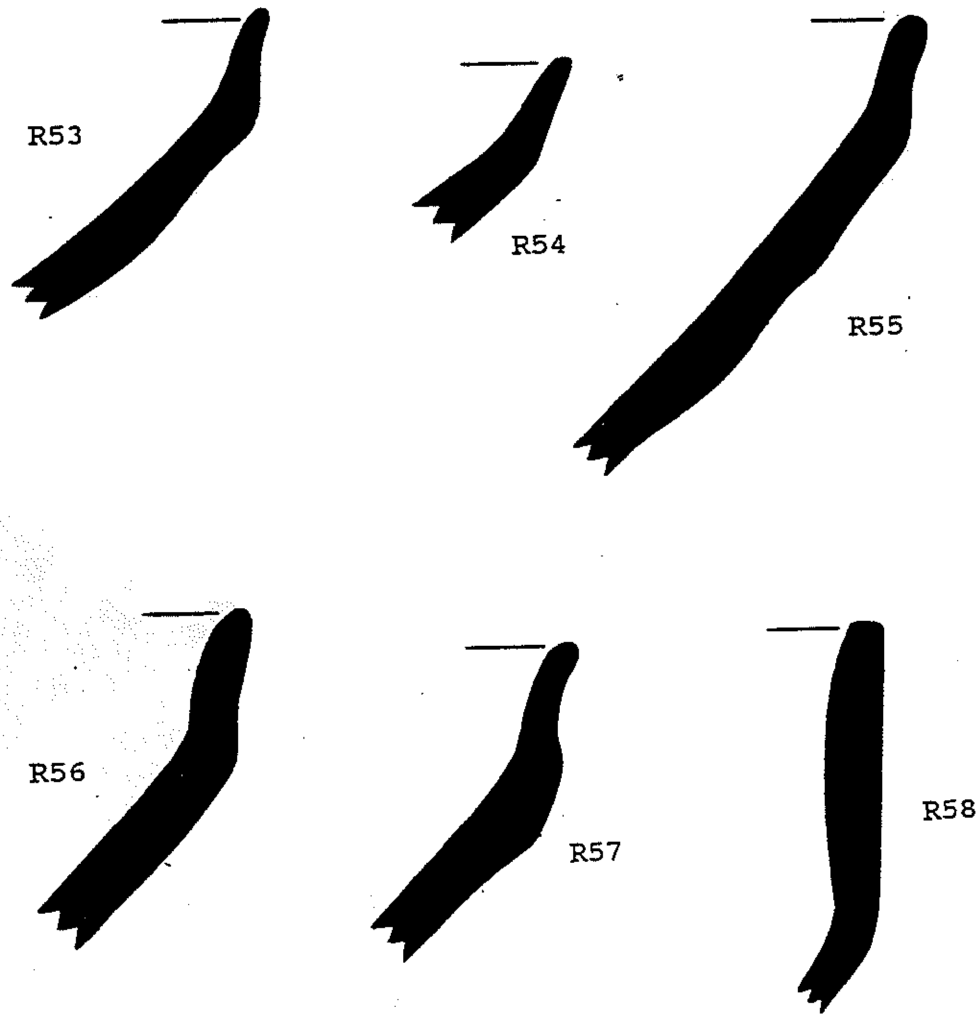


Shouldered Platter (R40), Copa Ware (R41, B18), Miscellaneous Specular Red Painted (R42), and Tecomate (R43) Rim and Base Forms from Venta de Carpio
(R = rim, B = base)



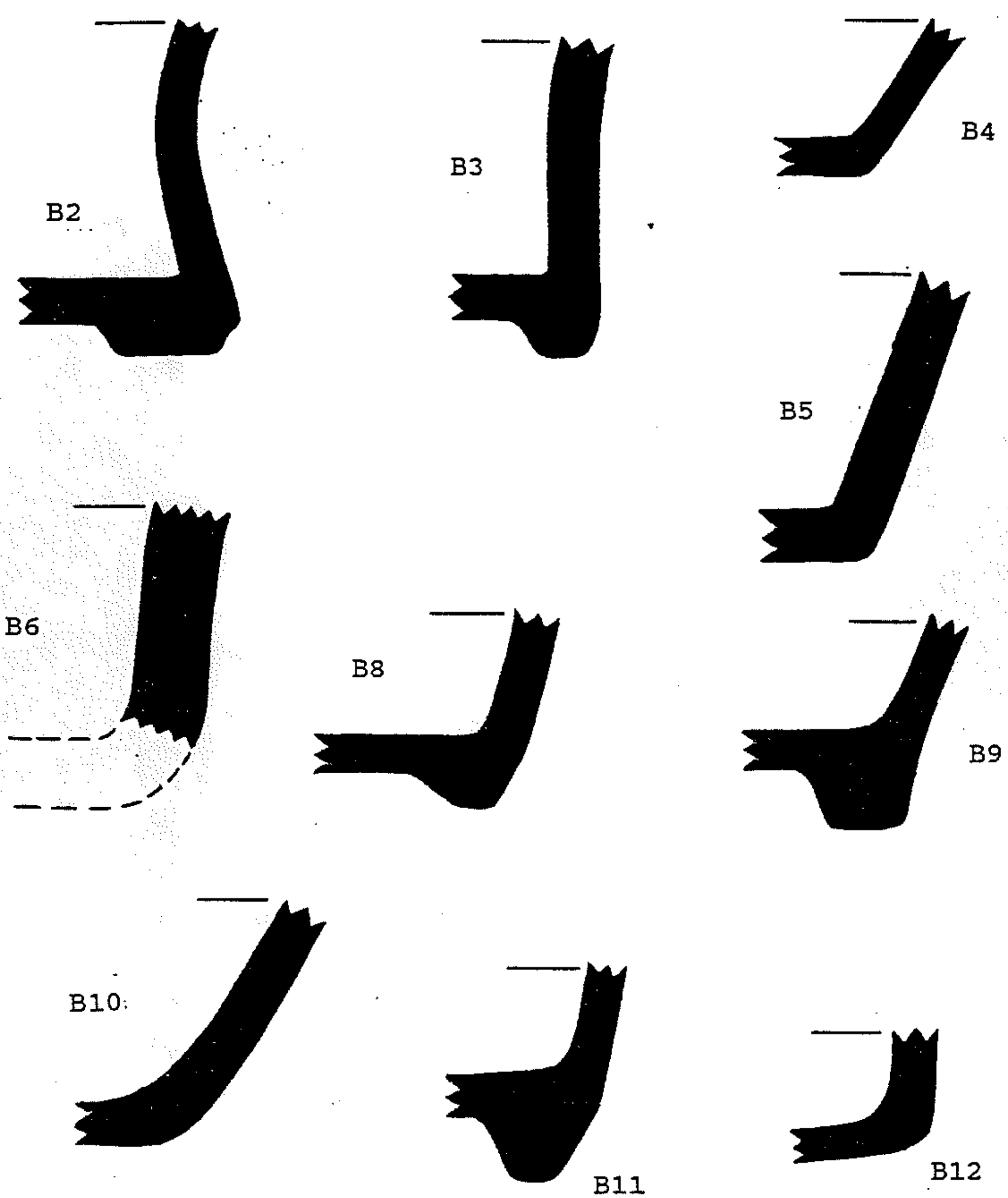
Comal Rim Forms from Venta de Carpio
(R = rim)

Figure 258



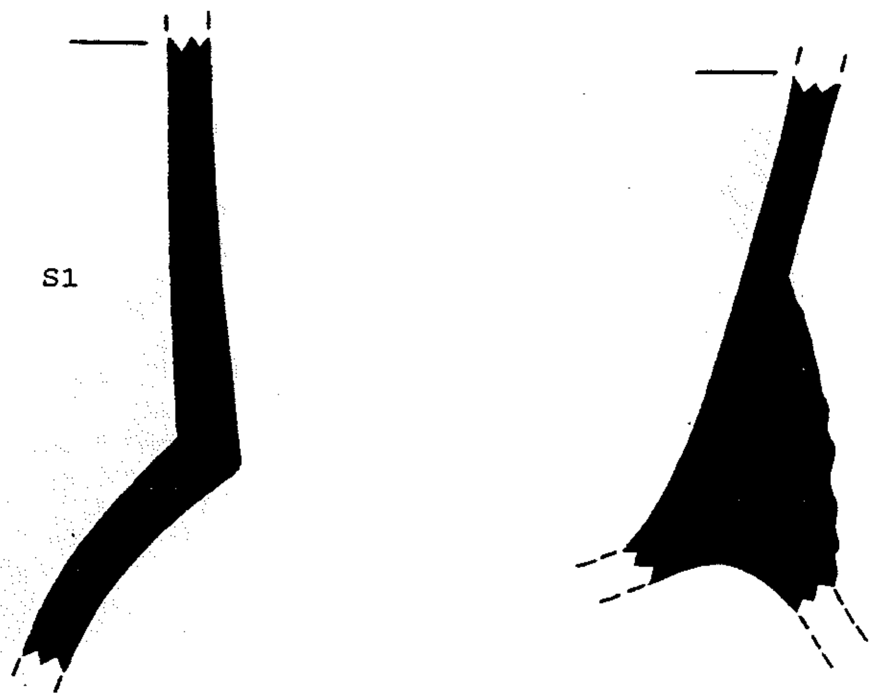
Shouldered Bowl Rim Forms from Venta de Carpio
(R = rim)

Figure 259



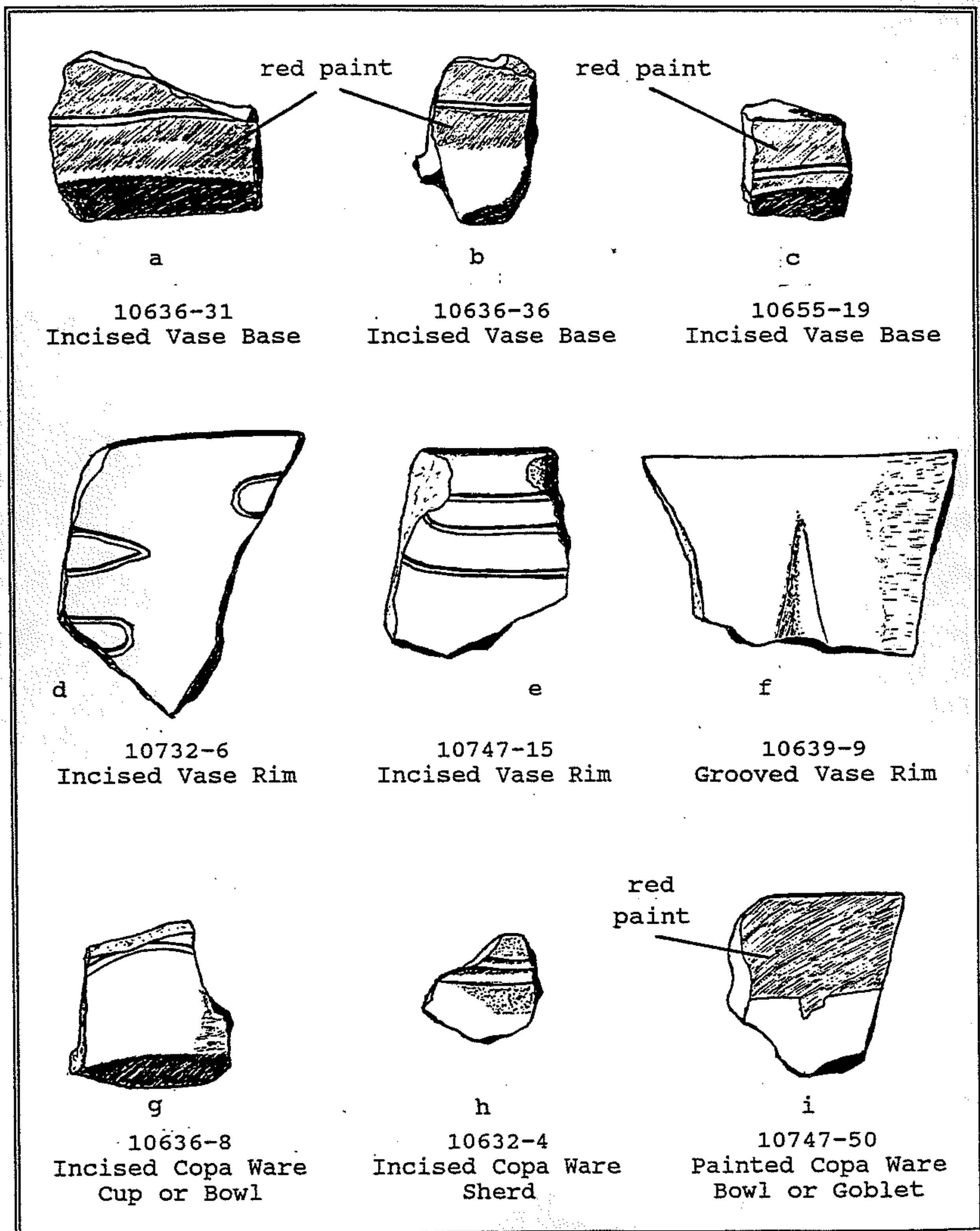
Flat Bottomed Vessels and Vase Base Forms from Venta de Carpio
(B = base)

Figure 260



Composite Silhouette (S1) and Censer (S2) from Venta de Carpio
(S = second profile)

Figure 261



a
10636-31
Incised Vase Base

b
10636-36
Incised Vase Base

c
10655-19
Incised Vase Base

d
10732-6
Incised Vase Rim

e
10747-15
Incised Vase Rim

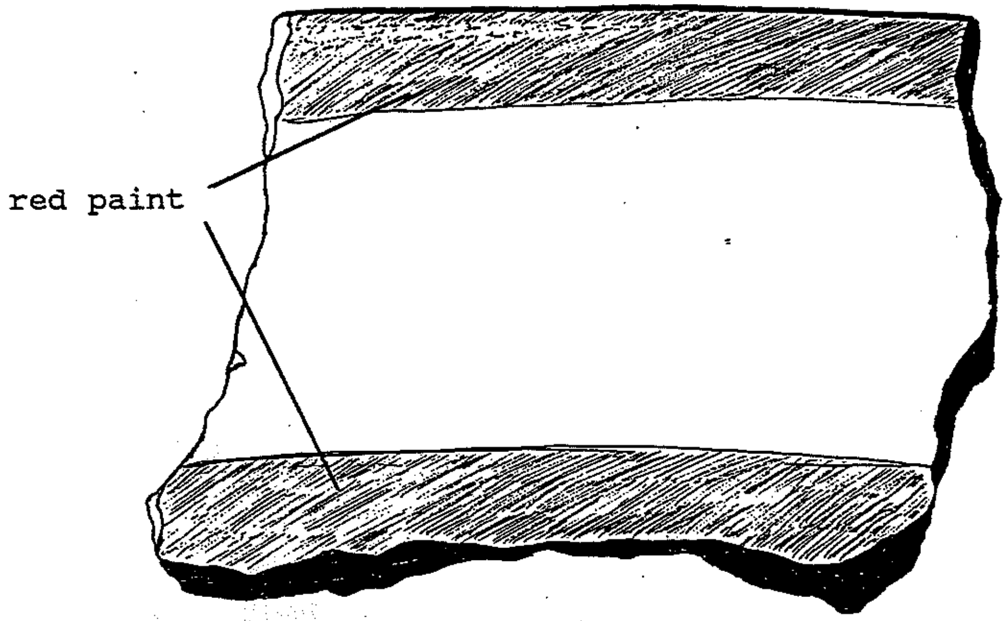
f
10639-9
Grooved Vase Rim

g
10636-8
Incised Copa Ware
Cup or Bowl

h
10632-4
Incised Copa Ware
Sherd

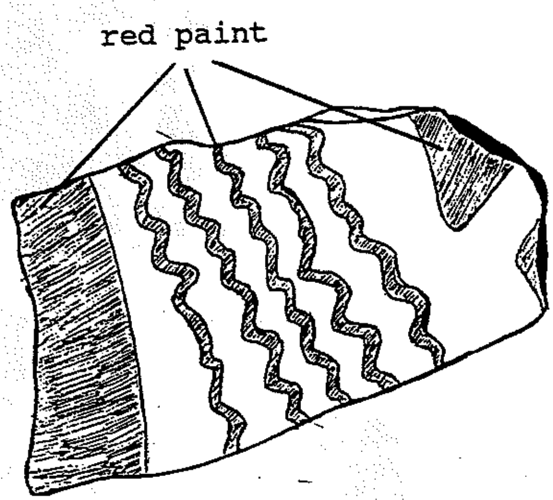
i
10747-50
Painted Copa Ware
Bowl or Goblet

Figure 262



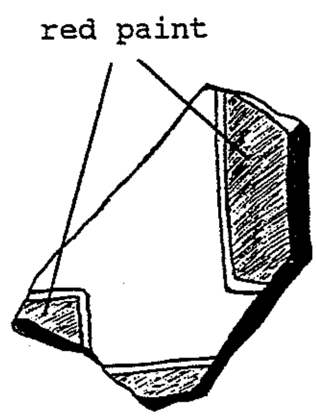
a

10639-4
Large Flat Bottomed Bowl with
Painted Rim and Base



b

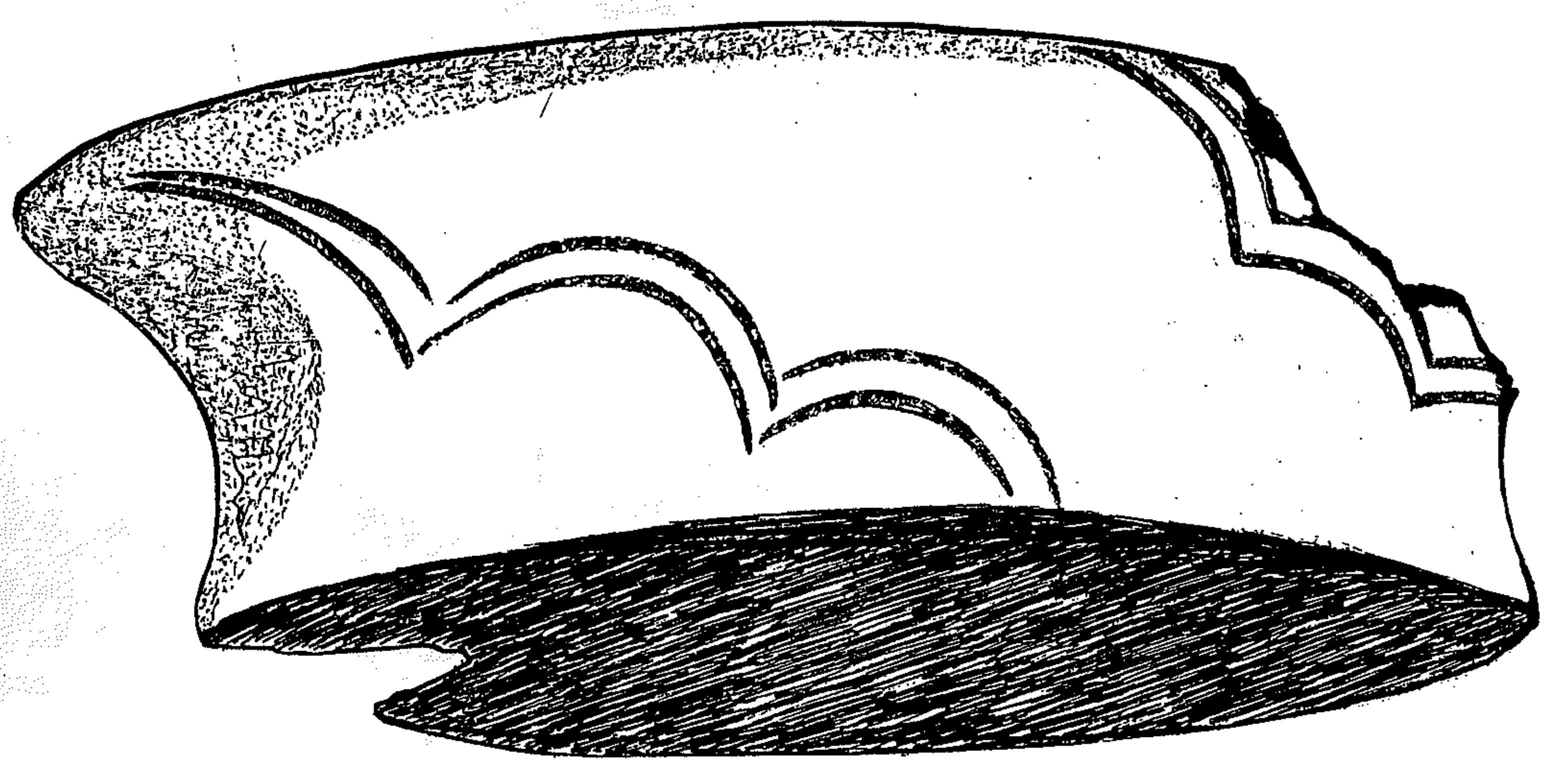
10747-33
Probable Bowl Body Sherd
with Painted Decoration



c

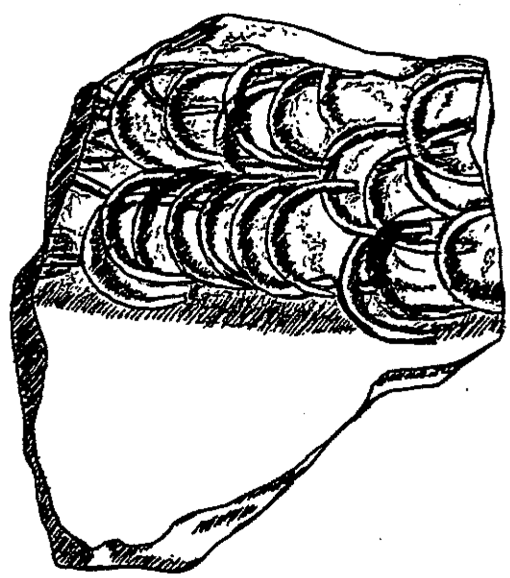
10648-43
Painted and Incised
Decorated Sherd

Figure 263

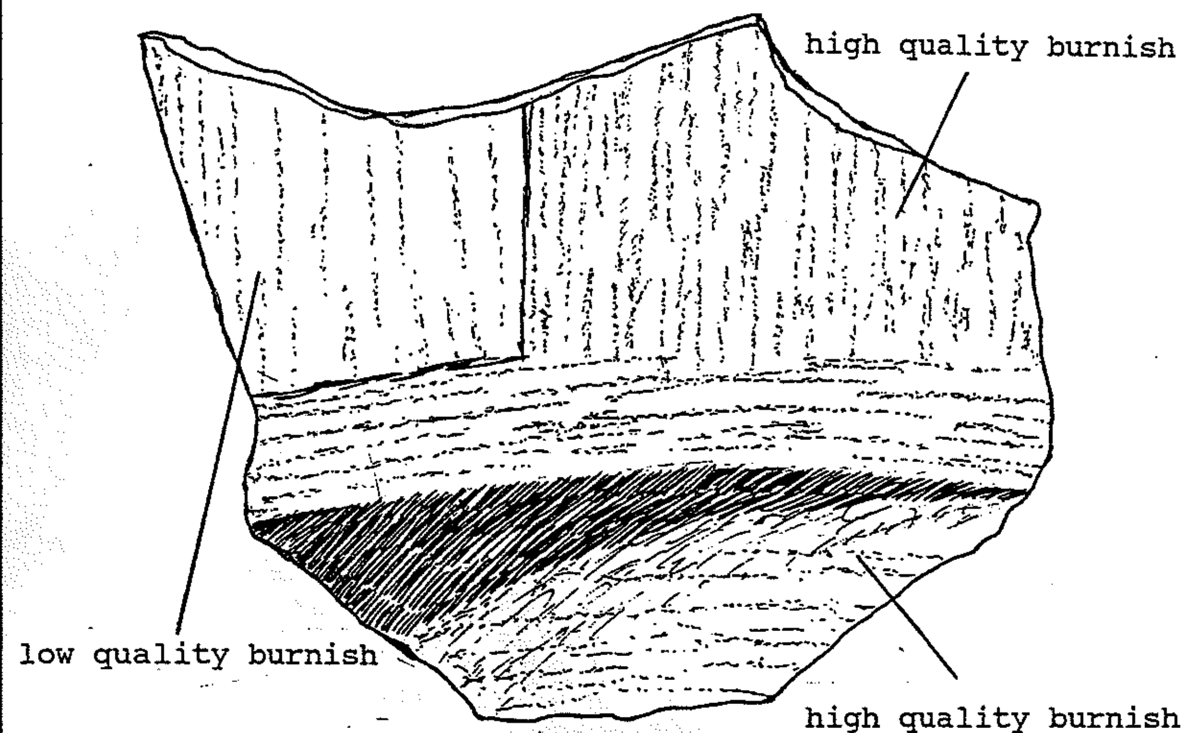


10747-26
Incised Incurved Bowl

Figure 264

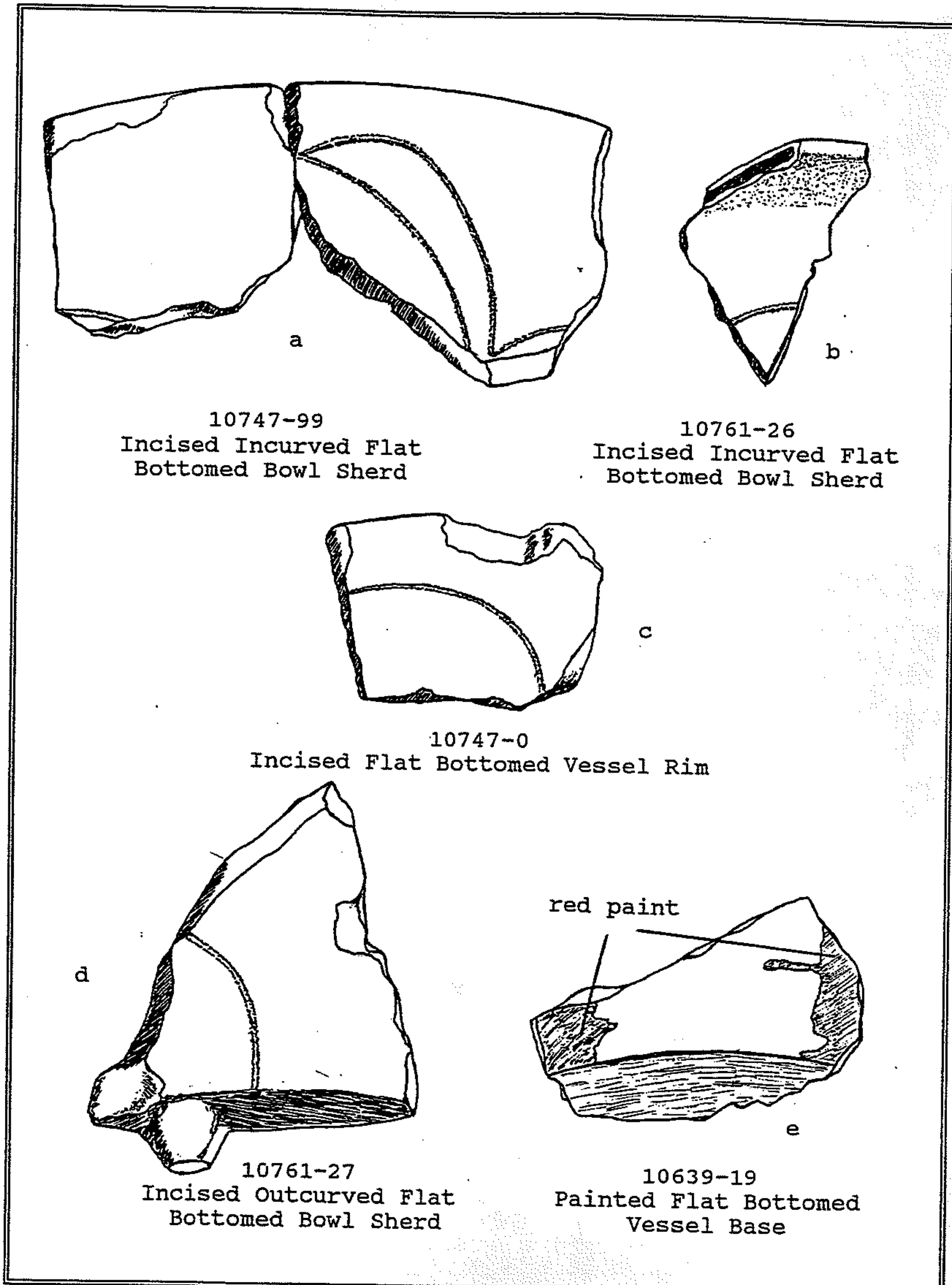


10747-12
Punctate Impressed Hourglass Censer



10615-14
Zone Burnished Composite Silhouette

Figure 265



10747-99
Incised Incurved Flat
Bottomed Bowl Sherd

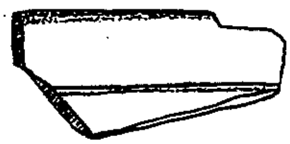
10761-26
Incised Incurved Flat
Bottomed Bowl Sherd

10747-0
Incised Flat Bottomed Vessel Rim

10761-27
Incised Outcurved Flat
Bottomed Bowl Sherd

10639-19
Painted Flat Bottomed
Vessel Base

Figure 266

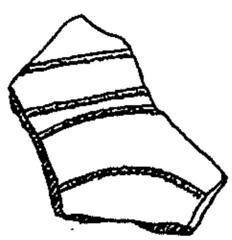


a

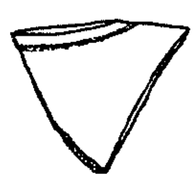
b

10615-23
Incised Thin Orange
Box Sherd

10632-37
Incised Thin Orange
Bowl Sherd



c



d

10615-41
Incised Thin Orange
Bowl Sherd

10660-27
Incised Thin Orange
Bowl Sherd

Figure 267

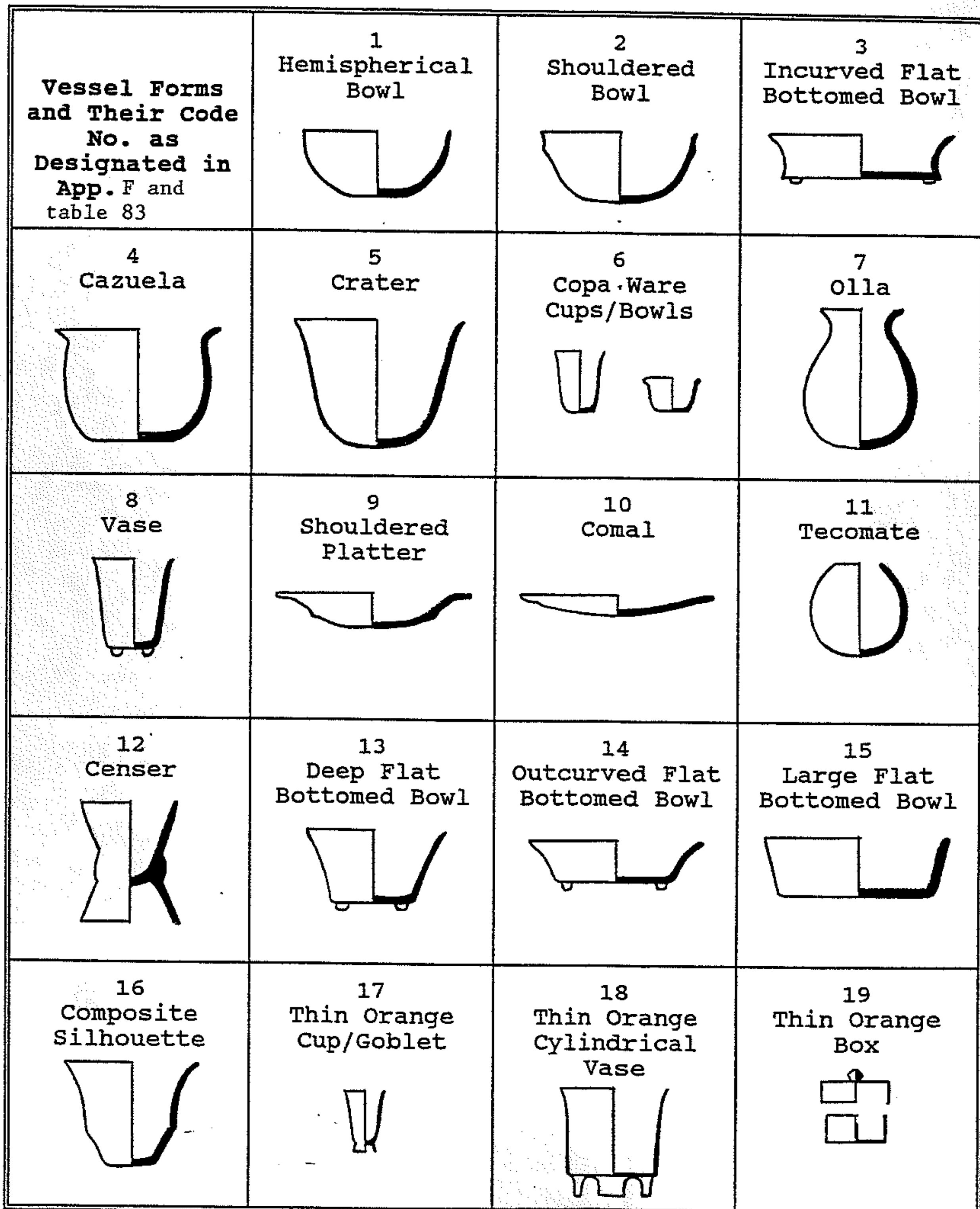
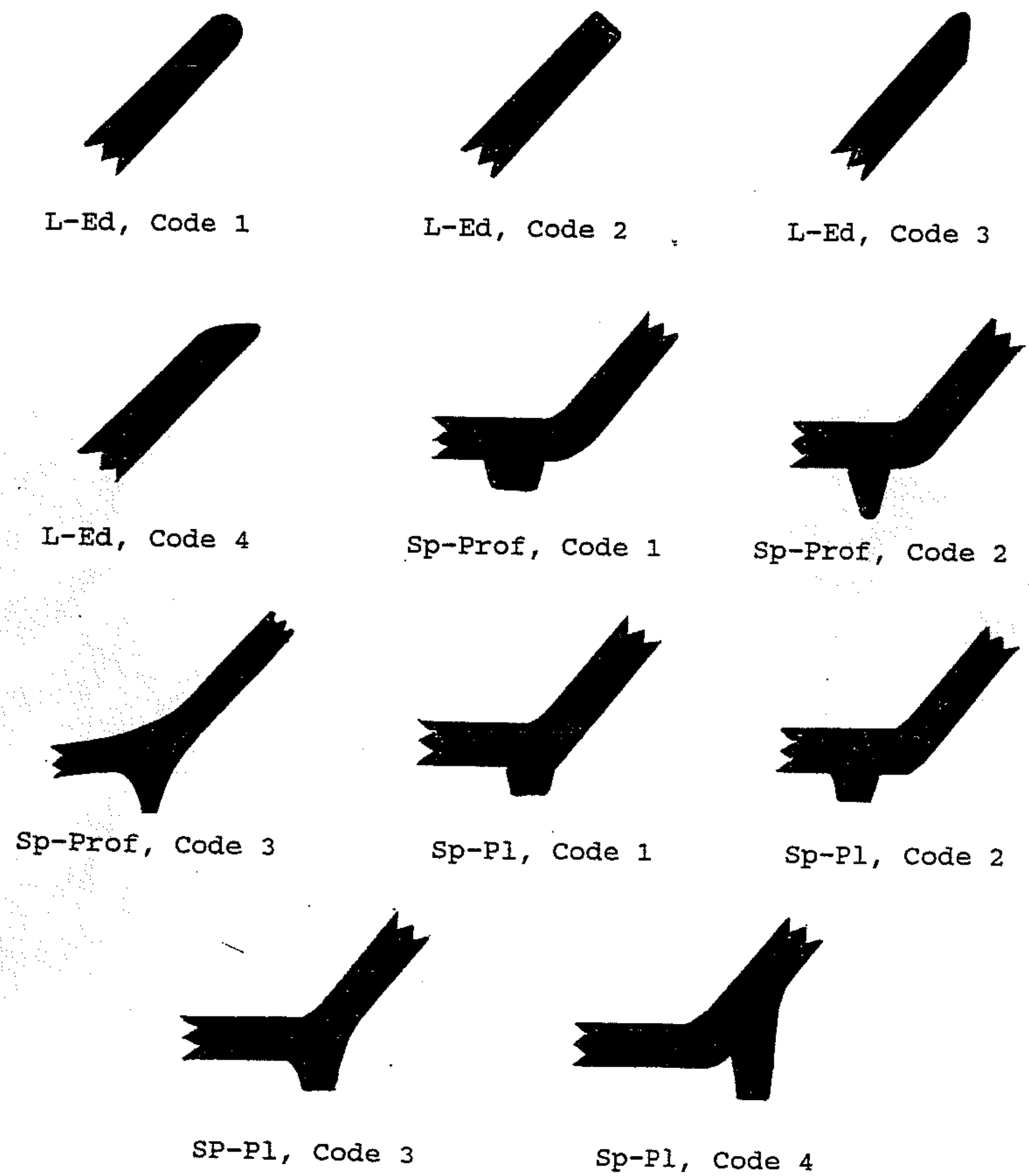

Vessel Forms and Their Code No. as Designated in App. F and table 83
1 Hemispherical Bowl
2 Shouldered Bowl
3 Incurved Flat Bottomed Bowl
4 Cazuela
5 Crater
6 Copa Ware Cups/Bowls
7 Olla
8 Vase
9 Shouldered Platter
10 Comal
11 Tecomate
12 Censer
13 Deep Flat Bottomed Bowl
14 Outcurved Flat Bottomed Bowl
15 Large Flat Bottomed Bowl
16 Composite Silhouette
17 Thin Orange Cup/Goblet
18 Thin Orange Cylindrical Vase
19 Thin Orange Box

Figure 268



Definition of L-Ed (lip edge), Sp-Prof (support profile) and Sp-Pl (support placement) Attribute Variation as Described in Appendix 5 and Coded in Appendix 6

Figure 269

CHAPTER 10

THE HANDMADE FIGURINES OF TC-8:

A STUDY OF FORMATIONAL PROCESSES, STYLE,

AND FUNCTION

Barbara J.Hodik

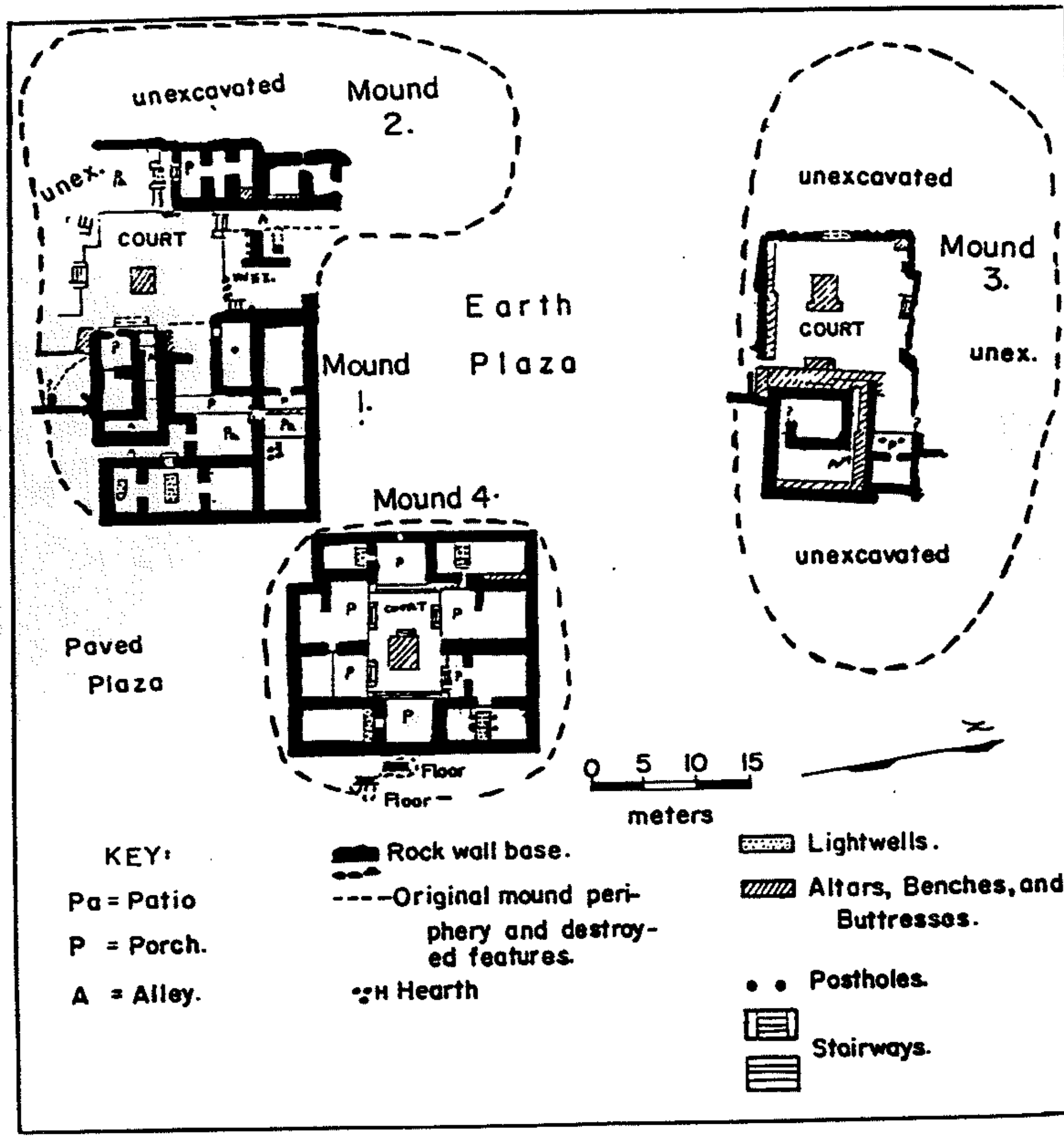

unexcavated
Mound 2.
unex.
COURT
Earth Plaza
Mound 1.
unexcavated
Mound 3.
COURT
unex.
Mound 4.
COURT
unexcavated
Paved Plaza
Floor
Floor
0 5 10 15
meters
KEY:
Pa = Patio
P = Porch.
A = Alley.
Rock wall base.
----Original mound periphery and destroyed features.
H Hearth
Lightwells.
Altars, Benches, and Buttresses.
Postholes.
Stairways.

Figure 270

Table 84

Comparative Chronological Sequence of the Basin of Mexico

	Basin of Mexico		Teotihuacan Valley	
Centuries	Phases	Periods	Phases	Periods
A.D.				
	IV-Tlatelolco	Aztec	Teacalco	Aztec
1500	III-Tenochtitlan		Chimalpa	
1400	II-Tenayuca		Zocango	
	I-Culhuacan			
1200	Mazapan/Culhuacan	Toltec	Atlatongo	Toltec
1100	Mazapan		Mazapan	
1000				
900	Coyotlatelco		Xometla	
800			Oxtotipac	
700	IV	Teotihuacan	Metepec	Teotihuacan
600	III-B		Maquixco (L. Xolalpan)	
500	III-A		Early Xolalpan	
400	II-III		Late Tlamimilopa	
300	II-III		Early Tlamimilopa	
200	II		Miccaotli	
100	II		Apetlac (E. Miccaotli)	Terminal
B.C.0			Teopan	Formative
100	I	Tzacualli	Oxtotla	
200			Tezoyuca-	Late
300		Ticoman	Patlachique	Formative
400	Atot-Cuantepec			
500			Cuanalan	
600	Totollca-La Pastora	Zacatenco		
700			Chiconautla	Middle
800				Formative
900	Iglesia-El Arbolillo		Altica	Early
1000				Formative
1100				
1200				
1300	Ixtapaluca			

A. INTRODUCTION

1. Objective of the Study

The major objectives of this study are as follows: to conduct a descriptive and stylistic analysis of handmade, rural Teotihuacan ceramic figurines collected by excavation and surface reconnaissance at the Santa Maria Maquixco Bajo site (TC-8 Mounds I, II, III, IV, and Pyramid) from 1961 to 1962 as part of the Teotihuacan Project, 1960-1965; to offer suggestions as to the meaning and function of the handmade figurines.

2. Clarification of Terms

Descriptive and Stylistic Analysis

Ben Shahn, the artist-writer, aptly titled a collection of his lectures as Charles Eliot Norton Professor at Harvard University The Shape of Content. Regardless of whether he intended it, the title of the book became a capsule definition of art (and by extension, certain crafts) for many. If art can be considered the "shape of content," then an analysis of such works of art or craft as handmade figurines would include a focus on shape, or denotative, descriptive aspects of an object, and on content, or connotative, stylistic aspects. Anna O. Shepard (1961:259-260), a chemist who has written extensively for archaeologists, states the double focus of the problem of analysis well:

> "The problem . . . can be simplified by distinguishing the connotative and the formal aspects of design and by recognizing that they can be studied independently. By connotative I refer not only to what is represented, but also to its meaning in the culture not alone the identification of a serpent, for example, but also an understanding of what the serpent signified or symbolized to the people who represented it. By formal aspect I refer to the qualities that define style. To separate the connotative and formal factors is not to deny the existence of relationships between them but rather to recognize the needs for different methods of study."

The descriptive analysis consists of an objective verbalization or naming of what is seen. The formal aspects covered in the descriptive naming in Chapter 3 are as follows:

1) Size (in centimeters)
2) Color (according to the Munsell Soil Color Charts)
3) Formation techniques
4) Sex
5) Head and face
6) Coiffure and headpiece
7) Body/torso/appendage shape and position
8) Clothing and accessories

Since the bulk of the handmade figurines in The Pennsylvania State University Department of Anthropology's collection are fragments consisting of heads, bodies/torsos, and unattached appendages (arms, hands, legs, feet, and peg/tripod supports), all of the descriptive categories cited above may not be applicable to each example.

The stylistic analysis undertaken is an outcome of the descriptive analysis.

Meyer Shapiro's (1953:287) definition of style as ". . . the constant form and sometimes the constant elements, qualities and expression in the art of an individual or a group." clarifies the concept of style as used in this study. The analysis of style includes iconographical analysis which interprets stylistic elements in a socio-religious context wherever possible.

Handmade, Rural Teotihuacan Ceramic Figurines

The term "figurine" refers to a small, handsized figure or statuette, not larger than 10 cm. The handmade figurines, in contrast to the moldmade figurines, have a chronological range that extends from the Tzacualli Phase of the Terminal Formative Period (which begins at 100 B.C.) through the Late Tlamimilopa Phase (which ends at A.D. 400 and doing which, moldmade figurines come increasingly to replace handmade ones). This collection, all of fired clay and some with stain decoration, derives from a rural Teotihuacan site and may therefore not constitute a representative sample of the style preferences of the city.

Santa Maria Maquixco Bajo Site, TC-8

Extensive excavations to solve chronological problems and to define ceramic assemblages and architectural features were conducted in four dwelling mounds and a temple-platform on the site - designated TC-8 - during the summers of 1961 and 1962. The excavations were part of a large project that included both excavations of a number of Teotihuacan period sites, and surface survey and sampling of an additional one hundred sites (see this Volume Parts 1 and 3). Although figurines were collected in all of these activities, only the sample from the TC-8 excavation is analyzed here.

Site TC-8, or the Santa Maria Maquixco Bajo site, was a Teotihuacan Period village, consisting of 16 house mounds, of which Mounds 1 and 2 (connected dwellings), Mound 3, Mound 4, and a temple-platform have been excavated. The excavation ground plan in Fig. 270 illustrates the size and placement of the mounds. Positioned on the North Piedmont of the Lower Teotihuacan Valley at the base of a hill known locally as Cerro de Calaveras, the site is 6 km. west of the Sun Pyramid and 1.5 km. north of the alluvial plain comprising the floor of the Valley.

A more specific look at the setting of the TC-8 site is given by Sanders (1965:125) who states that,

> "The site is small and compact, with a formal plan. It may be described as a rectangle measuring approximately 200 m north-south and 400 east-west, the long dimension being at right angles to the slope of Cerro Calaveras. The upper one-third of the rectangle lies on a small flat plateau-like surface, the lower end on gently sloping terrain. The lower, east edge of the village is defined by a shallow canalized barranca. The total surface area of the village is approximately 8 hectares. The lower 6 hectares is densely occupied by approximately 16 large stone and earth houses arranged in three east-west tiers; the houses are separated by small plazas forming a grid system of alternating houses and plazas. Some of the plazas were paved with stucco and lime plaster, others with earth and gravel. The upper-three hectares is occupied by a plaza with public buildings (including a pyramid temple), open areas and four or five houses approximately oriented to the noted tiers of houses on the lower side of the plaza."

It was in the excavation and surface reconnaissance of this site that the tiny figurines analyzed here were collected.

B. PROCEDURES OF INVESTIGATION

1. Selection of Figurines

All of the TC-8 figurine fragments (2,150) were subjected to a preliminary examination preparatory to the final analysis. The procedures of both the examination and analysis are described in the next sections. After the preliminary examination was completed, only handmade, human, ceramic figurine fragments were analyzed. Other types of TC-8 handmade figurines (zoomorphic or miscellaneous decorative forms) are not discussed because they are numerically limited in the collection and perhaps in part because of this fact, are apparently not sufficiently sensitive to stylistic changes to convey the kinds of cultural information gained from the human figures.[1]

Because the handmade figurines analyzed in this study are seldom whole and intact, heads were selected as the chief items of analysis[2]. Bodies, torsos, and appendages are considered only when they have a known association to a head/face. "Known association" is arrived at in one of two ways:

1) Known head/body/appendage associations cited by Kolb (1973), and
2) head/body/appendage associations determined by the author based upon the study of the relatively complete, handmade figurines found in the unexhibited Teotihuacan research collection at the American Museum of Natural History in New York City and the exhibited Teotihuacan collection at the Museo Nacional de Antropologia in Mexico City.

2. Procedures Followed in the Research

Preliminary Examination

All of the figurines had been washed and labeled with appropriate excavation unit catalog numbers. Charles Kolb had sorted the figurines into two basic categories handmade and moldmade. These were further subdivided into fragments representing heads, bodies, torsos, and appendages. The above categories were separately assigned to types or subsets based on the criteria of configuration, execution, elaboration and decoration (see Kolb, Chapter 5 this volume). This system devised by Kolb is designated as the "Subcategory-Subset Figurine Typology" whose basic construct is as follows:

HH=Handmade Head
MH=Moldmade Head
HB=Handmade Body
MB=Moldmade Body
HA=Handmade Appendage
MA=Moldmade Appendage

Within Kolb's system, a particular type of figurine subset is identified by the capital initials of the subcategory followed by a hyphen and a subset Arabic numeral. Hence, "HH-2" would mean a handmade head of type (subset) two.

Kolb used the entire figurine collection, from all of the excavations and surface surveys of the Teotihuacan Valley Project and designed the classification system used in this study. The only variations in his system are the result of the preliminary investigation which necessitated the creation of additional subsets and subdivisions for samples which had, in this writer's opinion, been erroneously classified by Kolb. For example, the subset HB-31 was established for a simple, handmade body classed as HB-7 by Kolb. Subset HB-7 includes "danzantes" or dancers, active bodies frozen in motion, whereas HB-31 is a static, frontal figure. Subdivisions HB-32a and HB-32b were established for handmade bodies of female figures clothed in the quechquemitl (cape) and enagua (skirt). Kolb has classified these as MB-11.

During the preliminary investigation, figurines were re-classified where necessary, and catalog records were made. Since photographs of handmade and moldmade heads in a frontal position had already been made

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[1]The statement that zoomorphic figures are numerically limited is substantiated by the fact that within the entire 2,150 fragment TC-8 collection, there were only 21 representations distributed among the following creatures: monkeys, tigers, coyotes, dogs, turkeys, parrots, ducks, serpents, toads, and fish.

[2]Throughout the history of art when human or anthropomorphic representation is involved, heads and faces tend to receive more attention than bodies. This focus is not so unusual since the face is the locus of four of the five senses and as such is the human expression center.

by James Dutt and Charles Kolb, a catalog record of drawings of the entire body/torso, and appendage collection was made.

Final Analysis

The final analysis consisted of a second washing of the figurines; the first washing had taken place so long previously that the form and color of many examples was obscured by dust and mud particles and an examination of the examples in order to obtain the descriptive information necessary for the stylistic analysis of the 374 handmade examples in Chapter 5 (see descriptions accompanying Plates 149-165). Within the context of the descriptive analysis, the following formation typology (based on methods of construction) was created:

FFT=Face Formation Type
EFT=Eye Formation Type
NFT=Nose Formation Type
MFT=Mouth Formation Type
CFT=Coiffure Formation Type
eFT=Earspool Formation Type[3]
nft=Necklace Formation Type
hFT=Headpiece Formation Type
cFT=Clothing Formation Type
BFT=Body Formation Type
AFT=Arm Formation Type
LFT=Leg Formation Type
HFT=Hand Formation Type
fFT=Foot Formation Type

The contents of each of the formation types appear in Table 93. As in the case of the Kolb classification, a particular formation subcategory is identified by capital or lower case letters followed by a hyphen and a subset Arabic numeral, e.g., FF-1 means a face of formation type (subset) one.

The formation typology was derived from careful observation of each figurine fragment. When a formation technique seemed evident, the writer tested the technique by constructing the figurine portion under analysis using a self-hardening clay commonly used in art classes across the country. All formation technique types were tested by this construction duplication process.

All 2,150 samples were washed by hand with a soft toothbrush in 74 degree to 78 degree water. All areas were washed except the surface bearing the classification letters and numerals in india ink. The washed samples were allowed to dry at room temperature (68 degrees - 72 degrees) for twenty-four hours or more prior to the descriptive analysis.

The figurines were described by types within the chronology already established by Kolb (see Part 2 Chapter 5). The chronology divisions within which the descriptive analysis unfolds are as follows:

Early Tzacualli
Late Tzacualli
Miccaotli
Early Tlamimilopa
Late Tlamimilopa

---

[3]Because of the repetition of the same alphabetical letter in the names of body parts and ornamentations, lower case letters are used for ornaments like eFT for Earspool Formation Type, while capital letters are used for body parts; hence EFT means Eye Formation Type. The only instance of a body part having a lower case letter designation occurred because foot and face begin with f. Face received the capital F and foot received the lower case f.

Because of this chronological organization, the subcategories and subsets do not necessarily appear in numerical order. For example, HH-14 is analyzed before HH-6 since HH-14 belongs to the Miccaotli Phase which precedes the Early Tlamimilopa Phase to which HH-6 belongs. Gaps in numerical sequence, e.g., a jump from HH-2 to HH-5, occur because there may be no TC-8 sample for the omitted categories[4].

Size was determined in centimeters because of the almost universal applicability of such a measure. Three measurements were taken for each head:

1) height (measured from chin to top of head or headpiece),
2) width (measured at widest point on the head - across the eye area), and
3) depth (measured from profile tip of the nose to the back of the head).

Color was determined by comparison with the Munsell Soil Color Charts, 1971 edition. These charts display 196 different standard color chips arranged systematically by the three variables used to describe all color: hue, value, and chroma (Munsell, 1971). The advantages of the use of the Munsell charts are cited by Shepard:

> The advantages of the Munsell system are so great that it is hardly necessary to argue its superiority. It is the only one . . . which has equal visual spacing of color. As a standard for color matching, it covers the range most uniformly in consequence of the fact that it is based on the way we see color rather than on the way colorants are mixed or color is calculated by laboratory or instrumental methods. One of the reasons why it has been widely adopted in scientific work is that it has been subject to the most exacting measurements, and optical constants have been determined with a degree of accuracy which ensures exact reproduction even though every copy were to be destroyed (1961:107).

The Munsell notation for color consists of individual notations for hue, value, and chroma combined in that order to give the color designation[5]. In writing the Munsell notation, there is

> . . . a space between the hue letter and the succeeding value number, and a virgule between the two numbers for value and chroma . . . . Thus the notation for a color of hue 5YR, value 5, chroma 6, is 5YR 5/6, a yellowish red (Munsell, 1971:no pagination).

One of the most persistent problems encountered in the use of the Munsell Soil Color Charts was the relative impossibility of accurate color determination. The colors of the figurine fragments were rarely exactly the same as that of the Munsell color chips. Although the introductory material on how to use the charts made reference to using decimals and numerals colors between certain chips, this study expresses color to the nearest color chip to avoid arbitrary or intermediate categories.

In order to check the author's objectivity in applying Munsell color designations to the figurine fragments, a set of ten heads, randomly selected from the entire handmade sample, was shown to a group of six artists on an individual basis. This group of artists consisted of three males and three females: two men and one woman who are practicing ceramicists and two women and one man, who, though they have had experience with ceramic art, are practicing artists in areas other than ceramics. The artists chosen have doctorates or are in doctoral programs in Art Education at the Pennsylvania State University, and were asked to assign Munsell color notations from the Soil Color Charts to the sample of ten heads. Each artist/judge did this work privately with the same set of directions, in the same laboratory, and under the exact lighting conditions[6] used by the author. None of the judges knew what Munsell color assignments had been made by the author or by any of the other judges. Table 85 gives the results of the judges' color analysis.

---

[4]Kolb established his subcategory, subset classification for figurines from many Teotihuacan period sites, of which TC-8 is only one. Hence, the TC-8 collection does not have examples to correspond with all of Kolb's subcategories and subsets.

[5]"Description of Munsell notation," Appendix G

[6]Lighting conditions were stabilized by daytime examinations in an archaeology laboratory with overhead fluorescent lighting and a tensor desk lamp.

As can be seen from Table 86, there were a total of 36 Munsell notations for a sample of 10 figurine heads. Only 1 of the 10 samples required 9 separate color notations (sample 2), the remaining 9 required three notations apiece. Table 86 indicates the percentage of judges' agreement with the author's color descriptions in the categories of hue, value, and chroma.

Table 87 gives the distribution of the percentage of the judges' agreement with the author's color assignments, the number of responses, and the percentage of responses. Since 82% of the judges' responses are in 50% to 100% agreement with the author's assignment of Munsell color notations, these designations would seem to be acceptably objective.

In addition to size, color, and descriptions of construction techniques, written descriptions of handmade figurine heads and associated bodies and appendages were made on work sheets, an example of which appears in Appendix G. These descriptions dealt with the following particulars:

1) Sex (generally determined by coiffure, headpiece, and/or clothing)
2) Head and face (eyes, nose, mouth, and ear/earspools)
3) Coiffure
4) Headpiece
5) Body and appendage associations
6) Clothing

Terminology for details of face, body, and appendages is according to current anatomical usage.

TABLE 85
JUDGES' MUNSELL NOTATION OF HUE, VALUE, AND CHROMA FOR TEN SELECTED FIGURINE HEADS

Judges	Head 1		Head 2		Head 3	Head 4	Head 5	Head 6	Head 7	Head 8	Head 9	Head 10
	H V C	H V C	H V C	H V C	H V C	H V C	H V C	H V C	H V C	H V C	H V C	H V C
Author*	5YR 6 4	2.5YR 6 6	10R 6 8	10R 5 4	5YR 6 4	2.5YR 6 6	7.5YR N 4/	7.5YR 6 4	5YR 6 4	2.5YR 5 6	7.5YR 6 4	10R 5 4
B.**	5YR 6 4	10R 5 6	10R 4 6	10R 5 4	5YR 6 4	5YR 6 6	7.5YR N 4/	7.5YR 6 4	5YR 5 3	2.5YR 5 6	7.5YR 6 4	10R 5 4
G.**	7.5YR 6 4	5YR 6 6	2.5YR 5 6	2.5YR 5 4	5YR 6 4	5YR 6 6	7.5YR n 3/	7.5YR 6 4	7.5YR 6 4	2.5YR 4 6	7.5YR 6 4	10R 5 4
A.**	5YR 6 4	2.5YR 6 6	10R 5 6	10R 5 3	7.5YR 6 4	2.5YR 6 8	2.5YR N 3/	7.5YR 6 4	5YR 6 4	2.5YR 5 6	7.5YR 5 4	10R 5 4
S.*	7.5YR 6 4	5YR 6 6	10R 5 6	10R 5 4	7.5YR 6 4	5YR 6 6	7.5YR N 3/	7.5YR 6 4	5YR 4 6	5YR 5 4	7.5YR 6 4	10R 5 4
M.*	5YR 6 6	2.5YR 5 6	10R 5 6	10R 5 4	7.5YR 5 4	2.5YR 6 8	7.5YR N 3/	7.5YR 6 4	7.5YR 5 4	2.5YR 4 6	7.5YR 6 4	10R 5 4
K.*	5YR 6 4	5YR 6 4	2.5YR 5 6	10R 5 4	7.5YR 6 4	5YR 6 6	2.5YR N 4/	7.5YR 6 4	5YR 6 4	2.5YR 5 6	7.5YR 6 4	10R 6 4

*A single asterisk indicates a female judge; a double asterisk indicates a male judge.

TABLE 86
PERCENTAGE OF AGREEMENT ON MUNSELL COLOR NOTATIONS OF HUE, VALUE, AND CHROMA

Head	Hue	Value	Chroma
1	66 2/3	100	100
2	33 1/3	66 2/3	83 1/3
	66 2/3	0	0
	83 1/3	100	83 1/3
3	33 1/3	83 1/3	100
4	33 1/3	100	66 2/3
5	66 2/3	100	33 1/3
6	100	100	100
7	66 2/3	50	66 2/3
8	83 1/3	66 2/3	83 1/3
9	100	83 1/3	100
10	100	83 1/3	100

TABLE 87
DISTRIBUTION OF PERCENTAGE OF AGREEMENT, NUMBER OF RESPONSES, AND PERCENTAGE OF RESPONSES

Percentage of Agreement	Number of Responses	Percentage of Responses
0%	2	6%
33 1/3%	4	11%
50%	1	3%
66 2/3%	8	22%
83 1/3%	8	22%
100%	13	36%
	36	100%

3. Summary

Though all 2,150 TC-8 Figurines previously classified by Charles Kolb according to his subcategory, subset system were part of a preliminary examination and occasional reclassification, only the handmade figurine heads along with any known assoicated bodies and appendages association were selected as the working sample of 374.

The final analysis consisted of 1) a second washing of the total TC-8 collection to prepare the figurines for 2) an examination directed toward obtaining descriptive information (sex, head and face, coiffure, headpiece, adornments, body and appendage associations, clothing and color), and most importantly, isolating formation techniques and classifying these techniques into a typology.

C. DESCRIPTIVE ANALYSIS OF HANDMADE FIGURINES

This section treats the physical properties of handmade, TC-8 figurines, with descriptive information on handmade heads and related bodies and appendages presented in chronological order according to Teotihuacan phase names. The Kolb classifications for the heads (and if applicable, for the bodies and appendages)[1] follow with the classification item under analysis marked with an asterisk. The data of the analysis for each head, body, and appendage type are grouped into three presentation areas:

1) Description: the general characteristics of the classification type;
2) Formation: the analysis of the formation techniques used and the application of a formation technique type category to each method of construction;
3) Color: the assignment of a Munsell color name and notation.

Because of the relatively uniform small size of the handmade heads, bodies, and appendages, size will be discussed only when it seems exceptional.

[1]Where there is no known body association for the head under analysis, the letters NBA (No Body Association) appear below the Kolb head classification.

Tables summarizing the incidence of formation technique types with Kolb subcategories and subsets and a table showing the quantity and incidence of handmade heads, associated bodies and appendages with chronological phases appear at the end of the presentation. For a detailed listing of the contents of formation type categories and photographic illustrations of them, consult the Plates.

1. Early Tzacualli

HH-1*, HB-6a, HA-7a

Description

The five HH-1 heads have prognathic faces, coffeebean eyes, no brows, gouge-slit mouths, necklace bands, and hollow earspools. Two appear to be bald, two seem to have had wide turban headpieces, and one probably had a narrow forehead band.

Formation

The FFT-1 faces were formed separately and applied to the upper end of a flat slab which then served as a headpiece support as well as a body form at the lower end. Small horizontally-scored fillets of clay are applied to the extreme sides of the faces to provide the EFT-1 "coffeebean" eyes characteristic of Late Formative figurines. Noses are NFT-1, applique fillets left unmodeled with joining area visible. Mouths are MFT-2, shapeless gouges at the bottoms of the prognathic faces. MFT-2 gouges are small enough to appear to be a wide slit. Earspools are small applique dots with punctate centers. There were two examples with necklaces. On one, the nFT-la necklace roll was added after the eFT-1 flattened, rolled ball with gouged center earspools; on the other it was added before the earspools.

Wide turban headpieces, hFT-1, are made of flat slab strips wrapped around the head and overlapping in the rear. These headpieces extend out from the head on the sides, but touch it in front and back. Flattened applique dots slightly smaller than the turban were probable center decorations. The one sample with a narrow forehead band was highly burnished. The band appears to have barely extended over the sides of the head.

Color

The HH-1 heads are without pigment, ranging in clay hues from light brown (7.5YR, 6/4) to reddish brown (5YR, 5/3).

HH-1, HB-6a*, HA-7

Description

HB-6a bodies are associated with HH-1 heads and HA-7a appendages. They are clothed only in loincloths and wear ankle bands and dots as well as wristbands and dots. Entire figurines would range from five to seven cm. in height.[2]

Formation

These BFT-1 bodies appear to have been constructed by joining two clay cylinders for the torso, leaving them unjoined for legs. These are four loincloth styles among the 22 HB-6a bodies:

1) rolled hip band (averaging .4 cm. in width) extending just over the sides of the body;
2) rolled hip band with separate side flaps extending from the top of the hip band to mid-thigh;

[2]These associations and size estimates are based on studies of complete figurines of this size in the Vaillant collection at the Museum of Natural History, New York City, and the Teotihuacan collection at the Museo Nacional de Antropologia, Mexico City.

3) rolled hip band with central applique disc, the same width as the hip band; and
4) rolled hip band with inverted "U"-shaped narrow clay cylinder placed under the band.

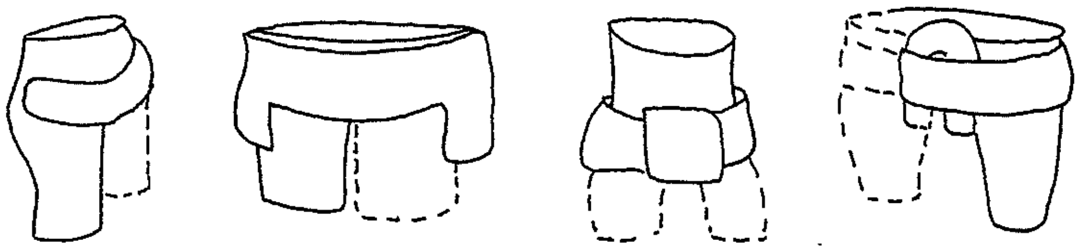

Fig. 271, HB-6a Loincloth Styles

Color

The bodies are not pigmented. The clay colors of four are light reddish brown (5YR, 6/4) while one is light red (2.5YR, 6/6).

HH-1, HB-6a, HA-7a*

Description

Legs and arms are cylinders, extended from the body. Feet are of two types:
1) flap foot and
2) T-foot.

Formation

The flap feet fFT-1 are formed by bending the cylinder leg to form the heel/foot and flattening the toe extremity into a thin flap which is folded under the foot. If present, toes are defined by crude scoring of the upper side of the flap. There does not seem to be any concern with anatomical correctness since the feet with toes have only three or four. The feet have either ankle or shin bands or appliqued, flattened dots on the front of the foot at the base of the ankle. Ankle or shin bands never extend to, or overlap, the back of the leg.

The T-foot fFT-2, is formed by flattening the clay at the foot end as done to form the flat foot, except that the clay is flattened from the sides rather than from the front and back. The flattened flap is then folded to the inside of the foot and the "T"-shape is given by gripping the front and back of the angle between the fingers (much like holding a cigarette) and pressing upward with the thumb against the bottom of the foot.

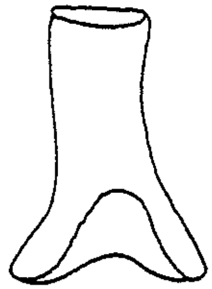

Fig. 272. View of T-foot from inside leg

Arms are individual cylinders taper-rolled to form the HFT-1 hand. Fingers are not distinguished. There is occasional slight elbow bending, but most frequently only the flat, tapered hand is curved or cupped. Applique dots appear at the wrists of these arms.

Color

Only two flap feet bear traces of red pigment (10R, 5/6). The remaining twenty appendages (arms and legs) are divided into the following clay hues:

Color	Munsell Notation	Number of Examples
Very dark gray	7.5YR, N3/	1
Dark gray	5YR, 4/1	1
Reddish gray	5YR, 5/2	1
Weak red	2.5YR, 5/2	2
Light reddish brown	5YR, 6/4	15

HH-2*, HB-19

Description

There is only one example of HH-2, an apparently bald, prognathic face with slit eyes and mouth, applique fillet nose, and hollow earspools. HH-2 is associated with a standing body having an applique band necklace and incised fingered hands on the chest. There are no examples of HH-19 in the TC-8 collection.

Formation

The FFT-2 face is constructed separately and applied to a neck cylinder flattened to form the back of the head. EFT-2 eyes are slits with displaced clay forming upper and lower lids on the left eye. The right eye has an upper lid twice the size of the left lid and lacks a lower lid. The nose is an NFT-1, applique fillet left unmodeled with joining area visible. The MFT-1 mouth is an upturned slit/smile (half the length of the 2.4 cm. face), and hollowed by a deep punctate depression. The earspools are eFT-2.

Color

The face is light reddish brown (5YR, 6/4) with a band of pinkish gray (5YR, 7/2) across the forehead and extending to the top of the head. This band remained as the result of firing discoloration because of the presence at firing of a now missing headpiece.

2. Early and Late Tzacualli

HH-9*, HB-31*

Description

There is only one example of HH-9. This category is characterized by a prognathic, noseless, mouthless face and double gouge eyes, applique single band necklace, and no earspools. The HH-9 head is 2.4 cm. high and 2.6 cm. wide.

Formation

A thick cylinder of clay is flattened from front and back. The FFT-3 face is formed by folding over the top end of the flattened cylinder approximately 3.3 cm. A rolled band of clay is added to define the chin and lower jaw about 2.4 cm. from the top of the head. The remainder of the facial fold-over becomes an upper garment. Each EFT-4 eye is formed by making two short horizontal gouges very slightly separated. The tiny separation area resembles a pupil. Arms, which do not remain, were probably attached at right angles to the sides of the upper torso just below the necklace band. Since the base of the body cylinder is missing, the support cannot be analyzed.

Color

The figure is of brown clay (7.5YR, 5/4).

3. Early and Late Tzacualli and Miccaotli

HH-4*, NBA

Description

The one example of HH-4 has an extremely prognathic lower face and high forehead with a looped braid from the upper left head down behind the left earspool and back to its point of origin. The top of the head is a raised surface, possibly the remains of a topknot. Earspools and gouged eyes and mouth are present.

Formation

The face is a modification of FFT-2 in that instead of the whole face being applied to a neck core, only the lower face was applied to a head form which may have been an extension of the body. The head form extending above the lower face becomes the high forehead. The applied lower face was a coil cylinder pressed in a "V" form around the head core. It is the pointed bottom of the "V" which suggests an exaggerated prognathism.

Eyes are EFT-6 gouge/slits placed at the juncture of the lower face and the head. The mouth is MFT-2; the left earspool is eFT-2; and the coiffure is CFT-5.

Color

HH-4 is made of yellowish red (5YR, 5/6) clay.

HH-11*, HB-28

Description

Category HH-11 is a catch-all miscellaneous category with portions of heads not sufficiently complete to warrant more precise classification. However, two heads and one head/torso bound figure are sufficiently well-preserved for analysis. The heads have prognathic FFT-2 faces, EFT-5 gouge eyes and MFT-2 mouths, pinched NFT-10, 11 noses, and remains of earspools. The torso has arms bound at the sides.

Formation

The faces were formed separately and applied to a neck which was part of the HB-28 body discussed below. On both samples the necklace band was applied first - the earspools next. One head has two small rolls of clay applied to the back of the head behind the eFT-4 earspools. These rolls seem to have functioned as props or supports for the large spools.

The head/torso bound figure was constructed by joining two cylinders and leaving the ends free to be legs, the same construction technique discussed above in connection with HB-6a. The legs are missing. Arms are separate rolls attached to the sides of the torso so that the upper ends of the arm rolls could be pinched together to form the back of the neck. The neck, thus extended, reaches up behind the separately formed face. Hands, headpiece, and earspools, if any, are missing.

Color

The two heads are light brown (7.5YR, 6/4) clay. The bound figure is brown (7.5YR, 5/2) clay.

HH-11, HB-28*

Description

The bodies associated with HH-11 are incipient "princess" bodies, a name applied to moldmade bell-shaped kneeling/seated female figures occurring most commonly during the Late Xolalpan period. These are fully-clothed forms with flap sleeves at the sides. Occasionally feet protrude from under the front of the figure's garment; otherwise the feet are absent.

There are remains of feet on the two HB-28 samples. The dresses of the figures are unadorned, though one figure has a double band necklace with random vertical scoring to suggest beads. Both figures have simple flaps draped over portions of the arms.

Formation

Clay is rolled into a truncated cone to form the BFT-5 "princess" body. Sleeves are flat clay flaps, rounded at the bottom. This roundness and sleeve form can be obtained by flattening a small ball of clay between the fingers. The tops of the sleeves are pinched in above the shoulders to form the neck. There are no hands in evidence. Feet are simple flattened dots of clay attached under the front of the cone/dress base to allow for a slight protrusion. The double band necklace nFT-3 (really a single wide band horizontally scored to suggest two bands or strands) is applied to overlap the upper sleeve/neck.

Color

One body is light brown (7.5YR, 6/4). The other is of light reddish brown clay (5YR, 6/4) with remains of reddish yellow pigment (5YR, 6/6).

4. Late Tzacualli and Miccaotli

HH-5*, NBA

Description

Category HH-5 has only one example: a distorted face[3] with gouged eyes, flattened earspool remains, and a "pillbox" headpiece.

Formation

The misshape FFT-2 face was applied to a neck cylinder flattened to become the back of the head. Only the left EFT-5 eye remains; the right eye, nose, and mouth were obliterated before firing. The hFT-2 "pillbox" headpiece was constructed by wrapping a cylinder of clay around the top of the head, just over the sides.

Color

The head is a dark brown clay (7.5YR, 4/2).

HH-10*, HB-9, 25, HA-1

Description

The thirteen heads in the HH-10 category are characterized by cleft (or heart-shaped) bald tops, gouge/slit eyes and mouths, applique fillet noses, and flat disc earspools.

Formation

The faces seem to have been hand-cut in heart form from slabs ranging from .5 to 1 cm. in thickness. The faces were then applied to neck cylinder extensions of already-formed bodies. EFT-6 eyes on eleven faces were formed by making horizontal gouge/slits. On two of the faces there was an application of two small fillets of clay to each eye to suggest upper and lower lids, a semi-coffeebean eye, EFT-7. Noses are NFT-1, 2, 3, 8, 9, and 10, unmodeled applique fillets, generally with slit nostrils and noses pinched from facial clay. The MFT-3 mouths are gouges at the bottoms of the faces which lends an open-mouthed, chinless look to the heads.

Color

The only examples of pigment were a reddish yellow (7.5YR, 7/8) on a brown (7.5YR, 5/2) clay, and a reddish yellow (5YR, 7/6) on a light reddish brown (5YR, 6/4) clay. The clay colors of the remaining twelve samples are as follows:

[3]The rationale for firing a misshapen face such as this might be questioned. One other such example of face distortion before the clay dried exists in category HH-10. Since other examples of distortion do not exist, it might be conjectured that these two examples were accidentally pushed against other objects in the array awaiting firing and were overlooked by the craftsman. Why the distorted heads were used is another question.

Color	Munsell Notation	Number of Examples
Light yellowish brown	10YR, 6/4	1
Gray	10YR, 6/1; 5YR, 5/1	1
Reddish Brown	5YR, 5/3	1
Light reddish brown	5YR, 6/3	1
Light brown	7.5YR, 6/4	3
Brown	7.5YR, 5/2	3

HH-10, HB-9, 25*, HA-1

Description

The TC-8 collection has no examples of HB-9. The five HB-25 bodies associated with HH-10 are of three types:

1) HB-25a/BFT-2: cylinder torso with horizontal perforation from front to back below necklace and horizontal perforation from side to side for probable puppet leg attachment;
2) HB-25b/BFT-3: flattened cylinder bodies with horizontal front-to-back neck base perforation but with cylinder legs attached to the body; and
3) HB-25c/BFT-4: cylinder bodies with vertical perforation from lower body through neck base.

Formation

There is one HB-25a body. The body cylinder has wide arm cylinders attached so that they cover the sides of the upper half of the body. The body's lower half is narrowed and perforated laterally so that puppet legs can be attached. A narrow band nFT-1 necklace is applied to the front of the neck.

The three HB-25b bodies are flattened cylinders with arms and legs permanently attached. One appears to have a loin band centered with an applique dot.

The two HB-25c bodies are crudely made cylinders with legs and arms attached. Both have rolled clay necklace bands. One wears a loin band.

Color

Two figurines, HB-25a and HB-25b retain red pigment (2.5YR, 5/6). The remaining four are of light reddish brown (5YR, 6/4) clay.

HH-10, HB-9, 25, HA-1*

Description

The appendages associated with HB-25a are flattened cylinder puppet legs, perforated at the upper end. No feet remain.

Formation

A straight clay cylinder was flattened and folded over laterally at one end, forming a slightly squared-off perforated thigh/hip which was joined to the perforated lower torso of HB-25a. Though there are no feet remaining, there is evidence that the LFT-1 leg cylinder was bent to form a heel and flattened to form a foot which stood out, spread-eagle fashion, from the leg.

Fig. 273. HA-1, Puppet Leg

Color

Two HA-1 legs are dark gray (5YR, 4/1). The remaining five are light brown (7.5YR, 6/4) clay.

HH-25, NBA

Description

HH-25 consists of four heads, two with wide headbands, all with applique dot eyes in depressed sockets, applique noses, and gouged mouths.

Formation

Faces are FFT-2; eyes are EFT-10; noses are NFT-4; mouths are MFt-4. Only two heads retain hFT-1 headpieces and one of these heads retains a nFT-1 necklace. Earspools were originally on this head with the necklace, but are now missing.

Color

The head with the necklace remaining retains traces of reddish brown (2.5YR, 5/4) pigment on the headpiece; the other heads are of pale brown (10YR, 6/3) and light brown (7.5YR, 6/4) clay.

5. Miccaotli

HH-12*, HB-28

Description

Heads in this category have a prognathic face, slit and gouge eyes, applique fillet noses, gouged mouths, no earspools, and T-shaped headdresses.

There are five types of T-shaped hFT-1 headdresses:

1) Wide flat band (the same length as the face below it - from 1.3 to 2 cm.) with a center applique vertical roll/stripe ornament extending from the top of the band to its forehead edge. There are four examples of this type.
2) Wide flat band with three or more vertical applique roll/stripes extending only halfway down the band from the top. There is one example of this type.
3) Wide flat band with vertical score extending from the top to the bottom of the band. There is only one example of this type.
4) Wide flat band with a center applique dot ornament. There are two examples of this type.

5) Narrow band with a center applique vertical roll/stripe ornament extending from the top of the band to its forehead edge. There is one example of this type.

Formation

The prognathic FFT-2 faces are generally constructed separately and attached to the neck extensions of HB-28 bodies discussed above in connection with HH-11 heads.[4]

The wide hFT-1 headbands are cut, ribbon-like, from slabs of .2 to .3 cm. in thickness. They are attached to the flat faces only in front and back. The sides are allowed to protrude out, giving the headpiece its characteristic "T" shape.

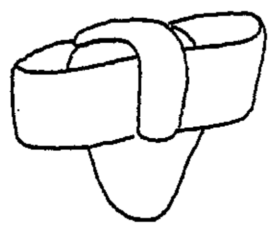

Fig. 274. T-Shaped Headpiece, Type A

Noses are HH-2 applique fillets, crudely modeled with slits for nostrils. Eyes are either slits or gouges (EFT-3, EFT-5). Slit eyes are generally positioned close together on the face while gouge eyes are spaced more widely. There are no brows. Mouths are either gouges or slits positioned low on the face (MFT-1, MFT-3, MFT-4).

Color

Six of the nine samples of HH-12 have remains of pigment, three do not. Pigments used are light red (2.5YR, 6/6), red (10R, 4/6-5/6), reddish yellow (5YR, 6/6), and light reddish brown (5YR, 6/4). Heads without pigment were of pinkish gray (7.5YR, 6/2), light brown (7.5YR, 6/4), and brown (7.5YR, 5/2) clay.

HH-15*, NBA

Description

The four heads in this category exhibit varying degrees of prognathism, gouge/slit eyes, applique fillet modeled noses, gouge/incised mouths, headdresses, hollow earspools, and band necklaces. Though one of the heads has a portion of the torso remaining, the remains are not complete enough to suggest a specific body type.

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[4]In the Vaillant Collection a simple, standing "gingerbread boy" body with dimensionality is also associated with HH-12, but no such example is present in the TC-8 collection. There are two other body forms associated with HH-12 in the Teotihuacan Collection of the Museo Nacional de Antropologia: 1) a peg back, standing female wearing a quechquemitl (cape with a closed front), and 2) a seated male figure wearing what seems to be a straight-bottomed quechquemitl and sitting with ankle-banded legs drawn up at the knees.

Formation

All of the FFT-1 faces were constructed separately and either wrapped around or pressed against necks extending from what appear to be slab or flattened cylinder bodies. Eyes are EFT-5 gouges on one sample, EFT-3 slits on the remaining three. NFT-7 noses are crudely modeled, applique fillets. Mouths are incised gouges low on the faces.

Headpieces of the remaining four heads are missing so their construction cannot be discussed.

Three heads have either double or single roll nFT-1, 2 necklaces applied before the earspools.

Color

Red (2.5YR, 5/6) pigment remains on the face of one HH-15 head. One head is of dark gray clay (5YR, 4/1), probably due to firing. One heads is of pink (7.5YR, 7/4) clay.

HH-16*, NBA

Description

The two heads in this category have prognathic faces, gouge/slit eyes, gouge mouths, and applique fillet noses.

Formation

One head was probably formed by pressing an oval lump of clay against a finger or a stick. There is no indication of a neck or of how the head was attached to a body. The eyes of this head are uneven EFT-5 gouges, as is the MFT-2 mouth. No headpiece remains.

The other head has a relatively large (4.5 cm. long) FFT-2 face formed separately and pressed against a neck core. Because the NFT-5 applique fillet nose is very close to the protruding upper lip, the face has an animal-like look. The EFT-8 eyes are slits with modeled pieces of clay above them to suggest large, bulging upper lids.

Color

The heads are of brown (7.5YR, 5/2) and light brown (7.5YR, 6/4) clay.

HH-19*, NBA

Description

The three HH-19 heads are of the god Xipe Totec and feature the typical circular, indented mouths and eyes, no noses, and rolled chin and headbands.

Formation

Though Xipe Totec heads span the Early Tzacualli, Miccaotli and Early Tlamimilopa periods, the similarity of head size (2.7 to 2.8 cm. high and 2.3 to 2.5 cm. wide) and the same .5 cm. diameter EFT-9 eyes and mouth[5] argue for the same period, and perhaps the same location of formation for the three samples in this sub-category HH-19.

The heads are type FFT-2, but the faces tend to be much thicker (1.3 cm to 1.7 cm.) in comparison with other faces of this formation type.

Headpieces are formed by encircling the face (toothache-band style) with a rolled clay band, overlapping the ends on the top of the head. Over this,a rolled clay band of approximately the same diameter

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[5]Though no record exists, early Xipe Totec faces could have been made with unnaturally shaped and sized mouths and eyes because of the traditional association of the god with rites of penitence (Sejourne 1956) and springtime fertility of plants. During Aztec times war captives were skinned alive during the feast honoring Xipe Totec, and priests donned these skins, their eyes and mouths exposed through the enlarged facial openings of the victim's skin. Whether or not the Teotihuacanos conducted such ceremonials is not known.

is applied to form a forehead cover whose ends extend around the back of the head and almost touch there.

Color

Only one head, the smallest, retains a red (2.5YR, 5/6) pigment. One is very dark gray (7.5YR, N3/) because of firing, and the remaining head is pinkish gray (7.5YR, 6/2).

6. Miccaotli, Early Tlamimilopa

HH-14*, HB-32

Description

The ten HH-14 heads have cap/banded headdresses, prognathic faces, applique roll necklaces, slit eyes and mouths, and no earspools. There are three major size ranges of HH-12 faces:

1) large - 2.2 to 2.7 cm. in length (two examples),
2) medium - 1.5 to 1.8 cm. in length (four examples), and
3) small - 1 to 1.3 cm. in length (three examples).

Formation

Faces were constructed separately and applied to two kinds of necks:

1) Flat, broad necks which are "cookie-cutter" extensions of slab-constructed flat bodies. (The three large FFT-1 faces and one medium face had this type of neck.)
2) Small, narrow cylinder necks around which the FFT-2 faces are wrapped. (The remaining three medium faces and the three small faces had this type of neck.)

The noses are either NFT-6 applique fillets or NFT-9 pinched facial clay. Regardless of their mode of formation, noses seem to be the first facial features formed. Eyes and mouths follow in an indeterminate sequence.

Headpieces are hFT-2 rolled clay forehead band cylinders from .4 to .8 cm. in width which are wrapped around the heads but do not meet in the back. Two of the small heads indicate that the faces extend or protrude above the forehead bands. One small and one medium head have their hFT-3 forehead bands flattened into a type of cap/hat. One small and one large head have flaps extending down from the forehead band along the sides of the face to form HFT-4 headpiece.

Necklaces, like headpieces, are applique rolled clay cylinders (nFT-1, 2) wrapped from the front to just over the sides of the neck.

Color

Seven of the ten HH-14 samples retain pigment:

Color	Munsell Notation	Number of Examples
Brown	7.5YR, 5/2	1
Strong brown	7.5YR, 5/6-5/8	3
Light reddish brown	5YR, 6/4	1
Reddish brown	2.5YR, 4/4	1
Red	2.5YR, 5/8	1

HH-14, HB-32*

Description

The three examples in category HB-32 are female figures clothed in simple, unadorned, straight front quechquemitls and long, ankle-length skirts.

Formation

The bodies are BFT-7 flattened cylinders with separate cylinder legs attached. The skirt is of thin (.2 cm. thick) cFT-1 slab formation wrapped around the waist of the front of the body, extending only slightly around the back. The quechquemitl is also of thin slab formation wrapped around the body to form rounded shoulders. Necklaces are nFT-1, 2 single or double clay rolls wrapped, like the skirts and quechquemitls, three quarters around the body.

Color

None of the three HB-32a bodies retains pigment. Two are of light reddish brown (5YR, 6/4) clay,and one is of reddish brown (5YR, 5/4) clay.

7. Early Tlamimilopa

HH-6*, NBA

Description

HH-6 is represented by only one example. The face is jowly, and prognathic, with the double gouged eyes discussed in conjunction with HH-9, and an open mouth. The headpiece is missing. There are no earspools.

Formation

The FFT-2 face is made separately and attached to a neck cylinder. The lower part of the face clay is pinched laterally to force it forward. The tip of this raised portion is gouged to form an open MFT-2 mouth. The NFT-2 nose is an unmodeled applique fillet; the EFT-4 eyes are browless double gouge/slits.

Color

HH-6 is light brown (7.5YR, 6/4) pigmentless clay.

HH-8*, HB-7, 8, HA-2, 3, 4, 5, 6

Description

The two examples of HH-8 are bald, flattened crania heads with horizontal, deeply depressed slit eyes (EFT-3), no brows, missing fillet noses, slit mouths low on the face, and no ears or earspools. These heads are approximately 2.8 cm. high and .8 cm. thick.

Formation

The FFT-2 faces are applied to neck cylinders flattened against the backs of the faces. One sample retains two flattened, rolled tabs pressed against the back of the head. Their position at the sides might suggest that the rolls may have been horn-like projections. This same head has gray diagonal strips at intervals across the forehead which, combined with tiny ridges of applied clay at the tips of the diagonals, would suggest that thin rolls of clay were applied to the forehead and draped over the top of the head, ending in the back.

Color

The heads are of reddish brown clay (5YR, 5/3).

HH-8, HB-7*, 8, HA-2, 3, 4, 5, 6*

HB-7 bodies are the small (none exceed 5 cm. from neck to buttocks), handmade, active nude bodies traditionally known as "danzantes" or dancers because of their contorted positions. Within this classification there are several sub-classifications assigned according to body position.

HB-7a

Description

These figures are characterized by the torso twist, arched back, and extended arm position bodies assume in order to throw an object. Though none of the fourteen samples in this sub-classification retain both arms, there are sufficient arm extensions to suggest that both arms were extended, one for throwing and one for balance. The hands appear as grasping mittens at the end of cylinder arms bent at the elbow. Of the sixteen hand samples, only one retained a tubular stick-like form in its closed grasp. There are no finger delineations in this hand sample.

The legs are cylindrical with a slight bend at the knee. There is no bone or muscle articulation, only a uniformly thick cylinder bent at the upper one third to allow a thigh area of approximately one-third the length of the leg.

The fFT-1 feet are of three types:

1) Feet with flattened flap foot at right angles to ankle/ leg. Twelve samples retained a leg, slightly bent at the knee; ten samples did not have a leg attached.
2) Feet and legs with cracked-off toe area, probably the same type as 1 above.
3) Feet with flattened flap foot, relatively heelless with obtuse angle bend at the ankle.

Formation

The BFT-6 torsos were constructed in four units. The upper chest and back, shoulders, arms and hands are formed from a single cylinder and attached like a "T" cross bar a the body cylinder pressed laterally to form the waist. The LFT-2 legs and neck are formed separately and added to the torso cylinder. Grasping HFT-2 hands are formed by splitting and pressing the arm cylinder into mitten fingers and a thumb. These are then curled around a tubular object, most often enclosing it completely so that the finger and thumb tips meet.

The flap foot formation has been discussed previously in connection with HA-7a.

Color

Two of the ten sample bodies retain red pigment (10R, 5/6). Those figures which are not pigmented are light reddish brown (5YR, 6/4) or dark gray (5YR, 4/1).

HB-7b

Description

BFT-6 torsos in this sub-classification have the torso twist and arched back of HB-7a above, but have, in addition, scored buttocks. Arms, hands, legs, and feet probably resemble those of HB-7a.

Formation

These bodies appear to have been formed in four units as were HB-7a, but joinings are generally more carefully concealed by smoothing the clay while still damp.

Color

Only one of the eighteen HB-7b torsos retains a reddish brown pigment (2.5YR, 4/4). The remaining seventeen are light reddish brown (5YR, 6/3-6/4).

HB-7c

Description

There are only five examples of this sub-classification. HB-7c, BFT-6 torsos are like all the previous sub-classification except that the area where the neck was joined to the torso is on the back, roughly between the shoulder blades. These figures probably had their heads thrown back.

Formation

Unlike the torsos in previous sub-categories, these torsos seem to have been constructed by rolling a smooth thick cylinder, attenuating one end and tilting it backward to become the neck. Arms are independent cylinders, AFT-2, joined to the torso. Four of the samples have the torsos and joining areas well-smoothed over; one retains finger impressions and untouched joining area.

Color

Four samples are light reddish brown (5YR, 6/4) clay; one retains reddish yellow pigment (5YR, 6/6).

HB-7d

Description

These forty-four torsos show no evidence of a twist. They are upright frontal cylindrical torsos.

Formation

The BFT-7 torsos are cylindrical rolls flattened from the front and back. The legs, arms, and neck are cylinders joined to the body. The joining areas are concealed by applying thin layers of clay and smoothing them into surrounding areas. Eighteen of the larger torsos have smooth, concealed joining surfaces. The remaining eighteen have irregular, obvious joining surface. These torsos were the smallest of the sample.

Color

Thirty-nine torsos are light brown (7.5YR, 6/4). Three retain evidence of red pigment (10R, 5/6); two retain evidence of reddish- yellow pigment (7.5YR, 7/8). The five pigmented torsos are crudely constructed.

HB-7e

Description

There are only four torsos in this sub-classification. They are the largest of the HB-7 category, measuring from 4 to 5 cm. in length. These torsos are carefully modeled with refinements such as scored buttocks, and in one instance, a punctate dot navel along with what appears to be a right breast. This is the only occurrence of a sexual distinction in the entire nude body sample.

Formation

These BFT-1 figures seem to have been constructed by the partial joining of two clay cylinders to form the torso, modeling the unjoined ends into legs. The natural joining line of the torso cylinders is left to delineate the buttocks. A thin layer of clay is pressed over the joining on the abdomen/chest and back and is smoothed into the legs and arms made of separate clay rolls joined to the body. The single torso with navel and breast has the navel formed by pressing a sharp pointed tool/stick slightly to the left of center. The breast is a ball of clay attached to the extreme right side of the upper torso. One torso has a distinct groove formed by passing a smooth stick/tool between legs. Another fragment (not classified as HB-7e) has the same groove, but through the center of the abdomen rather than between the legs. Both grooved torsos appear to have had separate necks joined at the back to give the head the thrown back appearance of HB-7c torsos.

Color

These figures are of reddish brown clay. One is colored through firing, exhibiting light red (2.5YR, 6/8) and reddish yellow (5YR, 6/6).

HB-7, 8*, HA-2, 3, 4, 5, 6

Description

There are twenty-four examples of this nude, sexless, seated torso. Two positions can be determined by the remains of legs and/or break off positions:

1) seated crosslegged with the left foot tucked under the thigh of the right leg and the right foot tucked under the left calf; and
2) seated with legs together and knees drawn up in front.

Four figures have stomachs formed by attached pieces of clay to the torso. These figures are seated in position 2.

Formation

These figures seem to have been formed in two ways:

1) A BFT-8 rolled clay cylinder body with rolled clay cylinder legs attached under the body and joined to form buttocks constitutes the first manner of construction. Twenty of the HB-8 torsos were formed in this way. The torsos range in size from 3 to 4 cm. in height. Where present, legs do not have knee or angle articulation. They are simple cylinders bent to form knees and tapered at the ankles. No feet are present.
2) Two rolled clay cylinders are pressed together at one extremity to form the torso and are left separated at one end to form the legs (BFT-1). There are three examples of this type of formation.

Color

Only two torsos appear to retain traces of yellow (10YR, 8/8) pigment. Three are red, but as a result of firing coloration rather than the addition of pigment. The remaining nineteen torsos are of light brown (7.7YR, 6/4) clay.

HH-13*, NBA

Description

The two HH-13 heads have offset, "tam-o-shanter" hair tufts on otherwise bald heads, gouge/slit eyes and mouths, pinched noses, depressed eye sockets, and remains of earspools.

Formation

On both examples the FFT-2 faces were constructed separately from a small round piece of clay flattened and attached to a neck cylinder with the rounded sides wrapped around the neck far enough to touch in the back of the neck/head. The baldness lends the 3.1 cm. faces an excessively high-foreheaded appearance.

The NFT-9 nose and depressed eye sockets were made by a single pinching formation motion which probably served two functions:

1) pinching the center of the face clay had the effect of raising a nose bridge while simultaneously depressing the eye-sockets, and
2) pressing the round flat face more permanently against the neck cylinder.

Nostrils are double slits at the base of the pinched nose while the mouth is a MFT-3 incised gouge low on the prognathic face.

The CFT-1 hair tufts (on the right side of one head and on the left of the other) are composed of two pieces:

1) a clay support piece fastened diagonally to the right or left side of the back of the head after the face was wrapped around the neck core and earspools were applied, and
2) a roll of clay wrapped around the support piece, but not overlapping in the back.

On one head the hair tuft support wedge appears to have extended over the top of the smooth hair tuft. On the other head the support wedge seems to have remained below the top of the diagonally-scored hair tuft. On this head there are remains of a smaller left tuft.

Some earspools seem to have been pressed tightly against the sides of the heads instead of being placed at right angles to them. One sample retains a right eFT-3 earspool.

Color

The double-tufted, scored headpieces head retains traces of red (2.5YR, 4/6) pigment on the brown face clay (7.5YR, 4/2). The other head is of light brown clay (7.5YR, 6/4).

HH-16* NBA

Description

The one head in this category has a prognathic face, deeply gouged eyes in depressed eye sockets, central "Mohawk" hair crest, and earspools.

Formation

The FFT-2 face was formed separately and wrapped around a neck core. Eye depressions were formed as the NFT-9 nose clay was pinched upward. Eyes are very deep EFT-5 gouges which give a cavern-like appearance to the eyes. The mouth is missing. Earspools are appliqued; however both are too damaged to determine their style. The CFT-2 "Mohawk" hair crest is a roll of clay with attenuated edges extending from the back of the head over the center of the forehead.

Color

There are remains of red pigment (10R, 5/6) over the entire head.

HH-17*, NBA

Description

HH-17 contains four miscellaneous heads with slit-gouge eyes and mouths and headpieces. Two of the faces are similar in that they are both small (2.5 cm. in length), are less prognathous than the remaining two faces, and have flat headpieces. The two remaining faces are medium-sized (3.3 cm. in length), very prognathous, and have tall, somewhat elaborate headpieces.

Formation

The two smaller heads have FFT-2 faces. Eyes are EFT-3 slits, mouths are MFT-4 incised gouges. Noses are missing. One headpiece, HFT-5, had three cleft incisions, though only the center and left incisions remain. The forehead edge of this headpiece is indicated by a horizontal scored line across the forehead. The other headpiece was a hFT-6 double roll band, flattened around the sides of the head.

The two medium-sized faces were formed by flattening the front and back of one end of a clay ball to form the forehead area, and pinching the sides of the other end between the fingers to produce the lower face. This face formation type is called FFT-5. The eyes are EFT-5 and mouths are MFT-3. Noses are NFT=7 - applique, modeled fillets.

One head was a wide wrap-around, flattened roll headpiece with random blunt tool depressions, probably to suggest cotton - hFT-7. This head is pressed against a back panel slab.

The other headpiece is a 1 cm. wide roll of clay curved around the face and pressed into the head at the jaw. The roll is randomly gouged to suggest hair, CFT-3. A flat tab of clay extends up from behind the head and has a .4 cm. wide roll of clay wrapped around it, hFT-8. Hollow eFT-2 earspools were added after the hair.

Color

The cotton headpiece head retains a red pigment (10R, 5/6) overall. The other has a reddish yellow (7.5YR, 6/6) pigment on the face only. The headpiece clay is light brown (7.5YR, 6/4). There is a red pigment (2.5YR 4/6) over the entire front of the small, cleft-headpiece head. The remaining small head is dark gray (7.5YR, N/4).

HH-22*, NBA

Description

The remaining right half of a hollow head, HH-22, seems to be a combination of moldmade and handmade techniques. Red pigment is concentrated, goggle-like, over the eye, ear remains, horn-like headpiece protrusion, nose, and mouth. The half-head is relatively large: 5.2 cm. high and 3.0 cm. wide from nose to ear.

Formation

The head seems to have been mold-made from a mold having EFT-4 eyes, NFT-5 nose, and MFT-6 mouth. The horn-like protrusion seems to be part of a cap whose forehead edge is suggested by a depression above the brow area. The ears seem to have been the only handmade portion on the head. However, only remnants of the right ear remain, so the handmade ear construction is a conjecture based on the relative impossibility of including the ear in a mold.

Color

There is red (2.5YR, 5/8) pigment applied selectively to the head and at the base of the neck to suggest a garment.

8. Early and Late Tlamimilopa

HH-23*, NBA

Description

HH-23 comprises two hollow, lower human face fragments.

Formation

A thin (.4 cm.) slab of clay was placed over a curved surface to provide a convex shape for the face. Noses are NFT-5. Though both mouths are MFT-7, one fragment has a long, shallow, thin-lipped mouth while the other has a short, deep, wide-lipped mouth.

Color

One face bears light red pigment (10R, 5/8) and the other is of reddish yellow (5YR, 6/6) clay.

9. Late Tlamimilopa

HH-7*, HB-7, 8, HA-2, 3, 4, 5

Description

The eight heads in category HH-7 are characterized by slit eyes and mouths, applique modeled noses, baldness, and no earspools. The heads are associated with the same bodies and appendages discussed above in connection with HH-8 heads.

Formation

The faces are modeled by hand and attached to separate necks. There are two basic styles of HH-7 heads:

1) "Bozo" round FFT-2 faces (never more than .8 cm. thick) are pressed onto neck cylinders which run all the way up the back of the face. These three faces have long, horizontal slit EFT-3 eyes (approximately .7 to .9 cm. in length), deeply depressed, without brow delineation. The NFT-6 nose is an applique fillet of clay modeled into the face; the nostrils are depressed slits at the base of the fillet. The mouth is a long (.8 to 1 cm.) depressed MFT-2 slit at the bottom of the face. There is no chin.
2) Elongated FFT-4 faces (1.3 to 1.8 cm. thick) attached to thin neck cylinders at 45 degree angles. The neck/face joining is smooth and almost invisible. These five faces have deeply depressed

EFT-3 horizontal slit eyes; four of the five faces have deeply depressed EFT-3 horizontal slit eyes; four of the five having brow delineation achieved either by pressing a flat, curved tool well above the eye slits to suggest the skull's supraorbital arches covered by the brows, or by depressing a flat, very slightly curved tool close to the eye slits. NFT-6 noses are applique, modeled fillets whose root begins at the juncture of the brows. Nostrils are horizontal slits at the base of the nose. MFT-7 mouths are long, horizontal slits so low on the face that there is no chin. Only one of these five faces has MFT-5 upper lip articulation produced by cutting away two semi-circular pieces that meet in the center to form a bow upper lip. The lower lip is deeply undercut to provide a mentolabial sulcus and a slight chin protrusion. This head also has ear depressions parallel with the eyes. Displaced clay is pushed back to form the auricle.

Color

The "Bozo" faces are pinkish gray (7.5YR, 6/2), light brown (7.5YR, 6/4), and brown (7.5YR, 5/2). The elongated faces are red from firing (2.5YR, 5/6), light reddish brown (5YR, 6/4), and dark gray (7.5YR, N/4).

10. Summary

Descriptive data for the TC-8 heads and related bodies and appendages were presented according to a format consisting of 1) description of the head/body/appendage type; 2) formation technique types, and 3) color assignation according to the Munsell Soil Color Charts. Finally, summary tables indicate the incidence of formation technique types with Kolb classification subcategories and subsets.

TABLE 88
INCIDENCE OF HANDMADE HEAD SUBSETS WITH FORMATION TECHNIQUE TYPES FOR FACES, EYES, NOSES, AND MOUTHS

Formation Technique Type Number	Face Formation Type (FFT)	Eye Formation Type (EFT)	Nose Formation Type (NFT)	Mouth Formation Type (MFT)
1	HH-1, 14, 15; HB-31	HH-1	HH-1, 2, 6, 10	HH-2, 7, 12, 14
2	HH-2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 19, 25	HH-2, 4	HH-10, 12	HH-1, 4, 6, 7, 11, 14, 15, 16
3	HH-9	HH-7, 8, 12, 15, 17, 18	HH-10	HH-12, 13, 17; MH-1
4	HH-7	HH-6, 9, 11, 22	HH-25	HH-12, 17, 25
5	HH-17	HH-5, 11, 12, 15, 16, 17; MH-1	HH-16, 22, 23	HH-7
6		HH-4, 10, 11	HH-7, 14; MH-1	HH-14, 22
7		HH-10	HH-15, 17	HH-23
8		HH-16	HH-10; MH-1	
9		HH-19	HH-10, 11, 12, 13, 14, 16	
10		HH-25	HH-10, 11	
11		HH-13		

TABLE 89
INCIDENCE OF HANDMADE BODY SUBSETS WITH FORMATION TECHNIQUE TYPES FOR BODIES AND CLOTHING

Formation Technique Type Number	Body Formation Type (BFT)	Clothing Formation Type (cFT)
1	HB-6A, 7e, 8, 31	HB-32a
2	HB-25a	HB-32a
3	HB-25b	
4	HB-25c	
5	HB-28	
6	HB-7a, 7b, 7c	
7	HB-7d, 32a	
8	HB-8	

TABLE 90
INCIDENCE OF HANDMADE APPENDAGE AND BODY SUBSETS WITH FORMATION TECHNIQUE TYPES FOR ARMS, HANDS, LEGS, AND FEET

Formation Technique Type Number	Arm Formation Type (AFT)	Hand Formation Type (HFT)	Leg Formation Type (LFT)	Foot Formation Type (fFT)
1	HA-7	HA-7	HA-1	HA-2, 3, 4, 5, 7
2	HB-7c, 7d	HB-7; HA-5		HA-7a, HA-14
3		HA-14		
4		HA-9		
5		HA-9		

TABLE 91
INCIDENCE OF HANDMADE HEAD AND BODY SUBSETS WITH FORMATION TECHNIQUE TYPES FOR HEADPIECES, COIFFURES, EARSPOOLS AND NECKLACES

Formation Technique Type Number	Headpiece Formation Type (hFT)	Coiffure Formation Type (CFT)	Earspool Formation Type (eFT)	Necklace Formation Type (nFT)
1	HH-1, 12, 25	HH-13	HH-1	HH-1, 14, 15, 25
2	HH-5, 14	HH-16	HH-1, 2, 4, 17	HH-14, 15, HB-32a
3		HH-17	HH-1, 13	HH-14
4	HH-14, 17	HH-2	HH-11	
5	HH-17	HH-4		
6	HH-14, 17			
7	HH-17			
8	HH-17			

TABLE 92
QUANTITY AND INCIDENCE OF HANDMADE HEADS AND ASSOCIATED BODIES AND APPENDAGES WITH CHRONOLOGICAL PHASES

Chronological Phases	Heads	Number in Sample	Bodies	Number in Sample	Appendages	Number in Sample
Tzacualli:						
Early	HH-1	5*	HB-6a	22*	HA-7	22*
	HH-2	1*	HB-19	0		
	HH-4	1*	NBA			
	HH-9	1*	HB-31	1*		
	HH-11	13*	HB-28	2*		
Late	HH-4	1	NBA			
	HH-5	1*	NBA			
	HH-9	1	HB-31	1		
	HH-10	13*	HB-9, 25	0, 5	HA-1	7*
	HH-11	13	HB-28	2		
	HH-25	4	NBA			
Miccaotli:	HH-4	1	NBA			
	HH-5	1	NBA			
	HH-10	13	HB-9, 25	0, 5	HA-1	7
	HH-11	13	HB-28	2		
	HH-12	9*	HB-28	2		
	HH-14	10*	HB-32	3*		
	HH-15	4*	NBA			
	HH-16a	2*	NBA			
	HH-19	3*	NBA			
	HH-25	4	NBA			
Tlamimilopa:						
Early	HH-6	1*	NBA			
	HH-7	8*	HB-7, 8	80, 24	HA-2, 3, 4, 5	119
	HH-8	2*	HB-7,8	80, 24*	HA-2, 3, 4, 5	119*
	HH-13	2*	NBA	3		
	HH-14	10	HB-32			
	HH-16b	2*	NBA			
	HH-17	4*	NBA			
	HH-22	1*	NBA			
	HH-23	2*	NBA			
Late	HH-7	8	HB-7,8	80, 24	HA-2, 3, 4, 5	119
	HH-23	2	NBA			
Total		89		137		148

*Note: Some of the Kolb classification heads, bodies, and appendages appear in more than one chronological phase. Because of the similarity of samples in each sub-category, it was not possible to place samples within their exact chronological phase. Thus, if HH-4 heads occur in Early and Late Tzacualli and Miccaotli phases, the same total number of examples of HH-4 in the TC-8 collection appears each time the sub-category is repeated. The first appearance of a subcategory sample number is followed by an asterisk. The totals at the end of the table are the sums of only the numerals with asterisks.

D. STYLISTIC ANALYSIS OF HANDMADE FIGURINES

> "Style is, above all, a system of forms with a quality and a meaningful expression through which the personality of the artist and the broad outlook of a group are visible. It is also a vehicle of expression within the group, communicating and fixing certain values of religious, social and moral life through the emotional suggestiveness of forms" (Shapiro, 1953:287).

Within this stylistic analysis, the descriptive elements discussed in the previous chapter are considered as three systems:

1) a form or style system: the recurring commonality of figurine forms of style;
2) an iconographic system: the meanings of the figurines to the Teotihuacanos and
3) a functional system: the purposes served by the figurines for the Teotihuacanos.

The chronological plan of the preceding section is retained as a format for the stylistic analysis. In order to trace specific style, and hence, iconographic systems more carefully, the following form and formation of specific features will be considered within each chronological period:

1) heads (including eyes, noses, mouths, and coiffures)
2) bodies and appendages (including arms, legs, hands, and feet)
3) clothing
4) ornamentation (including earspools, necklaces and headpieces) and
5) color

The iconographic analysis and the examination of the possible functions of the figurines follows.

Clearly, investigations into purposes or functions of figurines produced by a long-dead civilization require an archaeological approach, while examinations of style and meaning require an art historical approach. As Paul Keleman (1946) has indicated, the tasks of the archaeologist and the art historian, while different, complement one another. Part of the archaeologist's approach is to construct the unknown from the known. To do this, the archaeologist frequently draws upon the assumption that cultures, even though they may be separated by space and time, have structural similarities; and further, if one wishes to understand one culture about which little is known, one can extrapolate from a culture which seems to have achieved a similar level of development and which is better known. The art historian/educator interprets that which is known in relation to the arts of the rest of the world as well as to contemporary people.

1. Early Tzacualli: 100 B.C.-A.D. 100

The descriptive analysis of the Early Tzacualli phase figurines represented in the TC-8 sample indicates that they were generally small (under 8 cm.) figures with simple nude and semi-nude bodies, rudimentary appendages, and prognathic faces. Facial and body features and adornments (necklaces, earspools, headpieces) are either drawn into the clay or are applied fillets. Frontality characterizes these figurines. All the clues to their formation were derived from "rear views" because the back of the figures were left unfinished. Since only the fronts received the craftsperson's attentions, it would appear that the figures were meant to be looked upon (perhaps lying in the palm of the hand or positioned somewhere in the owner's home[1]).

Heads

Early Tzacualli phase heads (HH-1, 2, 4, 9, 11) would be more correctly called faces insofar as the examination of their formation[2] reveals that the heads were the result of the application of a preformed face to a neck cylinder, a body cylinder, or upper arm cylinders pinched upward to become a neck support for the face. The prognathism associated with the handmade faces from this period (and indeed, even into the next period) could be the result of the positioning pressure of the craftsperson's fingers applying the face to the neck or body extension and modeling the extension against the face to become the flat back of the head (see Plate 150). The faces are reduced to their barest anatomical essentials.

Eyes

Eyes are of five types:

1) coffeebean
2) slits with displaced clay forming upper and lower rim-lids
3) horizontal slits
4) two horizontal gouges, slightly separated, form each eye. The tiny separation areas suggest pupils
5) horizontal gouges (see Plate 150).

Eyes are perfunctory, they are not functional eyes, rather they are conceptual representations of eyes. Attention to eye formation, however, provides valuable information about the mood or expression conveyed by the tiny faces. On the whole, because the formation of slit eyes displaces a minimal amount of clay and hence minimalizes possibilities of facial clay distortion, slit eyes tend to be positioned closer together and give the faces an expression of wise, though passive, scrutiny. On the other hand, because gouging eyes out of facial clay displaces greater quantities of clay and thus can distort facial expression, gouged eyes are positioned further apart and lend a more open, solemn mien to the face.

Noses

Where present, noses are applique fillets with joining areas revealed; or raised surfaces resulting from pinching facial clay upwards between the fingers; or the nose is merely suggested by pressing the facial clay forward between the fingers to form a wolf-like snout that serves as both the nose and the mouth. The latter method seems to have been used on the earliest Tzacualli figurine faces.

Mouths

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[1]The samples studied in this thesis were found in rooms of the houses used by the nuclear family and not in the outdoor altar courtyards or at the pyramid worship/ceremonial location. The room sample findings could have been floor debris or wall or ceiling fill (see Chapter 3, Part 1, this volume).

[2]Technique, subject matter, and material are generally given a secondary position in the analysis of art works (particularly modern works), while formal and qualitative features receive primary attention. However, this order may have to be reversed when one attempts to analyze the work of an ancient culture such as that of Teotihuacan. Though he is speaking of the importance of the instruments used in a craft, Arnold Hauser's statement can be extended to include the craftsperson's earliest tools, his or her hands, and the resulting formation techniques:

> "Besides the factors rooted in social reality or determined by the desire for self-expression, there is the whole apparatus of the craft, of instruments that are gradually and progressively perfected, as in any other technique. This apparatus has its own history, which is on the whole one of continuous progress attributable to immanent causation . . . . Even the formal and representational elements in art manifest certain intrinsic developmental trends independent of the circumstances and aims of the particular artist . . ." (Hauser quoted in Wicke, 1971:110).

Like the eyes, the mouths are either slits or gouges and occur low on the face. As in the case of the formation of the eyes and the noses, this would seem to indicate that the craftsperson was more concerned with conceptual representations (possibly because of the need for what could be termed mass-production techniques) than with careful realism in dealing with the human form.

Coiffures

Early Tzacualli heads are either bald or have headpieces on seemingly bald heads. The baldness could result from the desire to represent bald figures, or it could be a formation by-product in that attention was paid to the face rather than to the head. Since the head was really only a flat, frontal face, the hair could have been left to the imagination of the viewer/user as were other body characteristics like navels, breasts, and buttocks.

Bodies and Appendages

Bodies

Two types of bodies recur in the Early Tzacualli phase:

1) the joined cylinder body (see Plate 162)
2) the truncated cone body (see Plate 163).

The bodies seem to play a minimal role in the aesthetic of the figurines in that very little formation attention is given to them. They merely support the face and appendages. The truncated cone body form acts as both clothing and a base support. It is probably an incipient "princess" figure - the kneeling or seated female figure so common among the moldmade figurines of later periods.

Appendages

Arms are generally straight cylinders joined at roughly 90 degree angles to the bodies. There is an occasional bent elbow. Hands are mitten-like, either slightly cupped or flat with no finger delineation. The incipient princess bodies feature a triple purpose arm. The flattened balls of clay applied to the sides of the conical body serve simultaneously as arms, sleeves, and (at the pinched in upper arm/shoulder area) neck. Clay fillet feet may or may not protrude from under the edge of the cone-garment. The cylinders joined to form the bodies are left unjoined to serve as legs on the remaining body type. The legs end in a folded-over flap foot or a folded-over T-shaped foot. Since neither of these foot types seems capable of supporting a body, these figurines were either hand-held or propped up against something else.

Clothing

When clothed, the joined cylinder bodies wear taparrabas or loincloths in four styles (see Fig. 271), so it may be assumed that these are male figures. Female clothing is represented by the conical, all-in-one "princess" figure.

Ornamentation

Earspools

The earspool was an ornament worn in the lobe of the ear of both sexes throughout Mesoamerica (Sejourne, 1966). The earspools worn by the Early Tzacualli figures feature either gouged or depressed centers which would put them in the category of "napkin ring" earspools[3] Fig.275 illustrates this style of earspool and gives the nomenclature of earplug assemblage (Kidder et al., 1946:106).

According to Kidder (1946:106),

> "The edge of the backing rested against the mastoid, holding the ornament at right angles to the head, the flare to the front. To accommodate even the stem, the ear lobe must have been pierced by a sizable hole; but this, if the plug was to fit snugly, could not have been large enough to allow passage of either flare or backing."

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[3]Mesoamerica earspools are of two basic types: "napkin ring" and disc/plug. Kaminaljuyu burial remains indicate that the spools could be made of clay, shells, jade,copper, or wood (Kidder, et. al., 1946).

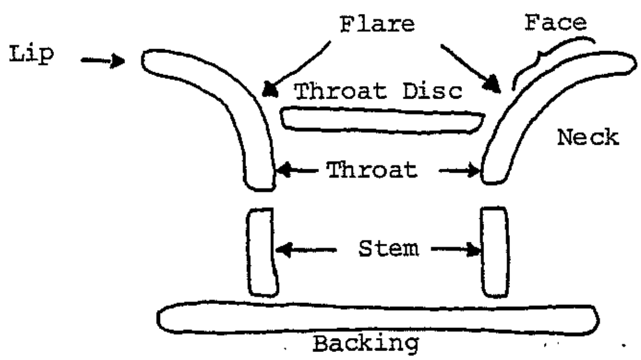

Fig. 275. Napkin Ring Earspool Assemblage

It would seem that the earspools were relatively though greatly simplified faithful representations of articles in common use at the time. It is almost as though the craftsman was most self-assured when representing ornamentation, for these adornments were human constructions resulting from practical know-how. In order to enable the earspools to stand out at right angles to the head, craftspersons often applied small props of clay behind the earspools.

Necklaces

Necklaces were simple single or double applique cylinders sometimes applied prior to sometimes after, the earspools. There was a method of scoring a single band of clay to give the appearance of a double band. Necklaces cover only the front of the figures and extend only slightly around their backs, giving additional emphasis to the frontality of the figure.

Headpieces

Where headpieces appear, they are turbans which extend only three-quarters around the head and extend out from the head on the sides. These turbans can have a center applique dot as ornamentation. According to Sejourne (1966) these headpieces are modeled after real headgear that was probably constructed from rigid materials or had an interior truss or support.

Color

The only Early Tzacualli sample with pigmentation applied to the clay was a "princess" body which had remains of a reddish yellow pigment, probably due to post-firing coloration. All of the rest of the samples are of unpigmented, naturally-colored, clay.

2. Late Tzacualli: A.D. 100-200

As in the case of the Early Tzacualli figures, those of the Late Tzacualli phase are small, semi-nude bodies. However, during this phase, the bodies exhibit perforations: from front to back at the base of the neck; from side to side at the base of the torso; and from top to bottom of the torso. Frontality persists, as does extreme facial prognathism and simplified features.

Heads

Of the Late Tzacualli phase heads (HH-4, 5, 9, 10, 11, 25), HH-4, 9, and 11 also appear in the Early Tzacualli phase and thus have been discussed in the foregoing section.

The cleft-head appears most frequently in the Late Tzacualli phase. Prognathism seems to be due to the application of the pre-formed face to a neck cylinder. The remaining face forms are also prognathic attachments to separate neck cylinders.

Eyes

Eyes are elaborated upon during this time and are of two types:

1) gouge/slits with applied fillets to suggest lids
2) gouges or depressions with protruding applique dots as eyes.

Noses

Noses are simple, unmodeled applique fillets with occasional slits for nostrils.

Mouths

Mouths continue to be somewhat haphazard gouge/slits at the end of a prognathic face.

Coiffures

In view of the demands for simplicity of form necessitated by the quantity production system which seems to have been used by the craftpersons, the cleft heads could have suggested a simple, smooth coiffure, parted in the center (Sejourne, 1966). Figures with headbands have no coiffures.

Bodies and Appendages

Bodies

Perforated torso bodies seem to have had two types of functional perforations:

1) A perforation from front to back at the base of the neck and a perforation from the top to the bottom of the torso. Either perforation was probably made so that a supporting cord could be passed through and either looped or knotted so that the body could be suspended. Such bodies seem to have been flattened cylinders and wear loincloths.
2) A perforation from side to side on the lower torso, probably so that a cord could be passed through and knotted to puppet-like legs. These bodies are round cylinders.

Appendages

The flattened cylinder bodies with type 1 perforations have remains of cylinder arms and legs joined to the torso cylinder. The rounded cylinder bodies with type 2 perforations have straight, flattened cylinder puppet legs (see Fig. 273).

Clothing

Type 1 perforation bodies wear simple taparrabos or loincloths which are more like waistbands, applied so that they do not interfere with leg positioning. Occasionally these taparrabos are placed so that they cover the cylinder leg joining areas. Type 2 perforation bodies are nude and seemingly genderless.

Ornamentation

Earspools

Where present, earspools are of the napkin ring variety reproduced by depressed-center dots of clay. Only cleft-head types retain traces of earspools.

Necklaces

The single, applique band necklace appears only on the heads wearing the wide headpieces discussed next.

Headpieces

Headpieces are wide, flat bands (1.5 cm. - the same height as the face below) wrapped around the face and reaching three-quarters around the head. These headpieces are unadorned.

Color

Color in the form of probably post-fired pigment seems to appear more often in the Late Tzacualli samples than in the Early Tzacualli ones. When it occurs, facial pigment is reddish yellow. Red pigment appears on Type 1 perforation/pendant bodies. Puppet legs have no pigment coloration.

3. Miccaotli: A.D. 200-300

During this phase, the faces are still prognathic (with the exception of the Xipe Totec faces which appear at this time) but eyes and noses begin to receive more careful formation. Headpieces with a wider variety of forms and decorations also appear.

Heads

Heads found in the Miccaotli sample are HH-4, 5, 10, 11, discussed in the Early and Late Tzacualli phases - and HH-12, 14, 15, 16a, and 19.

Faces attached to slab body extensions or to neck cylinders continue, and hence the prognathism continues. There is a tendency for larger faces to be attached to body slabs and smaller faces to be attached to neck cylinders. The Xipe Totec heads identified with this period represent a divergence in formation techniques and hence lack the prognathism common among the other heads/faces.

Eyes

There is a predominance of gouge/slit eyes, but modeled fillets of clay begin to appear as upper lids. The Xipe Totec eyes represent the greatest divergence from the gouge/slit eyes in that they are circular, almost tubular depressions.

Noses

Nostrils appear and nose fillets become modeled (that is, the area where the fillet is joined to the face is smoothed over) and probably are the first facial feature to be applied. Pinched noses also occur.

Mouths

Gouge/slit mouths, low on the face, persist into the Miccaotli period. The Xipe Totec heads mark the introduction of a tubular depressed mouth, formed with the same tool and in the same manner as the eyes previously discussed.

Coiffures

The only example of a coiffure is a double flap descending on either side of the face to the chin from a forehead band type headpiece. The hair panels are smooth and unscored.

Bodies and Appendages

The only body type known to be associated with Miccaotli phase heads is a female clothed in an enagua (skirt)[4] and a quechquemitl. The interesting feature about these fully-clothed female forms is that they have flat cylinder torsos to which cylinder legs are attached (see Plate 161) under the garments. There are no protruding hands or feet present.

Clothing

Clothing consists of the enagua and quechquemitl discussed above.

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[4]The enagua was probably " . . . made by wrapping a long strip of cotton around the waist and legs, a costume which still persists in the Indian villages of modern Mexico" (Vaillant, 1966:84).

Ornamentation

Earspools

Where present, earspools are of the depressed-center, napkin ring variety.

Necklaces

Necklaces are either single or double applique bands with no decoration, applied before the earspools in the entire Miccaotli sample.

Headpieces

Four major types of headpieces occur in the Miccaotli samples:

1) T-shaped headpieces (see Fig. 274) with a few ornamental variations (cf. Chapter 4, HH-12)
2) Rolled cylinder forehead bands
3) Flattened slab cap/hat
4) Xipe Totec forehead band circling a chin band which overlaps at the top of the head.

Color

Facial (and often entire head/headpiece) pigmentation occurs with more frequency in the Miccaotli sample than in the Early and Late Tzacualli sample. Colors are probably post-fired pigments. Reds, reddish yellows, brown, and reddish browns are used. The Xipe Totec head bears traces of red pigment.

4. Early Tlamimilopa: A.D. 300-400

Early Tlamimilopa figures continue to be prognathic with more refined facial features like modeled noses with punctate nostrils, depressed eye sockets with brow delineation, and bowed lip formation. Bodies are either seated or are the danzantes (active, nude or semi-nude) figures which begin during this phase.

Heads

HH-6, 7, 8, 16b, 17, 22, and 23 are represented in the Early Tlamimilopa phase. These heads are the usual faces attached to a neck support. The one formation deviation produced a large, hollow face.

Eyes

The double gouge eyes discussed previously in connection with Early Tzacualli phase seem to recur in the Early Tlamimilopa phase.[5] Depressed eye socket with gouge/slit eyes also appear during this time. The depression of the sockets occurs from finger pressure pinching up a nose. This socket depression forms an automatic brow delineation.

Noses

Most of the Early Tlamimilopa mouths are more refined slit/gouges, still low on the face. Two other mouth types appear at this time:

1) fillets of clay are applied to the face and modeled into upper and lower lips; and
2) a horizontal slit with articulated upper lip is formed by cutting away two semi-circular pieces from either side of the center of the top lip.

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[5]The problems inherent in categorizing figurines into some semblance of chronological sequence can be seen in the problem of the seeming recurrence of the double-gouge eye style from the Early Tzacualli phase in the Early Tlamimilopa phase. This could be a genuine recurring phenomenon or it could be that the heads with double-gouge eyes are from the same period, and even from the same workshop. It could also be that they are from different periods, but from the same workshop/family line which passed down that particular style of eye formation.

Coiffures

Baldness predominates, though tufts of hair on either or both the right and left sides of an otherwise bald head appear. A Mohawk-type crest of hair also occurs during this phase. A horseshoe-like frame of randomly scored clay "hair" surrounds one of the heads and is topped by an upright, banded tuft or headpiece (see Plate 160, Type 8).

In Aztec society (about which more is known), coiffures had specific significance, and this may have been the case among the Teotihuacanos. Aztec coiffure significance for the hairstyles cited in the previous paragraph is as follows:

1) Baldness: Motolina refers to the fact that girls who spent some time in the convent had their heads sheared and Sahagun confirms that virgins who did penance and served in the temple cut their hair (Sejourne, 1966). Merchants also cut their hair before departing on extended trade trips, and vowed not to cut their hair until their return (Sejourne, 1966). Finally, for males as well as for females, baldness may have been an outward sign of penitence and piety (Sejourne, 1966).
2) Right tuft: After a youth, by certain exploits having cultural sanction, signifies that he is worthy of being shorn of his "Mohawk" tuft, he is permitted to wear a tuft over the right eye (Sejourne, 1966).
3) Left tuft: After twenty or more glorious deeds, a man achieves the right to be called Quachic and to shave his head, leaving only a lock over his left ear (Du Solier, 1950).
4) "Mohawk" hair crest: Young children wear closely-shorn hair. Upon reaching puberty, young boys have their hair cut so that they wear what appears to be a "Mohawk" hair style (Sejourne, 1966).
5) Topknot: A warrior's hair was bound into a topknot when he had killed four enemies (Du Solier, 1950).

Bodies and Appendages

Bodies

The bulk of the bodies are the small (none exceed 5 cm. from neck to buttocks), active danzantes bodies discussed in detail in Chapter 3, HB-7. Another common body form is the seated figure either with legs together and drawn up at the knees or with legs folded in a cross-legged position. Occasionally a piece of clay is attached to the lower section of these seated figures to suggest a protruding abdomen.

Appendages

Arms and legs are tapered clay cylinders, frequently having ornamental dots of clay at the wrists and ankles. Because danzante figures are generally of double cylinder construction, their legs are merely the unjoined ends of the cylinders. Seated figures have separate cylinder legs which meet on the underside of the single-cylinder torso to form buttocks.

Clothing

There are occasional taparrabos or maxtlatls (breech clouts), but for the most part, the Early Tlamimilopa figures are nude.

Ornamentation

Earspools

Earspools are the gouge/depressed center napkin ring type. The only instance of ears (without spools) occurs in this sample. The ears are highly simplified and are either depressions with excess clay pushed back to form the auricle, or are applique fillets of clay.

Necklaces

None of the samples seems to have had necklaces.

Headpieces

Headpieces of this phase are either drawn on or appliqued. Types appearing on the Early Tlamimilopa samples are as follows: single or double roll headbands; large, thick caps randomly gouged to provide a textured appearance; and caps with horn-like projections. According to Sejourne (1966:53), the projections suggest that the figure so adorned is female:

> "De donde se puede razonablemente concluir que ese caracter binario, representado ya sea por los elementos erguidos, ya por dos mechones, es el signo de la feminidad."

Color

Where present, pigment is applied over the entire head and headpiece. Facial pigments are either yellow or red. Sahagun[6] claimed that Aztec women " . . . paint their faces yellow . . . " (Du Solier, 1950:74). According to Sejourne, the use of color on female figurines connected them to divinities. For example, yellow and red (symbolic of fire) would connect a figurine to the goddess Xochiquetzal (Sejourne, 1966). Nevertheless, since there do not seem to be any other supporting iconographic elements on the figurines of this phase to suggest that Xochiquetzal was part of the pantheon of gods, it seems highly speculative to conclude that female figurines with red and/or yellow faces represent Xochiquetzal.[7]

5. Late Tlamimilopa: A.D. 400-500

The Late Tlamimilopa phase marks a decline in handmade figurines, along with the appearance and increasing numbers of moldmade ones. Only two head categories (HH-7 and 23), in the TC-8 sample, both present in the Early Tlamimilolpa Phase, persist into the Late Tlamimilolpa Phase. These heads were discussed previously because they also appear in the Early Tlamimilopa phase.

E. ICONOGRAPHY AND FUNCTION

The foregoing analysis of the TC-8 handmade figurines, with its explicit focus on formation techniques, addresses a number of questions too seldom considered by either archaeologists or art historians. Characteristics of works of art or of craft products initially or automatically attributed to symbolism, or to attempts at realism or abstraction on the part of the producer, may be revealed first and foremost as the direct consequences of processes of manufacture. Regardless of the documented or inferred "meanings" of these objects to those who made and used them, they look like this because they were made in this way, following these steps. A second implication, of relatively recent concern to archaeologists, is energetic. Analysis of formation techniques of

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[6]The existence of post-Conquest ethnographic accounts of two types - those written by Spaniards and those written by natives - has contributed to more extensive knowledge of Aztec society. Of the Spanish accounts, the Historia de las Cosas de Nueva Hispana (also known as the Florentine Codex) by Fray Bernadino de Sahagun (c. 1550) is used most extensively in this study. Of the native accounts, the most useful for this study was the Codex Fejervary-Mayer, a pre-Conquest ritual manuscript of the so-called "Borgia Group."

[7]Xochiquetzal (whose name was derived from two Nahuatl words, xochi, flower; and quetzal, the quetzal bird of magnificent green and blue iridescent plumage) was the Nahuatl goddess of the underworld who was the symbol of evanescence and had the flower as her own symbol (Burland, 1967).

figurines permits in principle the investigation of the time and labor investment in manufacture of various types of figurine. In turn, questions of market size and level of demand bear directly on potential estimates of numbers of specialists in production and the extent to which these may have been part- or full-time. It is, for instance, tempting, if speculative, to link the correlated decline of handmade and emergence and increased frequency of moldmade figurines in Late Tlamimilolpa times to the increased population - and thus expanded market - of Teotihuacan.

Much of what the figurines may have meant to the population that made and used them is in any direct sense unknowable, inferable, if at all, largely on the basis of analogy with historically-documented or ethnographically observed societies judged to be similar on linguistic, energetic, or some other stated grounds. From the standpoint of archaeology, in other words, certain questions may be asked, and may lead in turn to other questions; others will necessarily remain speculative and incapable of proof on the basis of the extant data.

The foregoing stylistic and technical analysis has indicated that the bulk of the handmade figurines from TC-8 represent humans, with very few animal or animal-composite figurines known from later periods as symbols of deities. Divinities known from later, particularly Aztec, sites are found. The archaeological context of the figurines, moreover, is overwhelmingly domestic: they are found in the rooms of apartment-like complexes occupied by presumably related nuclear-family households. Examples recovered from wall or ceiling fill reinforce this "domestic" interpretations: they are expendable items discarded in midden heaps then re-used as construction materials for later domestic and civic architecture. Any presumably ritual function therefore suggests domestic rather than civic ritual, and an association with the living rather than the dead. These distinctions, especially the former, are drawn because Teotihuacan is a clearly urban center, with clearly evident differences of social status and political influence among its residents, including those of outlying communities. In such societies, one regularly finds differences between an official state religion with practices, and accompanying objects, of its own, and domestic-level rites with quite distinctly associated objects. The extent to which the relation between domestic and civic changed through the chronological sequence is still unknown, although, as suggested above, the size, and perhaps shape, of the market for such objects, seem to have altered. The continuity of context-domestic from the earliest to the latest examples-documents a functional continuity of behavior regardless of any ideological shifts. Stylistic changes, from the simplified Early Tzacualli examples through the more realistic, more subtly modeled Late Tlamimilolpa ones, are notable; I suggest that these changes again reflect, in some way as yet unknown, the size and shape of the markets, and the ability of an expanding market to support increasing specialization of production.

We can safely assume that the figurines had meaning, even where we cannot necessarily reconstruct what this might have been. Arguing on stylistic grounds, I suggest that the meaning was essentially iconic, a stimulus for some association (whatever its content) beyond the figurine itself. Such an interpretation implies that neither emotive nor esthetic considerations may have been relevant for either producers or consumers: the figurine served as a functional stand-in for something else. The function as icon is, moreover, compatible with possible uses as amulets (household or personal) or even as toys, especially in the case of the puppet and danzante forms, the nudity of which seems to invite their clothing by children or adults. In such an instance, there may be parallels at more inclusive sociopolitical levels within the city itself.

Most of the figurines from TC-8, as well as those recovered from other Mesoamerican sites of all periods, are found with heads detached from bodies. Often interpreted as intentional, as a ritual "killing" of the figurine prior to discard, this may have been accidental, part of an expectable taphonomic process. The preceding analysis has documented that, especially in the case of handmade figurines, the juncture of head and neck is the point of greatest structural weakness, the likeliest point for breakage following discard. Only a comparison of breakage patterns of the handmade figurines with those of moldmade ones in which the head and body were molded in one piece could potentially clarify this question-and then only if continuity through time of belief and behavior were assumed. Analysis in terms of formation techniques, as proposed in this investigation, could, with additional research, perhaps help to differentiate the deliberate-the probable relationship to belief-from the accidental but taphonomically expectable.

F. SUMMARY

A major objective of the study was to conduct a descriptive and stylistic analysis of handmade, rural Teotihuacan figurines from site TC-8. Site TC-8 was a Period village located on the North Piedmont of the lower Teotihuacan Valley, the valley most famous as the location of the ancient urban center of Teotihuacan wherein the figurines were probably produced by craftspersons living in craft complexes in the northwest quadrant of the city.

Though the total TC-8 sample of 2,150 figurine fragments which had been sorted into appearance types and chronology by Charles Kolb (using a subcategory, subset system and chronology he had devised) were part of a preliminary examination and occasional reclassification, only 374 handmade figurine fragments were selected for the final descriptive and stylistic analysis. The 374 handmade fragments do not represent the total TC-8 handmade sample; they represent all the handmade figurine heads along with any known body and appendage associations.

The final analysis consisted of an examination directed toward obtaining descriptive information (sex, head and face, coiffure, headpiece, adornments, body and appendages, clothing, and color), and most importantly, toward isolating formation techniques, laboratory replication of the techniques in clay, classifying these techniques into a typology, and charting the incidence of formation technique types with Kolb classification subcategories and subsets.

The stylistic analysis was structured around an examination of the figurines according to three systems:

1) a form or style system,
2) an iconographic or meaning system, and
3) a functional or purpose system.

Within the form or style system the elements of configuration and techniques of formation were examined as interdependent elements: the formation techniques being responsible for the figurine configuration and the configuration influencing the persistence of a given style.

Within the iconographic system, the possible meanings of the figurines to both the Teotihuacanos and to contemporary persons concerned with the study, production, and appreciation of Teotihuacan art were considered. For the Teotihuacanos, the meanings of the figurines were chiefly iconic in nature in that the "shape" or aesthetic of the figurine was less (if at all?) important than the content it represented or symbolized. Within the context of iconic meaning, a figure could have religious, magical, didactic, or simply culturally-reinforcing play functions. For contemporary students of the works of the Teotihuacanos, the meanings of the figurines are to be found in both their aesthetic dimension and their iconic dimension. This disposition to a dual consideration of both the shape <u>and</u> the content of the figurines can be a model for fruitful interdisciplinary inquiry on the part of art students and archaeologists.

Within the functional system, an examination of the locational and material evidence supportive of the figurines' meanings indicated that they were used in household settings and functioned as household deities, or more commonly as vehicles for magico/religious purposes, as toys, and as amulets.

APPENDIX G

FORMAT FOR DESCRIPTIVE ANALYSIS

Kolb Classification__________ Description:
Sorting Classification_________
Support_________________
Period_________________

_______________________________________Photo #____, Row___
Place in Row

	HEIGHT
SIZE	WIDTH
	DEPTH

COLOR HUE
VALUE/CHROMA

CONSTRUCTION

SEX

HEAD &	EYES
FACE	NOSE
	MOUTH
	EAR/EAR
	SPOOL

HAIRDO
HEADGEAR
SITE #
BODY
ASSOCIATION

APPENDIX H

DESCRIPTION OF MUNSELL NOTATION

Hue

" . . . The symbol for hue is the letter abbreviation of the color of the rainbow (R for red, YR for yellow-red, Y for yellow) preceded by numbers from 0 to 10. Within each letter range, the hue becomes more yellow and less red as the numbers increase. The middle of the letter range is at 5; the zero point coincides with the 10 point of the next redder hue. Thus 5YR is in the middle of the yellow-red hue, which extends from 10R (zero YR) to 10YR (zero Y)."

Value

"The notation for value consists of numbers from 0, for absolute black, to 10 for absolute white. Thus a color of value 5/ is visually midway between absolute white and absolute black. One of value 6/ is slightly less dark, 60 percent of the way from black to white and midway between values of 5/ and 7/."

Chroma

"The notation for chroma consists of numbers beginning at 0 for neutral grays and increasing at equal intervals to a maximum of about 20, which is never really approached in soil. For absolute achromatic colors (pure grays, white, and black), which have zero chroma and no hue, the letter N (neutral) takes the place of a hue designation" (Munsell, 1971, no pagination).

Plate 149. Face Formation Types (FFT) 1, 2, 3, 4, 5

*1) Flattened, shaped ball of clay applied to slab extension of the body.
2) Flattened ball of clay applied to a neck cylinder flattened to form the back of the head. Sides of the face may be wrapped around the cylinder.
3) Face is formed by flattening the end of a body cylinder and folding it forward.
4) Flattened, shaped ball of clay applied to a neck cylinder at a 45 degree angle.
5) The front and back of one end of a clay ball is flattened to form the forehead; the sides of the other end are pinched between the fingers to produce a prognathous lower jaw and to provide a gripping place as the face is applied to a neck support.

*Face Formation Type 1 is 3.7 cm. in length, measured from the top to the bottom of the fragment.

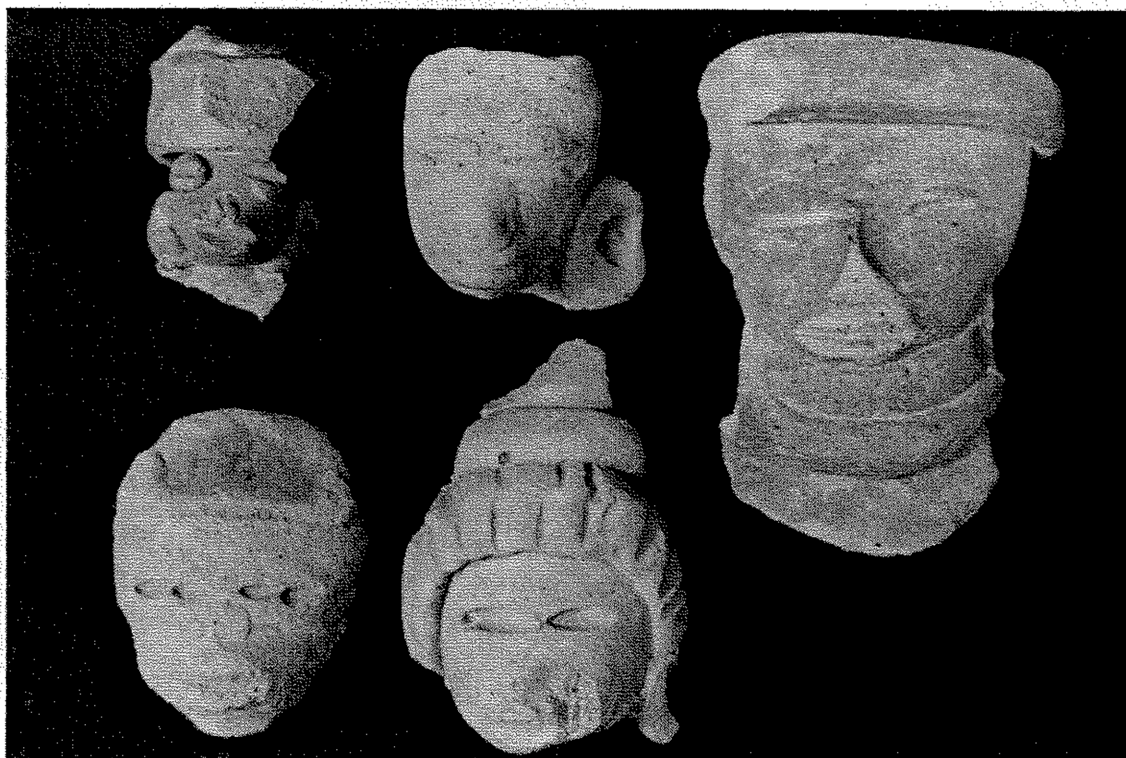

Plate 150 Eye Formation Types (EFT) 1, 2, 3, (row 1);
4, 5 (row 2)

*1) Coffeebean: Horizontally-scored fillets of clay.
2) Slits with displaced clay forming upper and lower rims lids.
3) Simple, horizontal slits.
4) Two horizontal gouges, slightly separated, form each eye. The tiny separation areas suggest pupils.
5) Simple horizontal gouges.

*Eye Formation Type 1 head fragment is 3.2 cm. in length from the top of the headpiece to the bottom of the neck band.

Plate 151 Eye Formation Types (EFT) 6, 7, 8 (row 1);
9, 10 (row 2)

*6) Gouge/slit eyes, too narrow to be true gouges (EFT-5) and too wide to be true slits (EFT-3).
7) Two small, horizontally-slit, modeled applique fillets form each eye - a semi-coffeebean appearance.
8) Slits with applique fillet, modeled upper lids.
9) Circular, depressed with flat-bottomed, dowel-like stick.
10) Circles are scooped/gouged out of facial clay, balls of clay are rolled and pressed into the gouged areas forming bulging, dot eyes.
11) Eye-socket depressions are made by finger pressure and a simple horizontal gouge is made within the socket depression. (see Plate 156 C Formation Type 1 (#1, row 1) for this example.)

*Eye Formation Type 6 head fragment is 3.1 cm. in length from the top of the head to the chin.

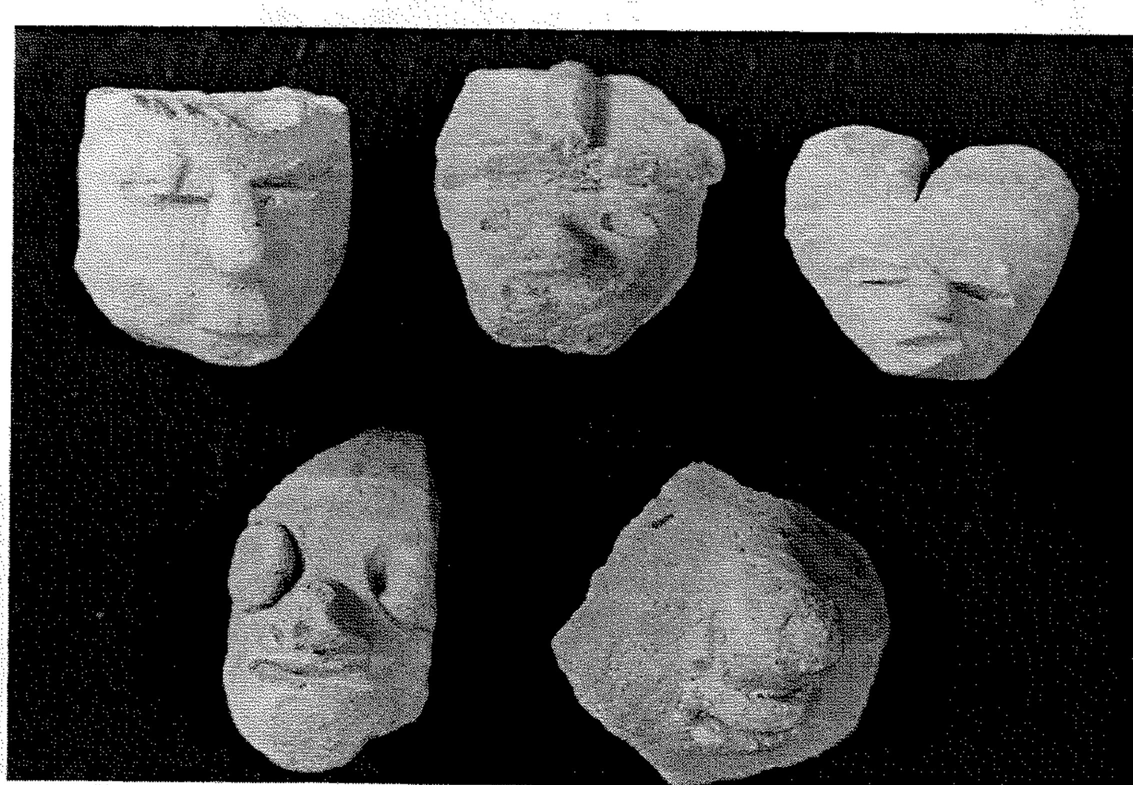

Plate 152 Nose Formation Types (NFT) 1, 2, 3 (row 1);
4, 5 (row 2)

*1) Applique fillet left unmodeled with joining area visible, no nostrils.
2) Unmodeled applique fillet with two slits for nostrils.
3) Unmodeled applique fillet with one slit for nostrils.
4) Unmodeled applique fillet with punctate, depressed nostrils.
5) Modeled, applique fillet, no nostrils.

*Nose Formation Type 1 head is 2.5 cm. in length from the top of the head to the chin.

Plate 153 Nose Formation Types (NFT) 6, 7, 8 (row 1);
9, 10 (row 2)

*6) Modeled, applique fillet with two slits for nostrils.
7) Modeled, applique fillet with one slit for nostrils.
8) Modeled, applique fillet with punctate, depressed nostrils.
9) Clay pinched upward between thumb and index finger from the center of the facial surface to form the bride of the nose with one or two slits for nostrils.
10) Clay pinched upward between thumb and index finger from the center of the facial surface to form the bridge of the nose with two punctate dots for nostrils.

*Nose Formation Type 6 head is 3 cm. in length from the top of the head to the bottom of the neck.

Plate 154 Mouth Formation Types (MFT) 1, 2, 3
(row 1); 4, 5 (row 2)

*1) Simple horizontal slit.
2) Shapeless gouge at the protruding end of a prognathous face. The gouge is small enough to appear as a wide slit.
3) Incised gouge at the protruding end of a prognathous face. The incised gouge is formed by making a concave, "v" shaped incision with two cutting motions.
4) Horizontal incision with displaced clay pushed upwards and downwards to form upper and lower lips.
5) Horizontal slit with articulated upper lip formed by cutting away two semi-circular pieces from either side of the center.

*Mouth Formation Type 1 head is 3.5 cm. from the top of the head to the chin.

Plate 155 Mouth Formation Types (MFT) 6, 7

*6) Long, wide gouge "drawn" with wide, pointed stick.
7) Thin rolls of clay appliqued to facial surface and modeled as lips.

*Mouth Formation Type 6 head is 4.7 cm. in length from the top of the head to the chin.

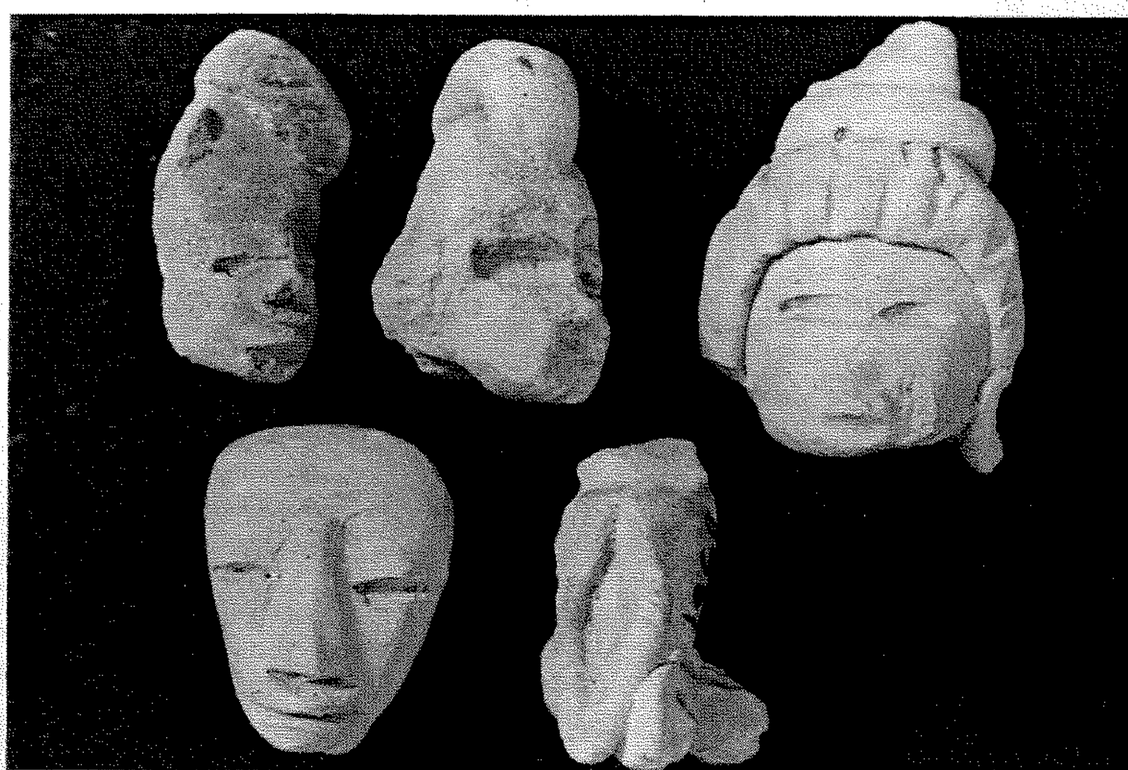

Plate 156 Coiffure Formation Types (CFT) 1, 2, 3 (row 1); 4, 5 (row 2) and Eye Formation Type (EFT) 11, #1, row 1

*1) Clay support pieces fastened to the back of the head and covered with clay rolls wrapped around the supports to suggest hair tufts.
2) Clay cylinder draped over the top of the head, attenuated and slightly flattened to the forehead above the eyes.
3) Clay cylinder draped over the top and down the sides of the head (a horseshoe effect) and pressed into the lower jaw area.
4) Bald, top of head smoothed over.
5) Thin, rolled cylinder of clay looped around side and back of head to suggest a braid.

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*C Formation Type 1 head is 3.3 cm. in length from the top of the head to the chin.

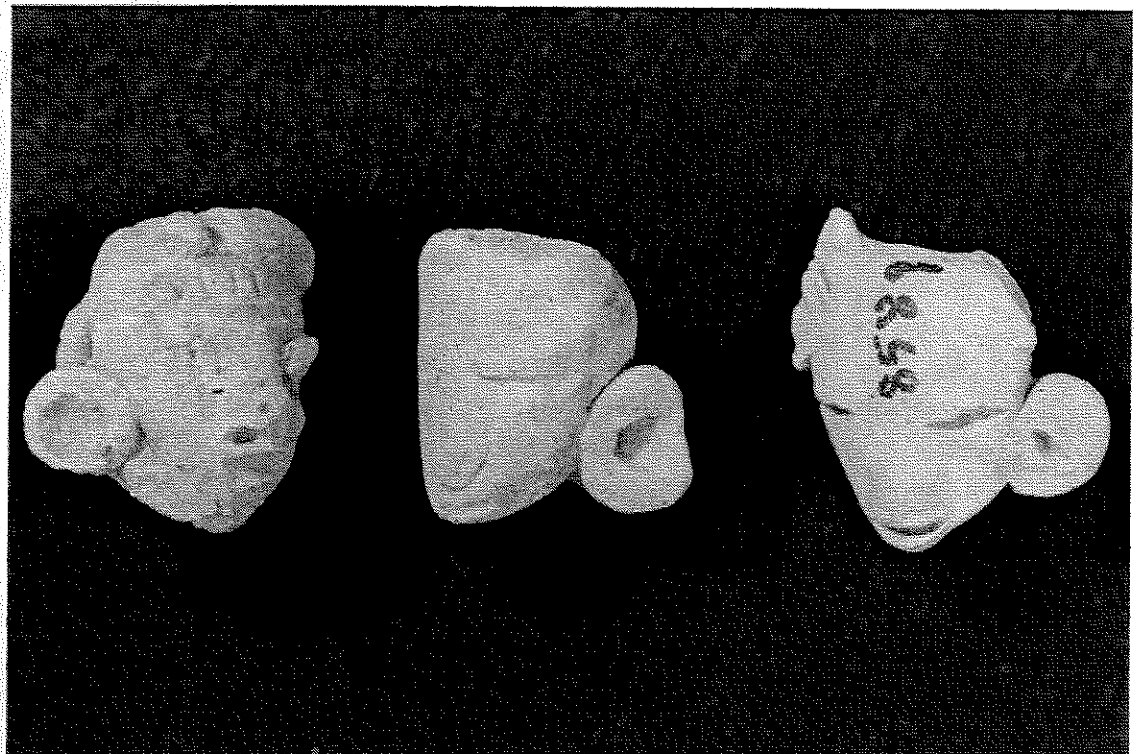

Plate 157 Earspool Formation Types (eFT) 1, 2, 3

*1) Rolled clay ball, flattened and gouged in the center.
2) Rolled clay ball, flattened and hollowed by a deep, punctate depression.
3) Rolled clay ball, flattened and incised in the center.
4) Rolled clay ball, flattened, (No example available).

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*Earspool Formation Type 1 head is 3 cm. in length from the top of the head to the chin.

Plate 158 Necklace Formation Types (nFT) 1, 2, 3

*1) Single rolled cylinder.
2) Double rolled cylinders.
3) Single rolled cylinder scored horizontally to suggest two bands or strands.

*Necklace Formation Type 1 head is 4 cm. in length from the top of the head to the chin.

Plate 159 Headpiece Formation Types (hFT) 1, 2 (row 1);
4 (row 2)

*1) Slab (strip) band, reaching three-quarters around the head.
2) Single rolled cylinder band, reaching three-quarters around the head.
3) Slab band curved over the top and sides of the face/head to form a cap. (No example available).
4) Fillets of clay flattened between the fingers and attached to the sides of the face. An HFT-2 band is then attached.

*Headpiece Formation Type 1 head is 3.5 cm. in length from the top of the head to the chin.

Plate 160 Headpiece Formation Types (hFT) 5, 6 (row 1); 7, 8 (row 2)

*5) Incisions/slits made vertically across the top of the head and horizontally across the forehead to suggest the contours of a headpiece.

6) Double rolled cylinder band, reaching three-quarters around the head.

7) Flattened, wide rolled cylinder with gouges and/or blunt tool depressions to suggest texture.

8) Single rolled cylinder band wrapped around a protruding support base giving a "pillbox" hat effect.

---

*Headpiece Formation Type 5 is 2.5 cm. in length from the top of the head to the chin.

Plate 161 Clothing Formation Types (cFT) 1, 2

*1) Thinly rolled (.2 to .4 cm. thick) slabs, cut, and wrapped around slab body cores as quechquemitl.
2) Thinly rolled (.2 to .4 cm. thick) slabs, cut and wrapped around a flattened BFT-1 body as enagua, or skirt.

*Clothing Formation Type 1 torso is 3 cm. from the neck to the edge of the quechquemitl.

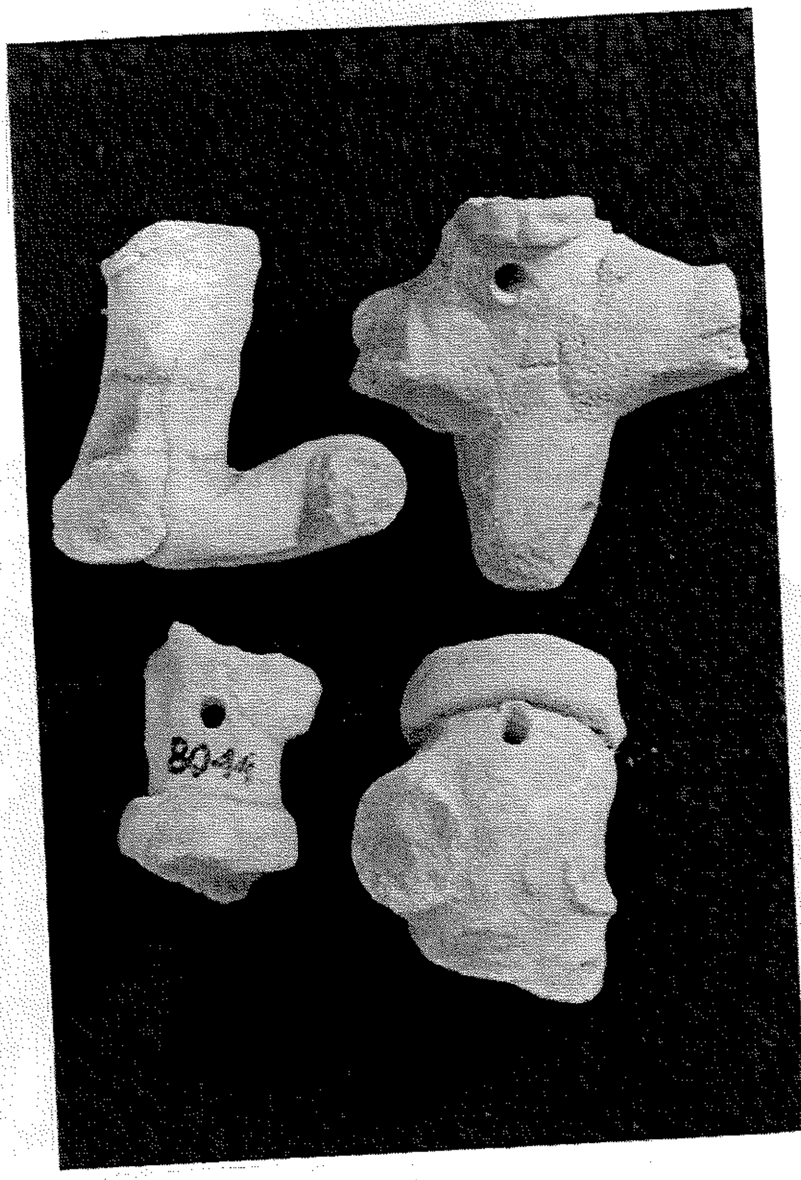

Plate 162 Body Formation Types (BFT) 1, 2 (row 1); 3, 4 (row 2)

*1) Two clay cylinders joined to form the torso at one end and left unjoined at the other end to form the legs.

2) A clay cylinder rolled to form the torso with a horizontal perforation from front to back below he neck area and a horizontal perforation from side to side for probable puppet leg attachment.

3) Rolled, flattened cylinder bodies with horizontal front-to-back neck base perforation, but with cylinder legs attached to the body.

4) Rolled cylinder bodies with vertical perforation from the lower body through the neck base.

*Body Formation Type 1 body is 3.7 cm. in length from the shoulders to the base.

Plate 163 Body Formation Types (BFT) 5, 6 (row 1); 7, 8 (row 2)

*5) Rolled, truncated cone bodies with apex used as neck.

6) "Danzante" four-unit construction bodies. The upper chest and back, shoulders, arms, and hands formed from a single cylinder and attached like a "t" cross-bar to the body cylinder pressed laterally to form the waist. Legs and neck formed separately and added to the torso cylinder.

7) Cylindrical rolls flattened from front to back. Arms, neck and legs are cylinders attached to the body with thin layers of clay concealing joining areas.

8) Simple, rolled clay cylinder.

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*Body Formation Type 5 body is 2.5 cm. in length from the neck to the base.

Plate 164 Arm Formation Type (AFT) 1, #1, and
Hand Formation Types (HFT) 1, 2, 4

*1) Attenuated cylinders attached to sides of torso.
2) Taper-rolled from arm cylinder, flattened and cupped with no finger delineation.
3) Grasping hands formed by splitting and pressing the arm cylinder into mitten fingers and a thumb.
4) Grasping hands formed by pressing attenuated arm cylinder into mitten fingers and adding a fillet thumb. (No example available).
5) Mitten hands formed by pressing attenuated arm cylinder into a fan/flare and adding a fillet thumb.
6) Mitten hands formed by pressing attenuated arm cylinder into a fan/flare hand and making two or three score lines to suggest fingers. (No example available).

*Arm Formation Type 1 arm is 3.5 cm. in length from top to fingers.

Plate 165 Leg Formation Type (LFT) 1, #1, and
Foot Formation Types (fFT) 1, #2; 2, #3

*1) Straight clay cylinder flattened and folded over laterally at one end to form a slightly squared-off perforated thigh/hip to be attached to a similarly perforated body by a cord or stick.

2) Flap foot is formed by bending the cylinder leg to form the heel/foot and flattening the toe extremity into a thin flap which is folded under the foot.

3) T-foot is formed by flattening the clay at the foot end from the sides rather than the front and back. The flattened flap is then folded to the inside of the foot and the T-shape is given by gripping the front and back of the ankle between the fingers (much like holding a cigarette) and pressing upward with the thumb against the bottom of the boot.

*Leg Formation Type 1 is 5.3 cm. in length.

CHAPTER 11

MISCELLANEOUS LITHIC, CERAMIC, BONE AND SHELL ARTIFACTS FROM TC-8

William T. Sanders

A. INTRODUCTION

Ceramic vessel sherds, obsidian tools and debitage, ceramic figurine fragments, particularly the first, comprise the vast majority of artifacts recovered from the Teotihuacan site excavations during the 1961, 1962 and 1963 field seasons. Pecked and ground stone artifacts; primarily made from volcanic rock and ranging considerably in density from very porous, light, spongy material to dense basalt; were relatively abundant secondary artifacts. They include tools usually identified (probably correctly) as mason's tools; architectural appendages, particularly curtain or door hangers; manos; metates; pestles; mortars; hammers and smoothing stones. The sample also includes stone balls, of varying size and doubtful function, and a number of trapezoidal basalt knives/scrapers which most probably date from the Aztec period occupation of the sites.

Much less abundant were a variety of artifacts made from very hard dense stone, usually identified as jade, jadeite, or nephrite in the literature, or from slate, and used for ornaments; flakes and cores of siliceous rock, probably quartzite and jasper; shell, used primarily for ornaments; and animal bone, used more commonly for gouges, needles, and awls, occasionally for ornaments or musical rasps. The latter were also manufactured from human bone.

Besides figurines and ceramic vessels the excavations yielded a variety of other ceramic artifacts, including discs of highly variable diameter, a small minority of which are perforated. The vast majority were apparently manufactured from sherds. It has been assumed by many archaeologists that they were used as spindle whorls, since the Teotihuacanos did not manufacture formal molded spindle whorls like the Aztec. The perforated versions however, do not seem to be common enough to have served as an artifact used in a major household activity, and this identification leaves unanswered the question of the use of the much more numerous unperforated examples. Perhaps this artifact was partially processed for future use as spindle whorls, stored until needed, and the holes bored at a much later time. They seem to show the same range in weight as the formally manufactured moldmade whorls for the Aztec period. An additional possible function, particularly the smaller ones, is their use as patolli pieces, a board game somewhat similar to parchisi. Several disc-shaped ceramic artifacts were formally manufactured in molds and seemed to have been used as wheels on toys.

Rarer ceramic artifacts include pipe, whistle, and flute fragments, possibly, as we suggested in Part I, used in ritual. Grouped in this inclusive category are a number of fragments that could be from any of the three artifact types. Earspools, both solid and hollow types, are rare and apparently were used as body ornaments. Also present are a very few ceramic stamps or seals, which because of their rarity are not securely dated. Much more abundant was a ceramic artifact referred to in the literature as a "candelero" and assumed to have functioned as an incense burner.

In this chapter I will provide a superficial analysis and relatively detailed description of this considerable variety of artifacts, with suggested functions, on the basis of surface appearance. This presentation, however, is admittedly little more than a typological catalog of artifacts collected by the project. Badly needed are in-depth technological and material science analyses of these artifacts by competent researchers in lithic and ceramic analysis. The collection of manos and metates is presently in the hands of Martin Biskowsky, a student at U.C.L.A, who is preparing a dissertation on manos and metates from Central Mexico.

B. GROUND STONE ARTIFACTS MANUFACTURED FROM VOLCANIC MATERIAL

1. Introduction

The term tezontle is used in Central Mexico for spongy, porous volcanic detritus (scoria), usually very light in weight, although there is considerable variation in density of the material so labeled. In fact, the full range of artifacts labeled as tezontle grade, at the denser, heavier range, into basalt, since some basalt is relatively spongy, with large numbers of visible air holes. What we obviously have is a continuum of volcanic detritus, from very light material full of air holes, to extremely dense compact material, in which the air holes cannot be seen with the naked eye. Artifacts labeled as basalt are usually gray in color whereas tezontle artifacts tend to be orange or reddish, although there is considerable overlapping into the gray shades. In other words, the color tends to range very much the way density does.

Irregular chunks of tezontle were, and are, used extensively for building materials in the valley, as fill for floors, platforms, and walls. It was also trimmed into roughly shaped rectangular blocks as facings for doorways and terraces, and processed into a great variety of artifacts, the function of which, in some cases, is problematical. The major characteristics of tezontle artifacts what would seem to relate to their function are rough surface, light weight, and precise form. Each artifact will be briefly described below; probable or possible functions will be suggested for some of them.

Basalt was used for the manufacture of facing blocks for construction of major public buildings in the city. It was also used to manufacture a range of artifacts in which its density, hardness, and a relatively smooth surface were of utility, such as plastering tools, manos, metates, mortars, pestles, and pounders. The same material was used for problematical artifacts, in the form of spheroids. A few artifacts were manufactured from softer materials such as tepetate and pumice.

All of these artifacts appeared to be manufactured using a combination of the techniques of pecking, grinding, and polishing.

2. Tezontle Artifacts

Masons's Tools

These artifacts have been identified as masons' tools in the literature and apparently were used to apply either stucco,or both stucco and plaster,on walls, ceilings, and floor surfaces. Their rough surface suggests that perhaps they were restricted to the use of stucco application and that the heavier, denser, and smoother basalt artifacts described later were used to apply the final coat of lime plaster. Alternatively the Tezontle artifacts were used to apply both and the basalt tools to polish the plaster surface. Approximately 61 were found in the three residential excavations at TC-8. Forty of these came from Mound 1-2, 9 from Mound 3 and 4 from Mound 4. Eight artifacts were from the site, but either misnumbered, or the identification lost with respect to specific provenience. Of the sample of 53 with proveniences, 13 were fragmentary artifacts and not initially identified as masons tools. The balance, 40 in all, were plotted on the distribution maps published in Part 1.

The 61 tools are similar in that all have two or more distinct segments, a larger, lower segment with a flat base, that presumably was the working surface, and frequently shows signs of wear; and usually one, rarely two upper segments, that were smaller in plan, and apparently served as the handle. The lower segment is usually rectangular, occasionally oval in plan. The upper segment is highly variable. Of the sample 32 had handles with a rectangular plan and comparable in shape to the base, and nine were classified as square, although the two dimensions were rarely identical in such cases. The 41 artifacts so classified, however, were highly variable in other characteristics which presumably had something to do with their specific uses. Variation occurred in overall size, ratio of handle surface area to base, total height, height proportion of base to handle, and degree of symmetry, particularly in the positioning of the handle in reference to the base. Often the location was so asymmetrical that we referred to them as the "shoe type" in the Toltec Period volume. They also varied in the overall height of both base and handle and the latter often has a sloping upper surface, often as much as 30 degrees. Some examples, in contrast, had very symmetrical dimensions in width, length, and height of both segments. Furthermore, the density of the artifacts varied considerably, from very light spongy texture to a weight and texture almost comparable to basalt. The workmanship of manufacture varied strikingly, from extreme well tooled to very crudely shaped artifacts.

Of the remaining classified artifacts two have lateral perforations in the handles, another has a partial perforation of this type (possibly it was a unfinished tool). Two others have deep longitudinal grooves on the upper surfaces. Other than this feature these last would be classified as rectangular handled artifacts.

Table 93 Tezontle Stucco and/or Plaster Applicators

A. Square Handled Variety

#	Base (cm) Length	Width	Total Height	Handle (cm) Length	Width	Height	Basal Wear	Density	Color	Observations	Figure	Plate*
1	6.5-7.1	(App)5.2	3.7-3.9	3.6	3.2	1.7	Heavy	Light	Grey	Well Tooled, Symmetrical, Varying Height, Sloping Handle Surface	280 F,G	169A,B, 170A 1-3
2	(Est)8.3	(Est)7.5	4.3	5.0	4.3	1.6	Light	Very Light	Grey	Well Tooled, Symmetrical, Varying Height, Sloping Handle Surface	281 Hi	None
3	(Est)7.4	4.7	4.2	5.3	4.6	1.7	Heavy	Medium	Grey	Well Tooled, Symmetrical, Varying Height, Sloping Handle Surface	279 C,D	None
4	8.4	8.2	5.5	5.1	(Est)4.3	2.8-3.0	Light	Medium	Reddish Grey	Shoe Type - Both Dimensions, Well Tooled	None	None
5	7.5	(Est)7.5	5.4	4.8	4.7	2.9	Light	Light	Grey	Well Tooled, Symmetrical	279 G,H	169A,B 170A 1-2
6	6.0	5.0	7.2	4.6	4.3	2.5-3.1	Light	Medium+	Grey	Roughly Tooled, Symmetrical	281 E-G	None
7	6.0	6.0	5.5	5.0	5.0	3.0	Heavy	Medium+	Grey	Roughly Tooled, Symmetrical	279 E,F	170B, 171A,B 1-3
8	8.5	(Est)6.5	5.5	6.0	5.4	2.2	Light	Medium	Grey	Well Tooled, Symmetrical	None	None
9	8.5	7.4	8.6	7.8	5.8	5.6-6.0	Heavy	Dense+	Grey	Roughly Tooled, Symmetrical	278 C,D	170B, 171A,B 1-2

Range in Basal Dimensions 6.0-8.5 x 4.7-8.2 Height 3.7-8.6

Range in Handle Dimensions 3.6-7.8 x 3.2-5.8 Height 1.7-6.0

B. Rectangular Handled Variety

#	Base (cm) Length	Width	Total Height	Handle (cm) Length	Width	Height	Basal Wear	Density	Color	Observations	Figure	Plate*
1	(Est)6.8	5.0	4.8	8.1	3.0	3.7	Heavy	Heavy	Yellowish Grey	Well Tooled, Shoe Type - Both Dimensions	280 D,E	166A,B 167A 3-2
2	Eroded	Eroded	?	(Min)4.5	3.0	?	Heavy+	Light	Grey	Well Tooled, Shoe Type - Both Dimensions	None	None
3	Eroded	Eroded	?	6.0	3.4	4.5	Heavy+	Light	Grey	No Data	None	None
4	Broken	6.8	4.8	?	2.9	2.6	Medium	Light	Grey	Well Tooled, Shoe Type-Width, Sloping Wall Both Dimensions	None	None
5	(Est)9.0	6.8	4.6-5.6	7.5	4.0	3.0-3.2	Medium	Medium	Grey	Well Tooled, Shoe Type-Length, Handle Surface Sloping	278 G,H	166A,B; 167A 3-3
6	8.0	(Est)5.2	3.9-5.3	4.6	2.6	1.7-2.6	V. Light	Light	Grey	Well Tooled, Very Asymmetrical Height	None	None

7	6.5	5.5	3.6-4.3	5.5	3.6	2.2	Medium	Medium	Grey	Well Tooled, Shoe Type, Asymmetrical Height, Sloping Surface	None	None
8	?	6.5	4.0-5.7	6.5	2.5	1.8-2.1	Light	Light	Grey	Well Tooled, Shoe Type-Width, almost no Heel	None	None
9	?	7.5	3.8-4.2	(Est)5.5	4.0	1.5	Medium	Medium	Grey	Well Tooled, Shoe Type-Width, Variable Heights Both Parts	None	None
10	8.5	5.5	3.0-3.4	6.8	4.0	1.7	Heavy	Light		Well Tooled, Very Variable Height- Width Dimensions, Symmetrical Plan, Sloping Handle Surface	281 L,M	167B, 168A,B 2-3
11	9.0	6.3	3.7	9.0	2.4	2.1	Medium	Light	Reddish Grey	Very Well Tooled, Shoe Type-Width	None	None
12	10.0	6.2	4.5	7.0	2.8	1.9	Heavy	Medium	Grey	Well Tooled, All Dimensions Symmetrical	276 D,E	166A,B; 167A 2-3
13	6.5	5.0	3.5-3.8	4.5	2.5	1.5-2.2	Medium	Medium	Grey	Well Tooled, Shoe Type- Width	277 I,J	166A,B; 167A 3-1
14	7.2	4.3	4.4	5.3	2.7	V.Asym	Heavy	Heavy	Grey	Well Tooled, Handle Asymmetrical - Width, Height	None	None
15	(Est)8.0	3.0	5.7	6.8	5.0	1.4	Light	Light	Grey	Well Tooled, Prob. Shoe Type in Length Dimension	276 A-C	167B; 168A,B 3-2
16	11.2	7.5	5.0	9.6	5.4	2.5-3.0	Medium	Heavy	Grey	Well Tooled Symmetrical	None	167B; 168A,B 1-2
17	(Est)4.8	4.0	(Base Only 1.8	Handle Almost Gone			Light	Light	Grey	Well Tooled - Fragment	None	None
18	9.5	6.0	7.3	7.7	3.6	4.1	Heavy	Heavy	Grey	Roughly Tooled, Symmetrical	279 M,	166A,B; 167A 2-2
19	?	6.0	4.1	6.3	3.6	2.5	Medium	Light	Grey	Very Well Tooled, Symmetrical	279 I,J	166A,B; 167A 1-3
20	9.0	8.0	4.3	6.3	5.0	1.8	Medium	Medium	Grey	Well Tooled, Symmetrical	[illegible]	[illegible]
21	Broken		3.2-4.1	7.1	5.5'	1.1-2.9	Heavy	Light	Grey	Well Tooled, Symmetrical Plan, Upper Surface Both Parts Steeply Incline	277 A,B	None
22	Broken		4.3	9.2	3.0	3.5	Light	Medium	Grey	Prob. Symmetrical all Dimensions, Very Well Tooled	None	None
23	8.9	5.4	4.7-5.3	7.5	4.2	2.5-3.1	Heavy	Medium	Grey	Symmetrical all Dimensions, Roughly Tooled	None	None
24	9.8	5.7	8.8	8.6	2.3	2.9	None	Light	Grey	Symmetrical all Dimensions Well Tooled	280 A-C	167B; 168A,B 3-3
25	?	6.8	3.1	6.7	4.3	1.9	Light	Medium	Grey	Probably Symmetrical, Well Tooled	None	None
26	?	6.6	5.7	?	5.1	3.5	Heavy	Medium	Grey	Symmetrical all Dimensions, Well Tooled		166A,B; 167A 2-1

Base Range in Dimensions 6.0-11.2 x 4.0-8.0 Height 3.0-8.8

Handle Range in Dimensions 4.5-9.1 x 2.5-5.5 1.5-4.5

C. Probable Rectangular Handle Variety												
1	6.0	?	5.0		(All Missing Artifacts)					Well Tooled Symmetrical 1 Diameter	None	None
2	6.0	?	3.0							Well Tooled Symmetrical 1 Diameter	None	None
3	5.1	5.5	2.0		Only Laboratory Drawings					Well Tooled Symmetrical 2 Diameter	None	None
4	?	?	?							Well Tooled Prob. Symmetrical 1 Diameter	None	None
5	9.3	3.2	3.2		Available - No Other Data					Well Tooled Symmetrical Width, Shoe Type	None	None
6	7.2	4.0	4.0							Well Tooled Symmetrical Length	None	None
7	6.8	4.8	4.8							Roughly Tooled Symmetrical Length	None	None
D. Ring Handled Variety												
1	?	6.0	(?)6.4	5.7	3.0	2.1	Heavy	Medium	Grey	Well Tooled, Shoe Shape-Width, Handle Surf. Dome Shape	None	170B; 171A,B 2-2
2	(Est)7.9	(Est)6.0	3.5	5.8	2.0	?(Hole .8)	Light	V. Light	Grey	Well Tooled Symmetrical Width Diam.	279 K,L	None
3	?	7.6	5.8	7.1	2.5	2.9-4.3 (Hole 2.0)	None	Medium	Grey	Well Tooled Symmetrical Width Diam.	281 C,D	170B; 171A,B 3-2
Range - Base - Dimension 6.0-7.6 x 7.9 Height 3.5-6.4												
Range Base Handle Dimension 5.7-7.1 - 2.0-3.0 2.1-4.3												
E. Grooved Handled Variety												
1	9.3	6.0	4.7	8.4	3.7	2.9-3.1	Heavy	Medium	Grey	Well Tooled Symmetrical - Both Diam.	276 H-J	169A,B; 170A 2-4
2	(Est)7.6	7.1	4.2	6.0	5.0	1.5	Light	Medium	Grey	Well Tooled Symmetrical - Width Diam.	None	169A,B; 170A 1-4
Range of Base Dimensions 7.6-9.3 x 6.0-7.1 Height 4.2-4.7												
Range of Handle Dimensions 6.0-8.4 x 3.7-5.0 1.5-3.1												
F. Pyramidal Variety												
T1	11.2	11.0	7.2	6.1	3.5	2.1	Light	Light	Grey	Very Well Tooled - Symmetrical all Diameters	281 A,B	166A,B; 167A 1-1
T2	9.1	8.1	1.8									
2	10.6	6.6	5.9	10.1	3.4	1.8	Heavy	Heavy+	Grey	Very Well Tooled - Symmetrical all Diameters	279 A,B	167B; 168A,B 1-3
3	9.3	8.0	7.2	7.2	4.8	2.4	Light	Medium	Grey	Well Tooled Symmertical		
H. Miscellaneous												
1	?	(Max)6.8	5.3	4.1	3.6	2.5	Heavy	Light	Grey	Well Tooled, Prob. Shoe Type Length Diam., Oval Plan	None	169A,B; 170A 3-2

2	?	5.3	5.3	?	2.4	2.9	Medium	Medium+	Grey	Roughly Tooled, Prob. Shoe Length Diam., Overall Dome Shape	None	None
3	7.2	6.5	5.3	7.6	5.3	3.1-3.5	Heavy	Medium	Reddish Grey	Roughly Tooled, Shoe Type-Width, Symmetrical Length, but with Irregularities	277 E,F	170B; 171A,B 2-3
4	?	7.0	8.0	6.9	5.9	(App) 4.0	Medium	Heavy	Grey	Very Roughly Tooled, Overall Symmetry but Very Irregular Diam.	276 F,G	170B; 171A,B 1-1
					G. Knob Handled Variety							
1	6.0	5.7	5.3	3.5	2.2	2.9-3.6	Heavy	Heavy	Grey	Well Tooled Symmetrical all Diam.	280 H,I	169A,B; 170A 2-1
2	6.7	6.5	(Min) 3.7	3.5	3.3	Broken Tip	Heavy	Medium	Grey	Well Tooled Symmetrical all Diam.	None	None
3	6.5	5.8	(Min) 3.0	3.5	3.5	Broken Tip	Light	Medium	Reddish Grey	Well Tooled Symmetrical all Diam.	None	None
4	?	7.5	3.0-4.7	3.9	4.2	1.7	V. Light	Medium	Grey	Well Tooled Handle & Base Very Sloping Surface, Asymmetrical Plan		169A,B; 170A 1-1
5	6.5	4.0	4.5+	3.4	1.8	2.5+	V. Light	Light	Grey	Well Tooled Sloping Handle & Base Variable Height, Symmetrical Plan	None	169A,B; 170A 3-1
6	6.3	?	2.8+	3.1	3.1	Broken Tip	Heavy	Medium	Reddish Grey	Well Tooled Shoe Type Length	None	None
7	9.0	?	4.2	5.9	2.1	1.2	Heavy	Light	Grey	Well Tooled Very Sloping Handle & Base but Symmetrical Plan	None	None
8	5.7	3.2	5.5	2.8	2.5	2.8	Medium	Light	Grey	Well Tooled Symmetrical all Diam.	279 N,O	169A,B; 170A 2-2
9	6.9	5.4	5.6	3.7	2.3	3.6	Heavy	Heavy	Grey	Well Tooled, Sloping Angle Handle	None	169A,B; 170A 2-3

Range in Basal Dimensions 5.7-9.0 x 3.2-7.5 Height 3.0-5.3

Range in Handle Dimensions 2.8-5.9 x 1.8-4.2 1.2-3.6

*Editors Notes: In the plate column, the first number after the plate number refers to row number, second number to the position of the artifact in the row. The reader will note that not all of the illustrated artifacts are described in this and subsequent charts. That is because only the collection from TC-8 is analyzed. A few artifacts from other sites are illustrated either/or because of the unusual preservation of the artifact or to include all of the variety found within a type.

Est = Estimate
Min = Minimum
App = Approximation

A very rare form is a two, or three tiered pyramid. In these artifacts a well differentiated handle is not apparent and the upper segment has so little height that it is difficult to see how this could have been held during use. The three examples are large in size and dense in texture.

Nine artifacts have a very high, knob-like upper segment that would seem to be more functional as a handle than the great majority of artifacts classified in this category. Four others were classified as miscellaneous since they do not easily fit into the rest of the typology.

The great variety in this artifact would suggest equal variety of specific use, within the general category of stucco or plaster application, but the specific uses are not at all clear. What is obviously needed is a ethnographic study of tools comparable with those from Teotihuacan. Interestingly they have not been reported in Aztec sites, even though building construction in Aztec times was very similar and this raises additional questions as to their use. For further information on this artifact type see Table 93, Plates 166-170A and Figures 276-281.

Curtain Rings (Plate 175B)

In the collections are seven pieces of an artifact identified in the literature as curtain or door hangers. They are thought to have been imbedded in the masonry door frame and used to suspend light partitions to ensure privacy in the rooms of house compounds. All are constructed of light, porous tezontle having one (six cases) and occasionally two (one case) perforations and vary in shape from circular to rectangular. Occasionally two pieces of tezontle each share half of the perforated hole and were apparently joined when they were imbedded in the wall. In five of the cases we found traces of lime plaster, confirming their probable function as architectural features. The remaining two had either red or orange residues on them that probably represent paint. The perforations vary in diameter from 1.25-3.75 cm.

Miscellaneous Artifacts (Plate 174A, Fig. 282)

In the sample are a number of unique or rare artifacts of unknown function; their characteristics are summarized in the following table.

Table 94 Miscellaneous Tezontle Artifacts

Artifact Number	Shape	Dimensions (HLW in cm)	Color	Comments	Figure	Plate
1	Dome, Flat Base	5.0-3.75- 3.1	Grey	Basal Area Smooth	282A,B	174A 2-4
2	Dome, Flat Base	6.25-5.0-5.0 (Ht)	Grey	Rough Surface, Base Smooth	None	174A 1-3
3	Rectangular Cube	6.9-3.75-1.25	Grey	Smooth Base with Pink Residue	282H-I	174A 3-1
4	Dome, Flat Base	9.4(Diam)-5.0	Pink	Very Coarse Grain, Orange Residue on Base	None	None
5	Spool-Depressed Both Ends	4.4-2.5	Grey		282L,M	174A 3-3
6	Spool-Depressed Both Ends	5.0 (Diam) 4.5(Ht)	Grey-Reddish Tint		None	174A 2-1
7	Trapezoid	12.5-7.5 2.5 (Thick)	Grey	Very Fine Grain Probably Pumice	282P,Q	174A 3-5
8	Tubular	4.4-1.5 (Diam)	Pink	Regular Form	282R	174A 3-2
9	Grooved "Hammer"	5.75-2.0	Pink	Very Coarse Grain	282S,T	174A 1-1
10	Grooved "Hammer"	8.3-6.0 Diameter at the Groove 5.0	Grey	Orange Residue on the Base and Part of the Sides	282C,D	174A 1-2
11	Tube with Flat Ends	7.5				
12	Tube with Flat Ends	6.25				
13	Tube with Flat Ends	7.5				
14	Thick Bowl-Very Shallow Depression	13.75-3.75 (Thickness)				
15	Thick Bowl-Very Shallow Depression	4.4-2.5 (Thickness) 1.2 at Depression	Reddish Grey		282U,V	174A 3-4
16	Box	1.25cm Wall Height-2.5cm Rim Length	Red		282F,G	176 3-3
17	Box		Grey		282E	
18	Cone with Flat Base	7.6-Diam 2.6-3.8(Diam)	Reddish	Very Coarse, Smooth Base	282J,K	174A 2-3
19	Rectangoloid Artifact with Sloping Sides	9.5-11.4-4.6	Grey	Very Coarse Grain		174A 4-2
20	Rectangular	5.2-5.4(Min) 2.5(Thickness)	Grey	All Surfaces Smooth		174A 4-1

Diam = Diameter
Ht = Height

3. Basalt Artifacts

Manos and Metates (Plate 172)

Thirty-three fragments of manos were tabulated, all of grey basalt. The lab collection is probably not complete and some small fragments were either intentional left (probably mid-sections) in Mexico for reburial or we failed to identify them as manos. Five artifacts were identified as reworked mano fragments (see discussion of pestles below). We divided the sample into four categories based on the cross-section shape, i.e. square or rectangular 10 egs., triangular 2 egs, ovoid 8 egs and round 13 egs. Some of this variety is probably the product of differential wear but all fragments showed evidence of some use. In fourteen cases the wear was pronounced enough to result in a bulbous formation at the termini of the mano. This feature was found primarily in the rounded cross-section examples, thus supporting our notion that the latter is the product of wear. Evidence of a chalk-like residue was found on ten fragments. Average measurements of the cross-sections were as follows, triangular type average 4.4 cm, square or rectangular 4.9 cm, ovoid 6.6 cm, and round 5.0 cm. The ranges were, excluding the triangular type, 3.75 - 8.75, 5.6 - 8.75, and 3.75 - 7.5 respectively.

Twenty-nine metate fragments were recorded in the laboratory sample. Again some probably were left in Mexico or not identified in the field. All were of grey basalt and all show signs of wear. Four fragments had feet, but in the form of low round protuberances, unlike the prominent feet found in modern variants. A few examples have lip like edges, possibly the product of differential wear. Plate 195 previously published as Plate 4C in the Toltec Volume, Chapter 3 (Vol. 4, 1982) shows the contents of an offering cache from Oxtotipac, placed underneath the thick tezontle gravel deposits underlying the Oxtotipac Phase occupation of the cave and dating to the Teotihuacan Period. In the cache are two used manos and one heavily used metate, and one metate and one mano that appear almost new; along with a basalt disc-shaped artifact and a sphere. The association of the last two suggest their probable use as grinding tools. The unused or slightly used mano and metate are clearly of Teotihuacan age and probably represent the form of these artifacts that date from the Teotihuacan Period.

Table 95 Mano Fragments

Type	Number	Color	Diameter (cm)	Degree of Wear	Additional Comments
A -Triangular Cross Section	2	Med. Grey Basalt	Average 4.4	2 Sides Unworn, 1 Side Shows Wear	
B - Square or Rectangular Cross Section	10	Dark Grey Basalt	Range 3.75-8.75 Average 4.9	7 Have Wear on 1 side, 4 on 2 Sides, 1 all 3 sides	Wear has Produced Bulbs at the Termini in 3 Cases, 8 have White Residue, 1 Yellow Residue
C - Ovoid	8	2 Light Grey, 9 Med-Dk Grey	Range 5.6-8.75 Average 6.6	All Show Wear on 1 Side	1 Terminates in a Bulb
D - Round Cross-Section	13	Grey	Range 3.75-7.5 Average 4.0	All but 3 Wear on One Side	10 Terminate in Bulbs

Pestles (Plate 173B, Upper Two Rows, Plate 184C,D Upper Left, Fig. 284 C-E; J-P)

Ten artifacts in the TC-8 collections were classified as pestles. However, no mortars were found at TC-8, an artifact that does occur at Xometla and Oxtotipac. All show signs of wear, probably caused by grinding and pounding on some substance. Half seem to have included the bulbous end from a used mano which apparently was reworked and served as the functional end of the tool. These almost certainly were manufactured from worn, non-functional manos. Five others appear to have manufactured initially as pestles. In all probability both variants were used in conjunction with metates or more probably fragments of broken metates that continued in use. Such continued reuse of damaged or broken artifacts is common in peasant villages today in Mexico and archaeological evidence would suggest the same in the past. Fragments like those found in the general collection, occurred in situ on the floor of the room in the excavation of Mound 1 (see page 27, Part 1, the description of Feature 10).

Scrapers (Plate 176 Upper Row, Middle Row Left and Center, Fig. 283 A-E))

Among the ground stone artifacts are fifteen complete or partial artifacts manufactured of a very hard, homogeneous light grey stone that has a similarity to slate but it is probably made from a very fine textured basalt. All are trapezoidal in shape with well smoothed surfaces. The lower wider side of the trapezoid is thin and bevelled; the upper shorter margin is thicker and rounded; but the maximum thickness of the artifact occurred about 2 cm. below the upper edge, with the edges of the sloping sides slightly rounded. Maximum thickness of the seven complete specimens varies from .6 - 1.6 cm; maximum length i.e. the cutting edge, 8.5 - 12 cm and maximum height 5.1 - 7.6 cm (averages of these two dimensions 10.6 and 6.7). The cutting edge has a characteristic sheen to its surface, presumably produced by use, and the upper rim is roughened, presumably for hafting. They were initially identified as hoes, because of their shape and sheen of the working edge, but we were puzzled by their small size and weight, suitable only for perhaps weeding, and possibly hafted to a very short handle for this purpose. Recent discussions, however, with Jeffrey Parsons and Mari Carmen Serra suggest rather that they were used to pulp maguey leaves as a step in the manufacture of cordage. This conclusion is based on the fact that similar tools are used in the Meztitlan area of Hidalgo by Otomi Indians today (see Parsons and Parsons 1990). The fact that they have been found on Aztec sites and that none at TC-8 were found in primary deposits suggest that they date from the Aztec occupation at TC-8, a conclusion also supported by the relatively small number found in the excavations. Of the sample of 15, 7 are complete enough to obtain most of the measurements and these are presented in the table below.

Table 96 Basalt Trapezoidal Scrapers

	Height (cm)	Upper Width (cm)	Lower Width (cm)	Maxiumum Thickness (cm)
1	5.1	6.3	9.8	1.3
2	7.4	6.7	10.7	1.6
3	6.6		12.0	1.5
4	7.0	7.0	10.2	1.1
5	7.6	9.0	11.0	1.2
6	6.7	8.6	12.0	.6
7	6.6	6.0	8.5 (est)	1.4

Plaster Applicators (Plate 171A,B; 170B, Row 2, No 1 Row 3, No 1, Plate 184C,D Lower Left, Fig. 283 J-K, L-M)

Among the basalt artifacts were three manufactured of dense, fine-grained dark grey basalt that have been identified in the literature as mason's tools. They resemble modern clothing irons and have pierced vertical rectangular handles placed on flat, relatively thin horizontal rectangular bases. The height of the handle is several times the thickness of the basal or working portion of the artifact. In all three cases the bases are highly polished from use and in two cases the basal area is almost worn away. One artifact was almost complete. All are very well tooled artifacts. The handle opening dimensions varies from 1.3-3.1 cm, the length of the base from 6.2-12.5 cm and height including the base and handle from 5.0-6.5 cm.

Miscellaneous Artifacts (Plate 173A, Rows 1-3; Fig. 283 F-I, 284)

Among the sample were a number of unique or extremely rare artifacts of unknown function, their characteristics are summarized in the two tables below.

Table 97 Miscellaneous Basalt Artifacts

	Dimensions (LWH in cm)	Color	Figure	Plate
1 Rectangular Cube	4.4-4.6	Grey		173A 1-3
2 Rectangular Cube	5.7-5.3-4.3	Grey		173A 2-3
3 Rectangular Cube	8.2-8.2(Min)3.3	Grey		173A 3-2
4 Rectangular Cube	7.7-7.6(Min)3.3 5.4	Grey		173A 3-3
5 Rectangular Cube	8.5(Min) 5.0(Max) 4.7	Light Grey		173A 3-1
6 Hammer	9.7-7.5 5.0	Pink	283H,I	173A 1-1
7 Disc	Diameter 7.5, Thickness 3.3		284H,I	173A 2-2
8 Large Hammer	11.0-9.8-4.0	Light Grey	283F,G	173A 1-2
9 Trapezoid	6.5 Top, 8.0 Bottom, Thickness 3.60 at Long Side, 2.7 Short Side			173A 2-1

Min = Minimum
Max = Maximum

Table 98 Reworked Mano Artifacts

		Length (cm)	Width (cm)	Height or Thickness (cm)			Figure	Plate
1	Rectangular (Shape and Section)	6.7	4.7	4.0	Grey	Well Smoothed		
2	Rectangular (Shape and Section)	7.8	4.0	4.7	Grey	Well Smoothed	284S,T	173B 3-2
3	Almost Square	6.5	5.8	6.3	Grey	Well Smoothed		
4	Large Section- Trianguloid Cross Section	12.0	5.6	4.8	Grey	Well Smoothed	284U,V	173B 4-1
5	Short Setion - Oval Cross Section	6.6	4.3	5.7	Grey	Well Smoothed	284Q,R	173B 4-3
6	Rectangular Shape and Section	6.7	4.7	4.0	Grey	Well Smoothed		
7	Rectangular Shape and Section	6.0	3.6	2.8	Grey	Well Smoothed	284F,G	173B 3-1
8	Short Section - Oval Cross Section	6.0	5.0	4.0	Grey	Well Smoothed	284M,N	173B 4-2
9	Rectangular Shaped Section	10.2	5.2	4.4	Grey	Well Smoothed	284A,B	173B 3-3

4. Spheroids (Plate 175A)

Relatively abundant and puzzling artifacts from TC-8 are spheroids of highly variable size, and made of a wide range of volcanic materials (eleven of basalt, twelve of tezontle and five of tepetate or pumice). In general the basalt examples are larger in size, ranging from 3.75 - 10 cm in diameter with an overall average diameter of 6.6 cm. The smaller tezontle, tepetate or pumice examples range from 2.5 - 4.4 cm and average 3.5 cm. Signs of wear were not noted on these artifacts under superficial examination. Possible the heavier basalt ones were used to apply plaster at wall to wall, and wall to floor junctions, which in Teotihuacan rooms always have a rounded contour. The color of the basalt spheres is uniformly light grey; the tezontle's range from grey to reddish, and the tepetate or pumice examples are cream.

C. CHIPPED STONE ARTIFACTS (Plate 174B, 184A; Fig. 293 H-K)

In Part 2 (Chapter 6, Santley et al) we published a description of the major obsidian artifact categories such as cylindrical cores and rectangular blades, bifacial points and scrapers and workshop debris for the processing of the cylindrical cores (what Sanders in Part 1 misidentified as an unusual core-flake industry). In the chapter the focus was primarily on the production process of the tools, and while their typology does overlap the typology used in Part 1 of this volume, the emphasis was somewhat different. For this reason we have included here a plate showing the major obsidian tool types that were used in the mapping of the obsidian artifacts over the grid of the excavations at TC-8 presented in Part 1 (Plate 184A).

Along with the common daily used artifacts three ground obsidian beads and three eccentrics were found. The beads vary in diameter from 7.5 to 1.3 cm with holes from .4 to .7. Also in this sample of unusual obsidian artifacts was a miniature projectile point manufactured from a blade and measuring 2.7 cm in length, .9 cm in width and .2 cm in thickness.

Besides obsidian the residents of TC-8 used a variety of non-volcanic stone that appears to be either chalcedony, jasper, or quartz, for the manufacture of crude flake tools. In our sample we found six cores and twenty-five flakes along with eighteen additional pieces of indeterminate nature.

D. STONE ORNAMENTS (Plate 179A, Row 6; Plate 183B, Row 3; Plate 184B, Left Column; Fig. 293A-G)

A distinctive Mesoamerican technology is the manufacture of a great variety of body and clothing ornaments of hard, dense, fine-grained stone, variously labelled as jade, jadeite, nephrite, and serpentine, and varying in color from cream to grey, and various shades of green and blue. Artifacts of this type are a feature of the Teotihuacan culture and a small number occur in our TC-8 sample. They were considered as precious stones by the Mesoamerican people and used as status markers. More commonly found at both Teotihuacan and TC-8 are similar artifacts but manufactured of less precious materials such as slate. The slate sample from TC-8 consisted of the following items.

1. Portion of the head of a figurine comparable in size to ceramic figurines from the site.
2. Two flat rectangular objects with incised designs
3. One spherical bead

4. 35 pieces of very thin worked slate, possibly workshop debris, more likely portions of broken artifacts
5. Two perforated thin discs

The sample of precious stone artifacts includes the following.

1. A small piece of a perforated cuboid shaped artifact
2. Unworked piece or not obviously from an unfinished artifact - two examples
3. Perforated discoidal ovoid or spherical beads varying from 1-2.3 cm in diameter, .7-1.8 cm in thickness - seven examples
4. Ear spool fragments - two examples - one measuring .4 cm in thickness, 2.0 cm in height and 3.6 cm in diameter, and the other 2.0 cm in height, .2-.3 cm in thickness and 3.0 cm in diameter
5. Worked fragments - 2 pieces

E. CERAMIC ARTIFACTS

In Chapters 4, 5, 9, and 10 we have presented analyses of two classes of ceramic artifacts from the TC-8 excavations, sherds from vessels, and figurines, the two most abundant ceramic artifacts. The excavations also yielded, however, a large number of minor - in terms of abundance - ceramic artifacts, briefly described here. Some of them are of are uncertain function, others relatively well understood as to use.

1. Candeleros (Plates 180-181; Fig. 285-287)

Candeleros are well published and well known artifacts, often considered a diagnostic of the Teotihuacan Period and influence. Approximately 239 artifacts were collected. Because of their small size and solid construction complete or nearly complete examples form the majority of this collection. The artifact is also characterized by considerable variety, much of which has chronological significance. All are very small ceramic containers, usually with two chambers, a small minority consisting of a single chamber, and the vast majority have some form of decoration. Decoration includes partial (usually the lip) or very rarely, complete burnishing, of the exterior surface; punctation, incision, or a combination of both. These variations, along with plain undecorated examples, some of which have molded zoomorphic or anthropomorphic faces modeled at one or both ends, seem to be early forms i.e. Early and Middle Phase. Most later Teotihuacan candeleros, i.e. Late Teotihuacan Phase, to which the great majority from the TC-8 sample pertain, have large impressions or indentations on the surface, occurring in rows varying from one to three, and also varying in degree of precision and neatness of their application. Many appear to have been made by pressing the fingers onto the wet clay others by a round solid, blunt instrument, in both cases causing the edge of the impressions to be raised or lipped. In plan, the vast majority of the candeleros are oval but a very few exceptions have a rectangular form. These latter seem to be early, and often have incised or punctate design and partial burnishing.

On the basis of the above variety, Kolb defined seventeen kinds of candeleros. Table 99 summarizes the characteristics of the TC-8 sample. Only a few were found in the other excavations, (five from TC-49, ten from TC-5, one from TC-10 and none from TC-46) suggesting that they became common artifacts only in the Late Phase. At TC-8 types P and Q (the two or three row large finger imprinted varieties) made up forty percent of the sample. Many of these were found in primary deposits and hence are late in date, probably Late Xolalpan, but possibly starting from Early Xolalpan times. We now believe that the latest floors from TC-8 date from the Early Xolalpan Phase.

They have been called candeleros as a descriptive term because of the size of the chambers, approximately large enough to accommodate the larger candles used in Catholic rituals. Obviously they were not candle holders since candles were introduced by the Spaniards. With respect to function, most archaeologists have considered that they were used as small incense burners, possibly for pine resin or bark. Many of them do, in fact, have the interior surfaces coated with a dark charred residue (see Plate 180B, Row 3, no. 2) or the surface of the clay itself had been burned. Many of them were found in the rooms and the patios of the apartment at TC-8, suggesting their use within the actual living space. Another possible use might be to illuminate the rooms or patios.

Table 99 Candeleros

Type	Number	Number of Chambers	Plastic Decoration	Burnish	Figure	Plate
A	1	1	Vertical Rows of Small Punctations	Absent	287A,B, W-X	181 2-2, 2-1
B	15	1 or 2	Neat Parallel Circular Punctations Bordered by Incision	Absent	287S,T,U,V	181 1-2,3,4
C	17	2	Rectangular Shape + Linear Incision	Absent		
D	31	?	Incision	Lip	287N,O	181 3-1,2,3
E	10	1	Curvilinear Incision	Some have overall Burnishing		
F	5	2	Single Row of Elongated Oval, almost Rectangular Punctations	Absent	287E-G	181 1-1
G	3	?	Modelled Face on One End	Absent	287J-M	181 4-3
H	9	2	Modelled Face at One End, One Row of Oval Punctations, Incision	Absent	287H-I	181 3-5, 4-2
I	6	2	One Row of Oval Punctation	Lip	287E-G	181 1-5; 179A 4-1
J	4	2	None	Overall Burnishing		
K	6	1	Two Rows of Oval Punctation + Effigy Face at One End	Absent		
L	18	1 or 2	None	Absent		181 4-4
M	3	2	Very Irregular Large Punctates	Absent	286	180A 2-1, 3-3
N	4	?	None	One has Burnished Lip, the Rest Absent	287C-D	
O	5	?	Small Oval Punctate	One has Burnished Lip Absent		180A 4-1
P	39	2	Two Rows of Large Oval Punctates	Absent		180A 1-2, 1-3, 2-2
Q	63	2	Three Rows of Large Oval Punctates	Absent	285D-I	180B Row 1,2,3
	239					

2. Miniature Vessels

A number of miniature vessel sherds, principally from the florero form (8 egs), along with three ollas and one cup, were found. These also were probably used in ritual but the sample is too small to test their possible spatial correlation with other ritual artifacts.

3. Sherd Discs (Plate 179B)

A very common minor artifact at TC-8 (330 egs) was the unperforated ceramic disc; in all cases manufactured from sherds of broken ceramic vessels; varying in source from large jar fragments to thin orange bowl sherds. A considerable variety occurs in diameter and thickness within this artifact category. We sorted them by size intervals and they break down as follows; 1-2 cm, 40 egs; 2-3 cm, 113 egs; 3-4 cm, 103 egs; 4-5 cm, 28 egs; 5-6 cm, 12 egs; 6-7 cm, 2 egs; 8-9 cm, 2 egs. Thirty fragments were too small to obtain reliable diameter measurements. On the distribution maps in the Part 1 Appendix they are grouped into small (1-2 cm), small to medium (2-3 cm), medium (3-5 cm) and large (over 5 cm).

With the exception of the large category, all are within the size, range and more importantly, the weight, of the Late Aztec Period mold-made spindle whorls (it would have been useful perhaps to have classified them by weight). As in the case of the Aztecs the larger ones could have served for the manufacture of maguey thread, the smaller ones for cotton. Unfortunately for this hypothesis only a tiny minority of these artifacts are perforated (these were tabulated separately and are not included in the above counts). Only thirty-one discs with holes, plus three with drill marks, suggesting intent to perforate, occur in the sample. In addition, the collections include three mold made wheels from toys, a well known Mesoamerican artifact (Plate 178, Row 5, Nos 3-5).

The supposed spindle whorl function seems unlikely, even for the perforated ones, considering the small number of them for what would have been an important household activity. In contrast, the same excavation yielded ninety-eight mold-made spindle whorls, dating from the Aztec Period, from houses much smaller in size than the Teotihuacan houses and built on the summit of their remains. This sharp contrast in numbers is support for the argument that they probably were not used as spindle whorls.

One possible function is as patolli pieces (we found patolli games incised on the floors of one of the rooms at TC-8, Mound 1-2 and they have been found in excavated structures in many localities within the ancient city), but their abundance, and variation in size suggest that this could not be the only function. Possibly the smaller discs served this purpose. One possibility is that the great majority of them were actually manufactured with the intent to use them as whorls, but stored unperforated until they were needed. The large number and ratio to Aztec moldmade whorls would support this notion. Their parallel distribution to other artifacts, with respect to space within the compound, does not, however, suggest storage, but rather use.

Along with the discs, an additional fifteen worked ceramic sherds, varying in shape from oval to rectilinear were collected, of uncertain function. Possibly they were used to scrape soft materials.

4. Pipes-Flutes-Whistles (Plate 177B, 178; Fig. 288, 292A-C)

A relatively common ceramic artifact at TC-8 was the tobacco pipe, but we are not certain of its Teotihuacan age. Tobacco pipes, in general, in Mesoamerica have been considered as primarily Post-Classic in date, and even these are only common in the West Mexican sub-culture area. Many, therefore, possibly all, may have been of Aztec date. The total sample consists of 117 fragments of pipes, and an additional sixteen whistles and seven flute fragments. Only eighteen fragments were found in primary contexts (see Table 19-21, Part 1) but even this number includes flutes and whistles.

Among the pipes are fifty-four pieces that include bowls or parts of bowls (and hence of certain pipe identification), often with pieces of the stem still attached and fifty-three stem fragments (a number of these, particularly the small mid-section pieces may have been flute fragments rather than pipes), five additional pieces were classified separately because of the presence of a red paint on the surfaces. Most of them are well burnished, well manufactured artifacts, often with zoomorphic or anthropomorphic modelling, usually combined with incised decoration. Thirty-five fragments have a yellowish or whitish slip, eight fragments are unslipped or unburnished, and the balance usually have a well burnished surface varying in color from tan to black.

In all but one case the bowl-stem angle is rounded and does not form a right angle. A number of stems have modelled, wing-like ornaments added just below the junction with the bowl and bowls, occasionally show scars from or the actual remains of leg-like appendages for their support.

Additional ceramic artifacts, also of uncertain date, include a number of small fragments and a few cases of larger, almost complete examples of whistles (sixteen examples) and flutes (i.e. tubular pieces with perforations - seven examples). An additional number of large hollow handles, without perforations, are probably handles for portable incense burners, a Post-Classic artifact and presumably dating from the Mazapan or Aztec occupation of the site.

5. Pendant

A additional unique ceramic artifact in the collection is a single small ceramic artifact that has been pierced for suspension and was used presumably as some type of pendant.

6. Cone Shape Artifacts

Sixteen small solid objects, elongated, cylindrical and cone shaped, i.e. pointed at one end and flat at the other end, were found and are probably appendages to some larger object.

7. Effigies

Besides the anthropomophic or zoomorphic figurines we found three very small effigies, including a sea snail, an ear of maize, and an almond nut, that were also probably attached to some larger object.

8. Ear Spools

Eleven solid ceramic ear spools were found, in the form of cylinders with flattened ends, generally well smoothed or lightly burnished. One has an incised cross design and several others have similar designs, but with the two opposite cuadrants set off by small punctate impressions. Diameters vary from 1.7-3.0 cm, thickness from 1.2-1.6 cm. Eight additional ear spools were of the hollow "napkin ring" type with highly burnished dark surfaces. In the two cases, where the artifact was complete enough to obtain rim diameters, they measured 2.0 and 2.7 cm, and the length varied between 1.5 and 3.0 cm. Two additional solid ear spools were much smaller in size (ranging from 1.7-2.1) in length, diameter 1.1 cm), were cylindrical in shape, with flaring ends.

9. Figurine Molds

In Part 2, Chapter 6 we described and classified a great number of mold made figurines found in the TC-8 excavation. In striking contrast only two figurines molds were found, one of which is Aztec. The lone Teotihuacan mold is for the princess type figurine.

10. Small Mold Made Artifacts

Finally, among the ceramic artifacts were a very large number of mold made ornaments, with highly variable shape and design, that apparently came from shattered remains of the large, composite, mold-made censers referred to in the literature as the "teatro" type (see Plate 183 and discussion in Chapter 4).

11. Roof Ornaments (Plate 177A)

Approximately thirty-five fragments of a very large, thick (varying from 2 to 3 cm) ceramic artifact were found in the excavation of Mound 4; five additional ones came from Mound 3. Approximately 8 to 10 fragments have lost proveniences but almost certainly came from Mound 4.

Some of the sherds were portions of a feline effigy, including heads, forelimbs, hindlimbs, and body fragments. The heads measured 12 by 5 cm, the forelegs are 10.2 cm high, measuring from the shoulder to the sole of the paw. We estimate that the entire effigy, when assembled, probably measured 40 cm long and perhaps was about 20 cm high. It appeared to have been mounted or molded within a rectangular frame and formed a placque like object. There is also evidence that the jaguars carried feather headdresses. Traces of white plaster were found on some sherds. All four of the pieces from Mound 3 look like portions of the rectangular frame and perhaps were associated with a different type of artifact.

Approximately 2/3 of the sample from Mound 4 was found on the steps in front of Porch 5, three from the steps of Porch 2, and the balance from Porch 6 and its adjacent staircase. We suggest, but have no direct evidence, based on their size and distribution, that they probably were portions of roof ornaments and that the roof was decorated with a frieze of marching felines.

12. Seals or Stamps (Plate 179 Rows 1-3, Figure 289)

Eight fragments were found of stamps that may all be of Post-Classic age; all of these are illustrated in Figure 289. An additional six were from other Teotihuacan sites but are not drawn. They may be seen, however, in Plate 179A, rows 1-3.

Stamp and Seals

	Figure 289
Geometric, Fret Motif Fragment. Rectangular Shape, Flat	A
Geometric, Linear/Serrate Motif Fragment. Square/Rectangular Shape, Flat	B
Monkey, Body/Handle Fragment. Natural Shape, Flat	C
Geometric, Fret Motif, Handle Fragment. Square/Rectangular Shape, Flat	D
Monkey, Head + Body Geometric Motif Handle Fragment. Square Shape, Flat	E
Geometric, Linear Motif Handle Fragment. Square/Rectangular Shape, Flat	F
Geometric, Series of Fret Motifs Handle Fragments. Rectangular Shape, Curved Surface	G
Geometric, Linear Motif Fragment. Square/Rectangular Shape, Flat	H
Geometric, Linear Motif Serrate Handle. Rectangular Shape, Flat	
Geometric, Linear Motif Handle Fragment. Cruci-Form Shape, Flat	
Monkey, Head + Body Fragment. Natural Shape, Flat	
Geometric, Fret Motif Fragment. Square/Rectangular Shape, Flat	
Geometric, Fret/Concentric Motif Circles Fragment. Rectangular Shape, Flat	
Geometric, Spirals ("Sun Burst") Motif Fragment. Square/Rectangular Shape Flat	

F. BONE AND SHELL ARTIFACTS (Plate 184B Center Column, Row 1, 2, 3, Right Column; Figure 294)

Along with the partial osteological remains of animals, (described in Volume 4), or humans, along with nearly complete human skeletons found in the burials described in Chapter 3, Part 1, the project also collected twenty-five artifacts manufactured of human or animal bone, the majority of the latter. Artifacts of ordinary domestic activities include chisels (2), large awls (4), small awls and/or needles (5). Artifacts of more restricted use, i.e. those used as body or clothing ornaments, include one cylindrical bead, two perforated dog canine teeth, two carved effigies, all probably made from animal bone; three musical rasps made from human tibiae and a carved human skull fragment in the form of a disc 3 cm. in diameter and perforated by a hole 2 cm in diameter. In the preliminary report (Sanders 1965), I discussed the occurrence of isolated but unworked human mandibles and suggested their possible use as war trophies. In Part 1 Chapter 2 of this volume we have reconsidered the evidence, particularly considering the comparative data presented in the 1980 excavation of Tlajinga 33 (Storey 1992). The most probable explanation of their occurrence lies in the constant disturbance of earlier burials as later ones were inserted, during the history of use of the Teotihuacan compound. Information on the bone artifacts is summarized in the following table.

Table 100 Bone Artifacts

Artifact Type	# of Artifacts	Commentary
Carved Ornament	1	Flat Piece 1.5 mm Thick with 2 Perforations
Perforated Dog Canine Teeth	2	Drilled Hole in each, possibly Part of a Necklace
Beads	1	Cylindrical 1.8 cm long, .9 cm Exterior Diameter, .6 cm Interior Diameter
Chisels	2	One End Carved to Form a Gouge
Musical Rasps	3	Made from Human Tibiae Carved to a Point at One End and with Notches along One Side
Large Perforator	4	Long Thin Tools with Pointed Ends
Small Perforator	5	Smaller Version of above
Needles	5	One has an Intact Eye
Worked Skull Fragment	1	Circular, Perforated 3 cm in Diameter, Probably Human
Carved Effigy	1	Anthropomorphic

In the excavations at the three residential Mounds at TC-8 over 4,000 pieces of shell were found, the vast majority of them unworked. A discussion of the unworked shell is presented in Appendix L and here we will only discuss the very few cases where shell was actually worked into artifacts. The sample includes the following artifacts.

Table 101 Shell Artifacts

Artifact Type	# of Artifact	Commentary
Small Sea Snails	3	Perforated for Suspension
Carved Ornaments	2	1 is Triangular in Shape and with a Single Perforation the other has a more Complex Outline and has a Partial Perforation
Carved Disc	4	All Fragmentary
Carved Rectangular Ornament	2	Both Fragmentary
Chisels	2	
Tooth Effigy	1	
	14	

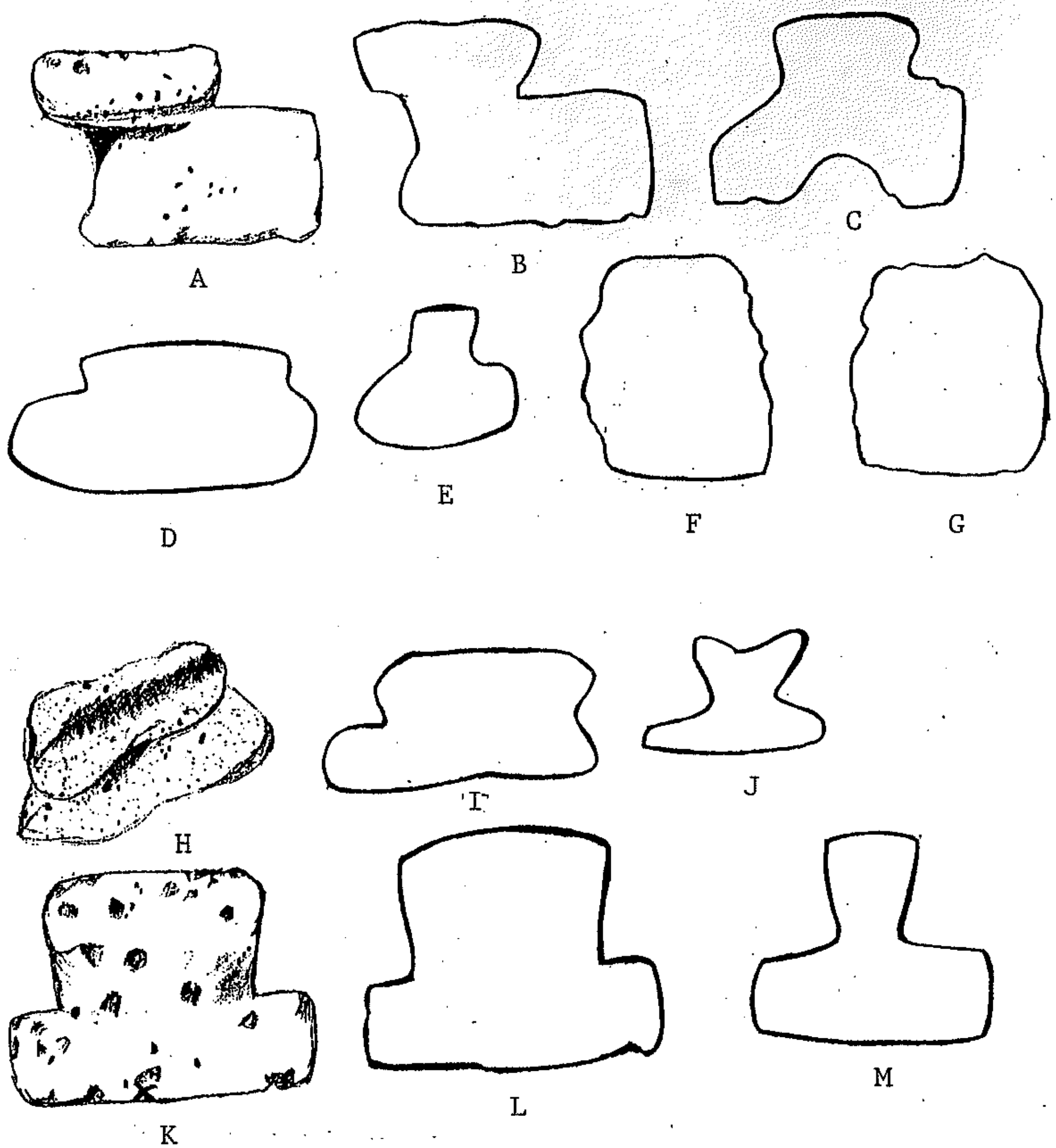


Figure 276

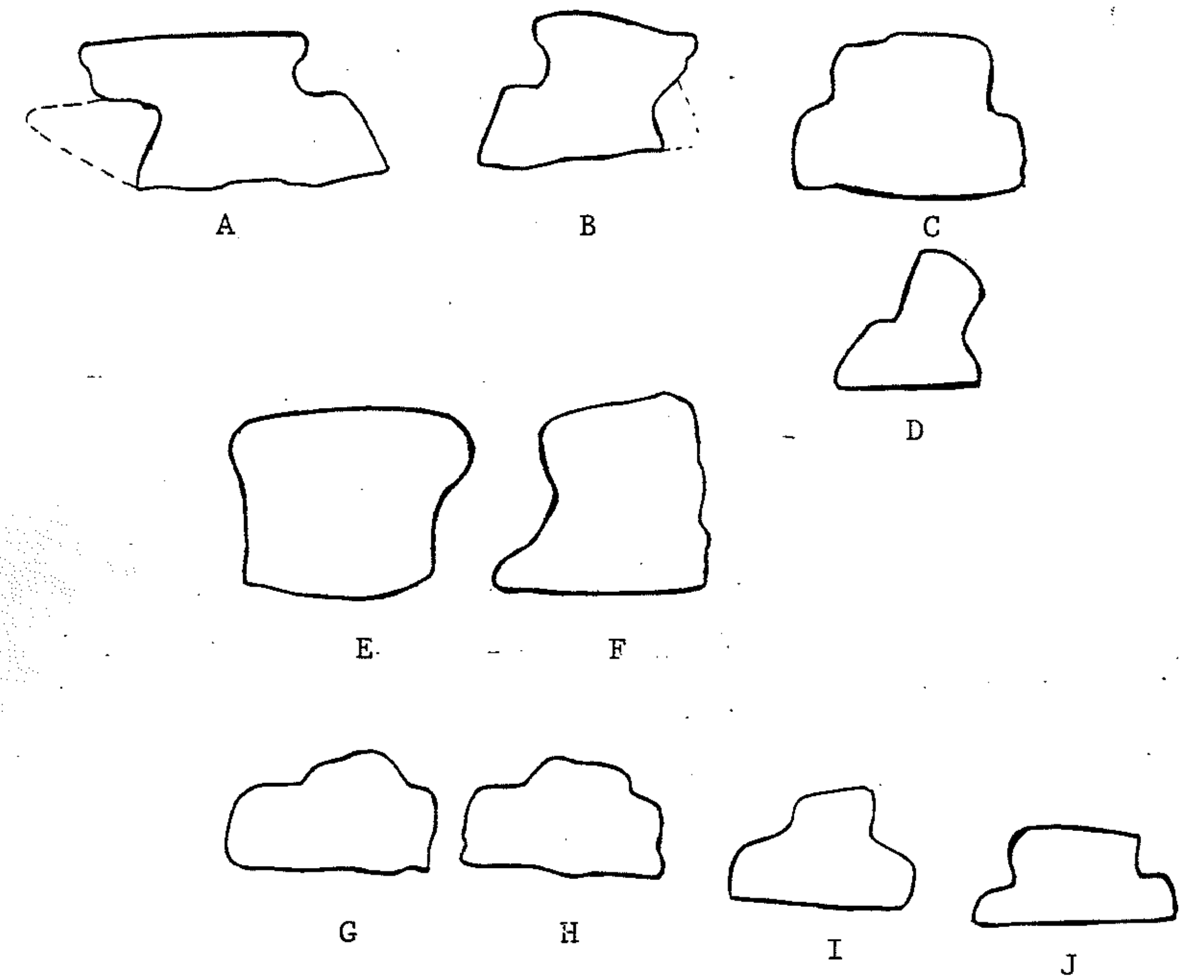
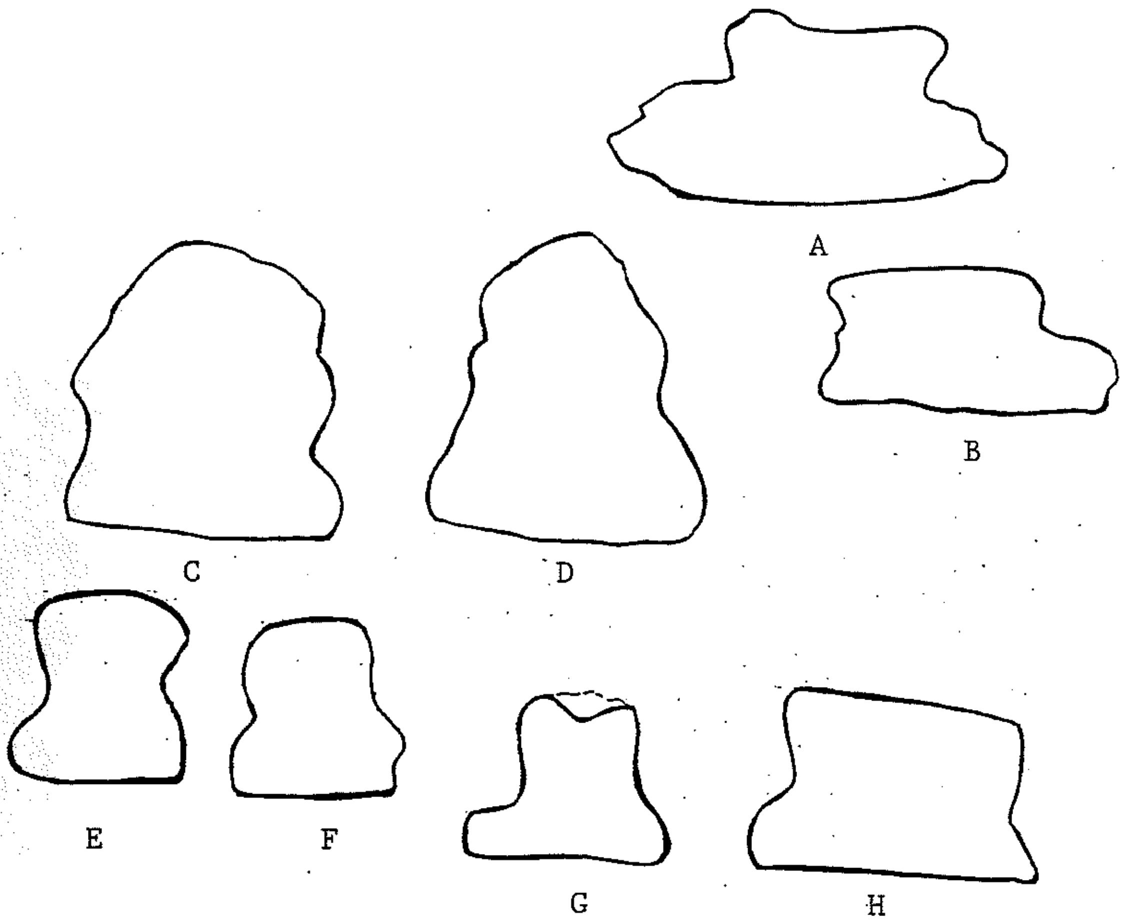


Figure 277



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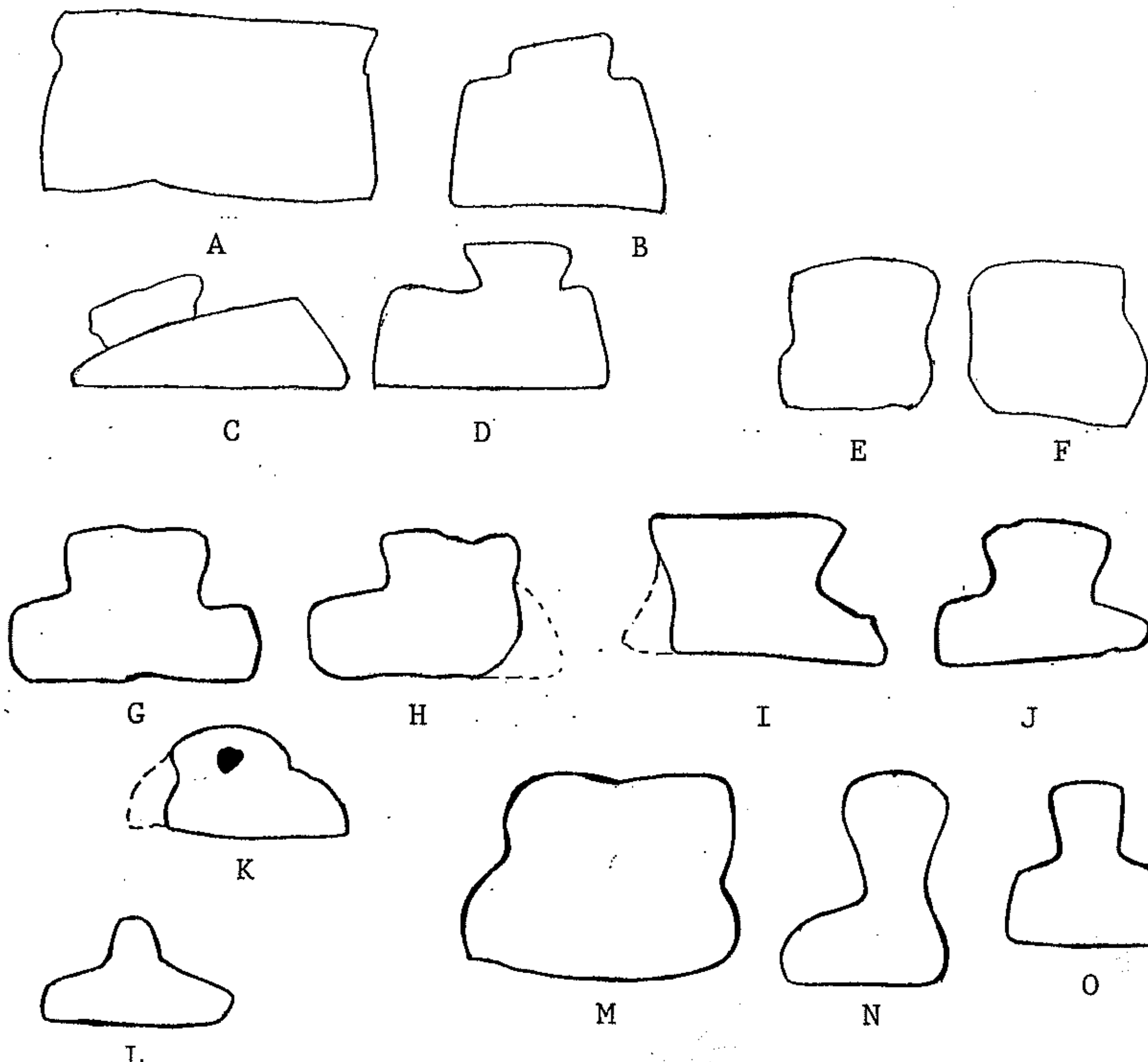

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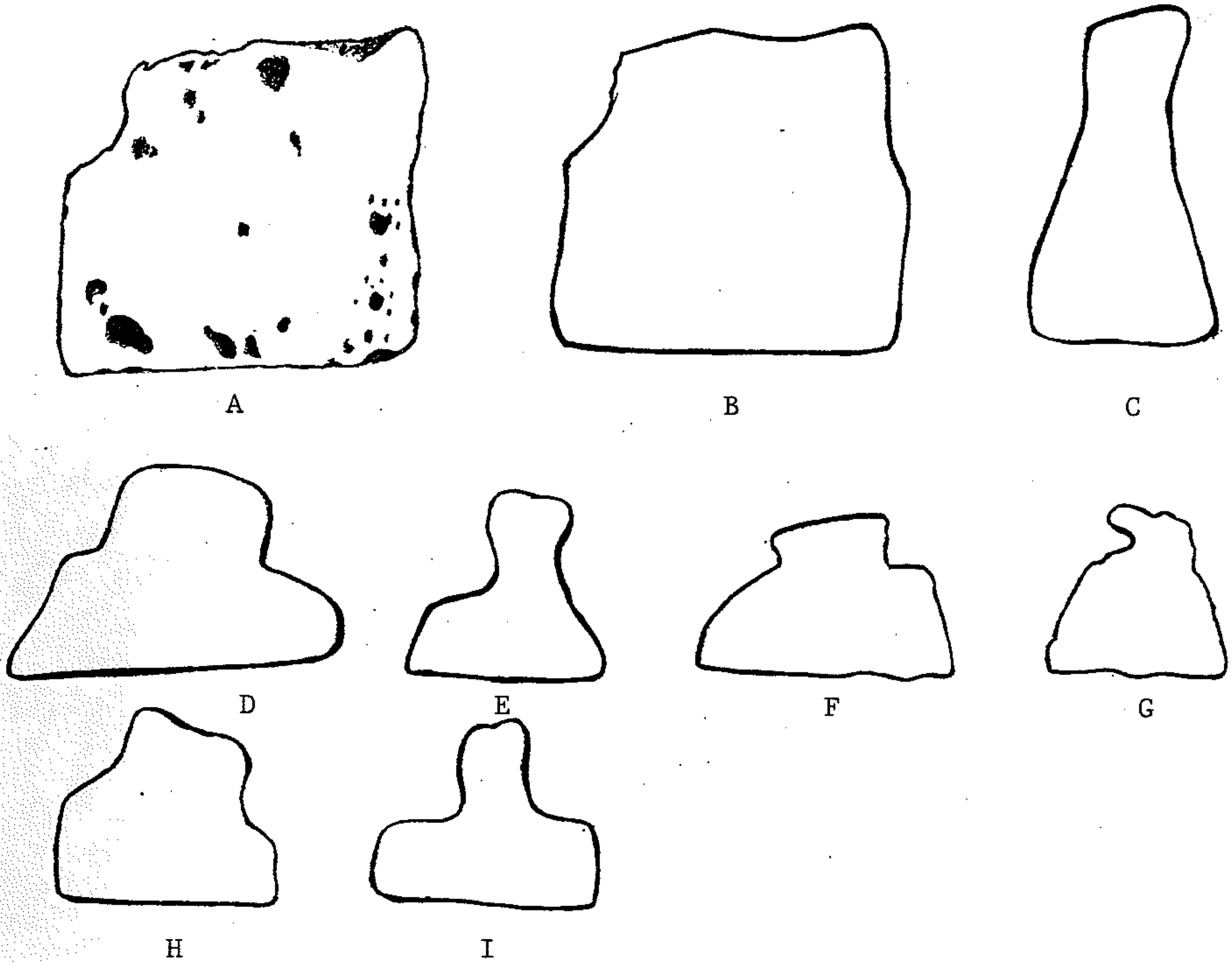

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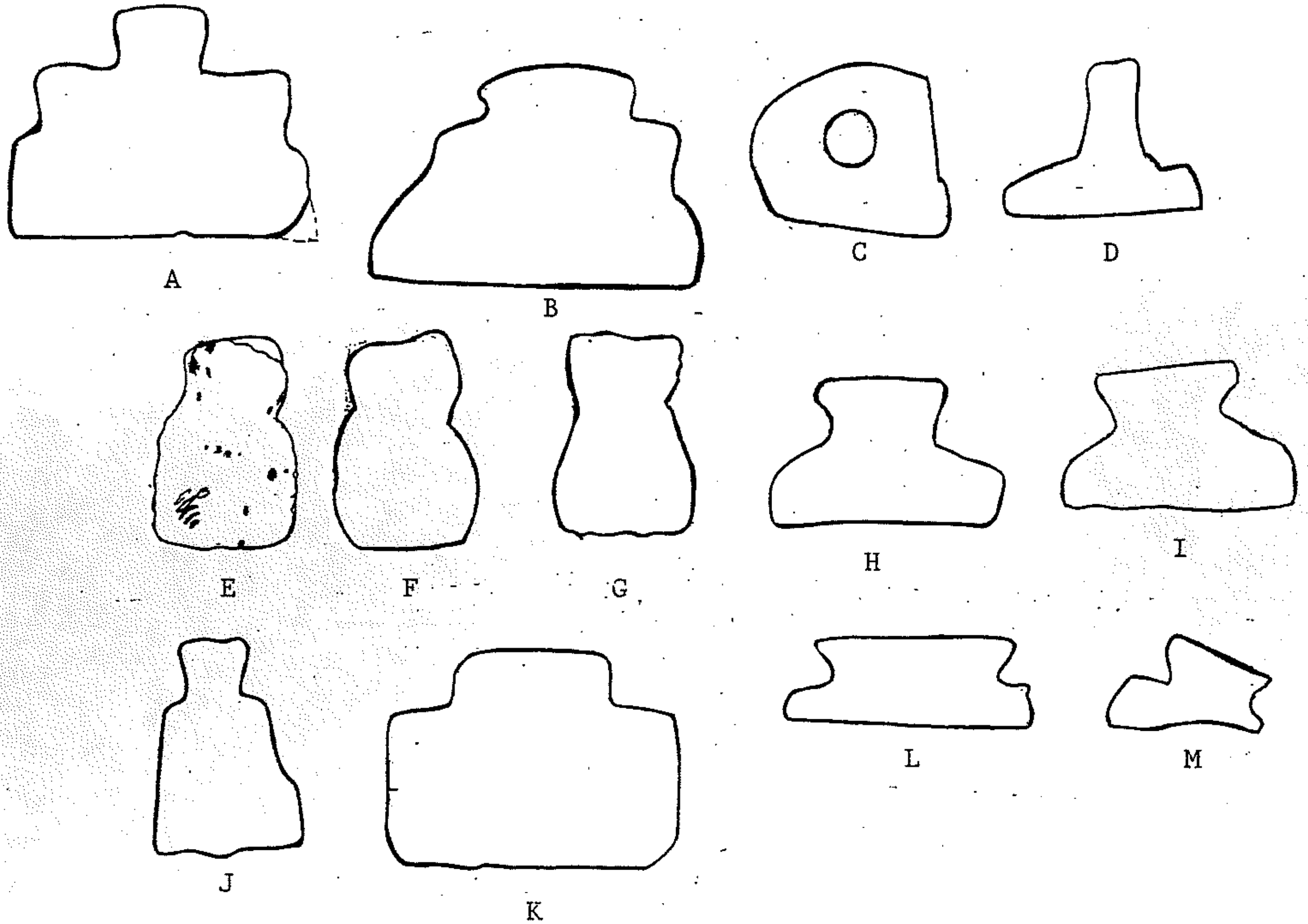

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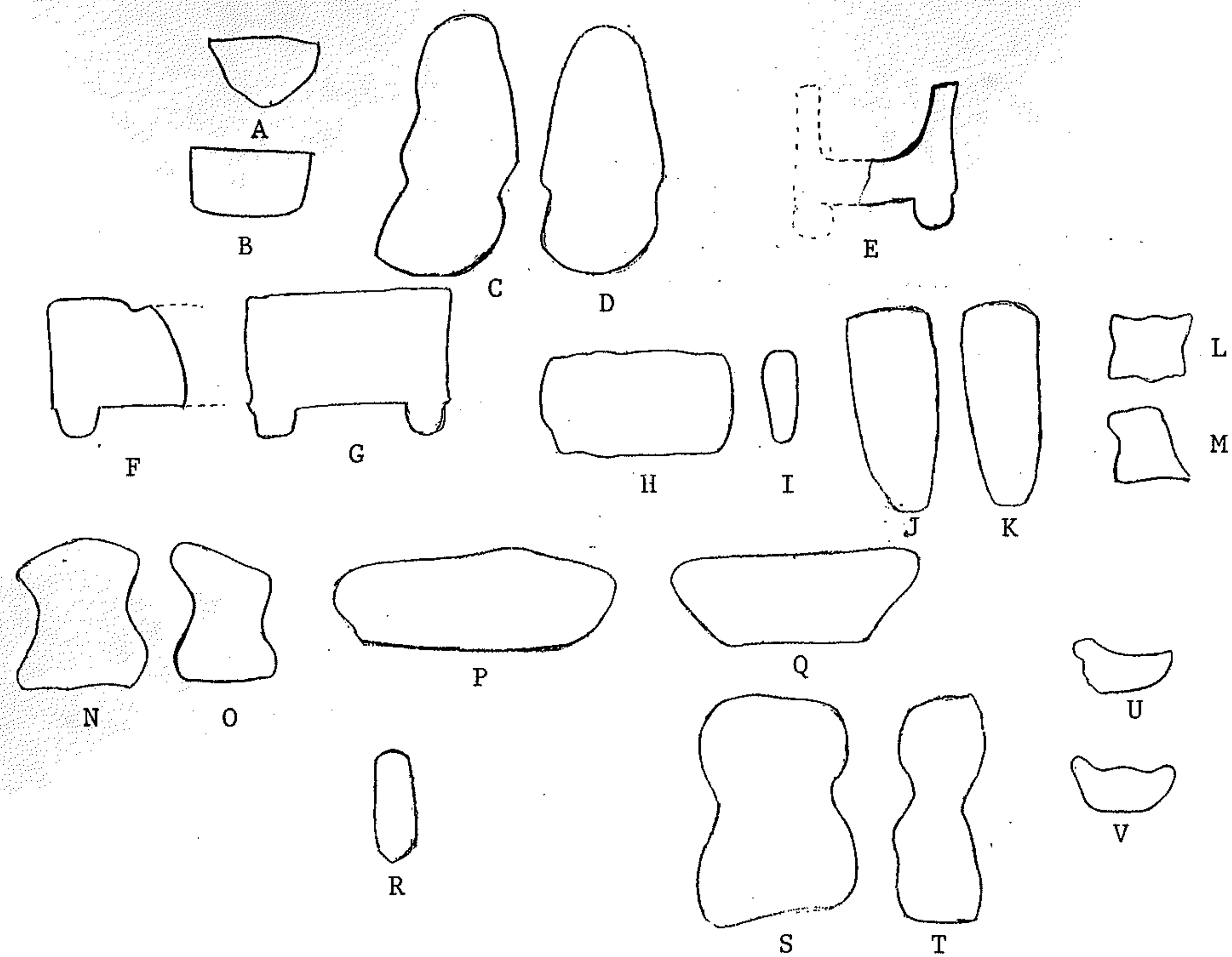

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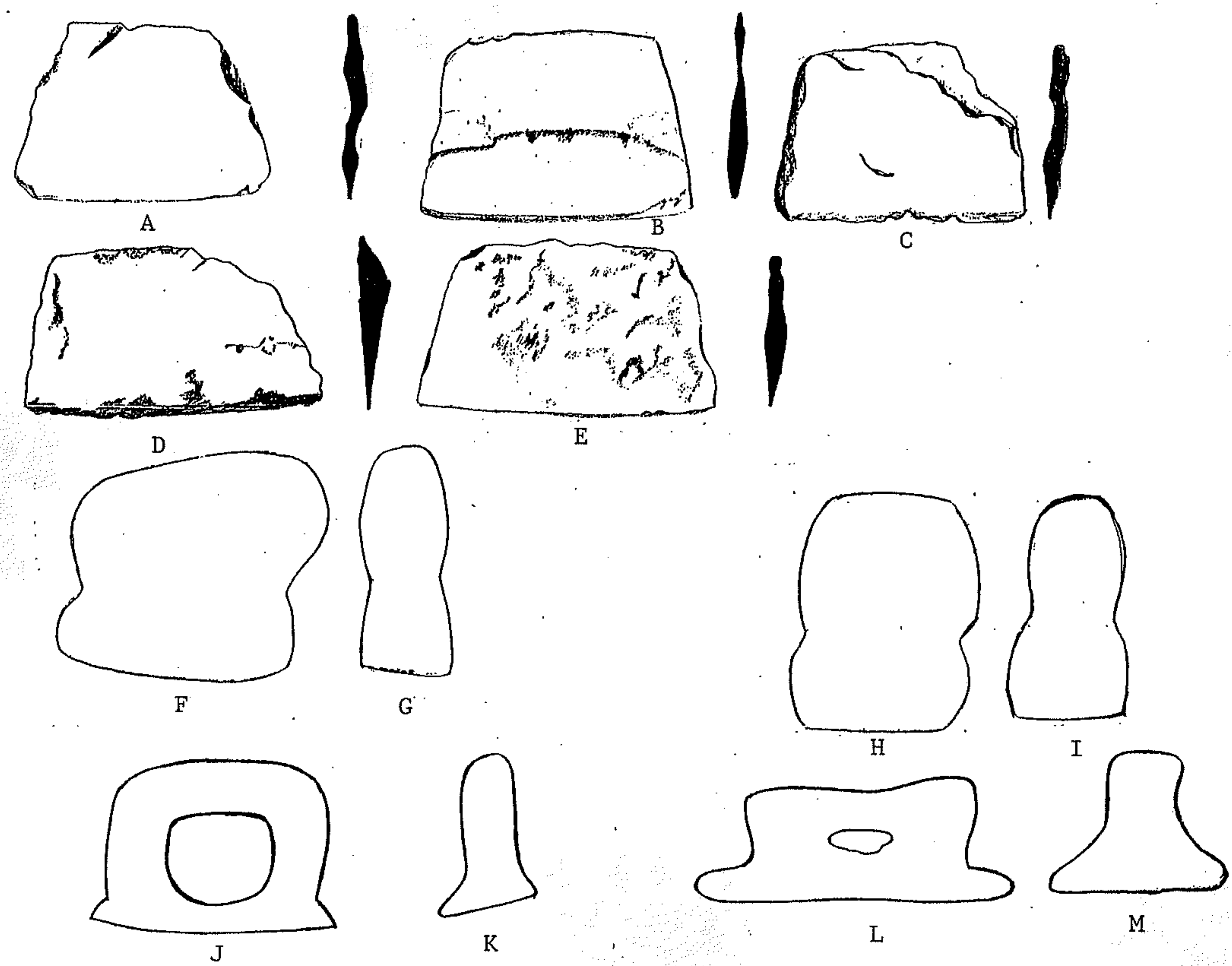
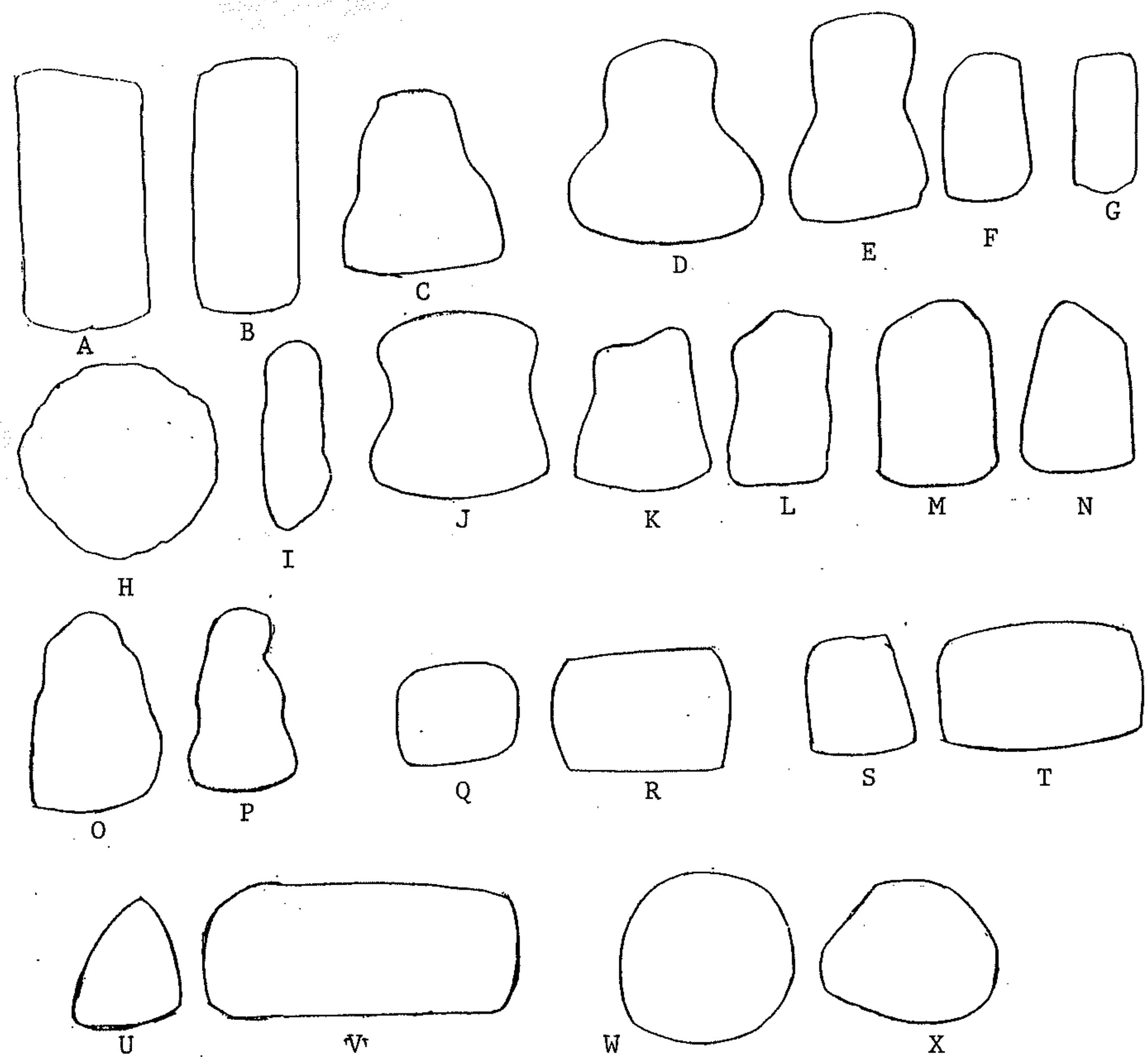


Figure 283

Figure 284



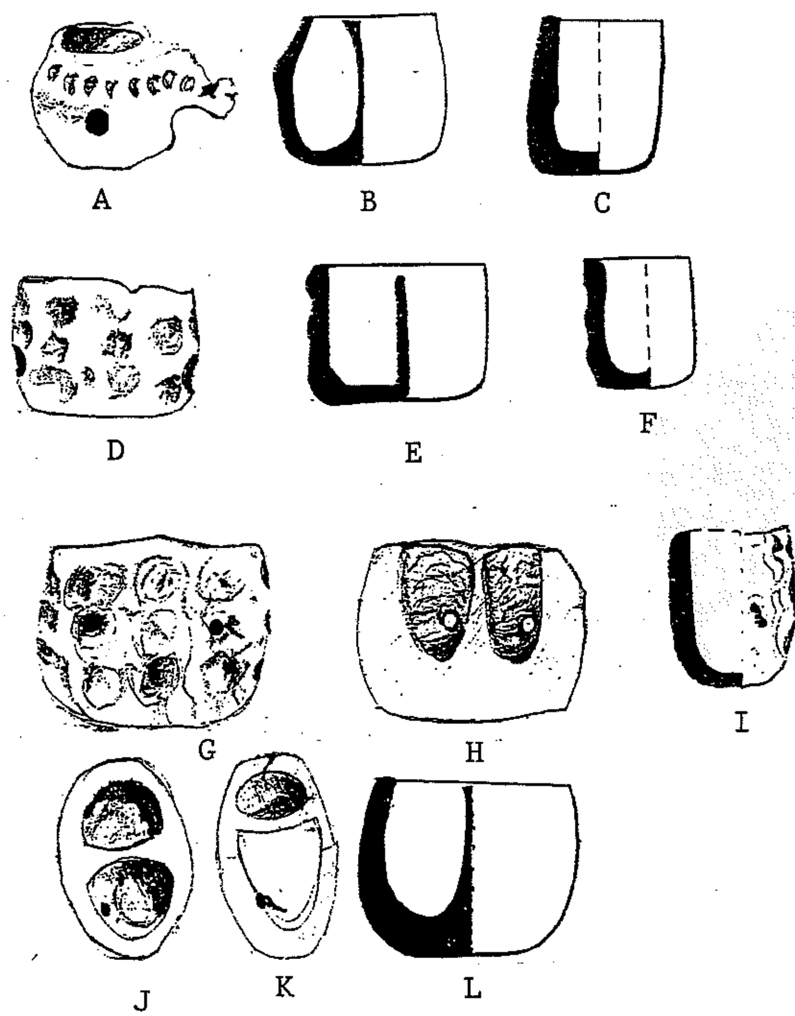
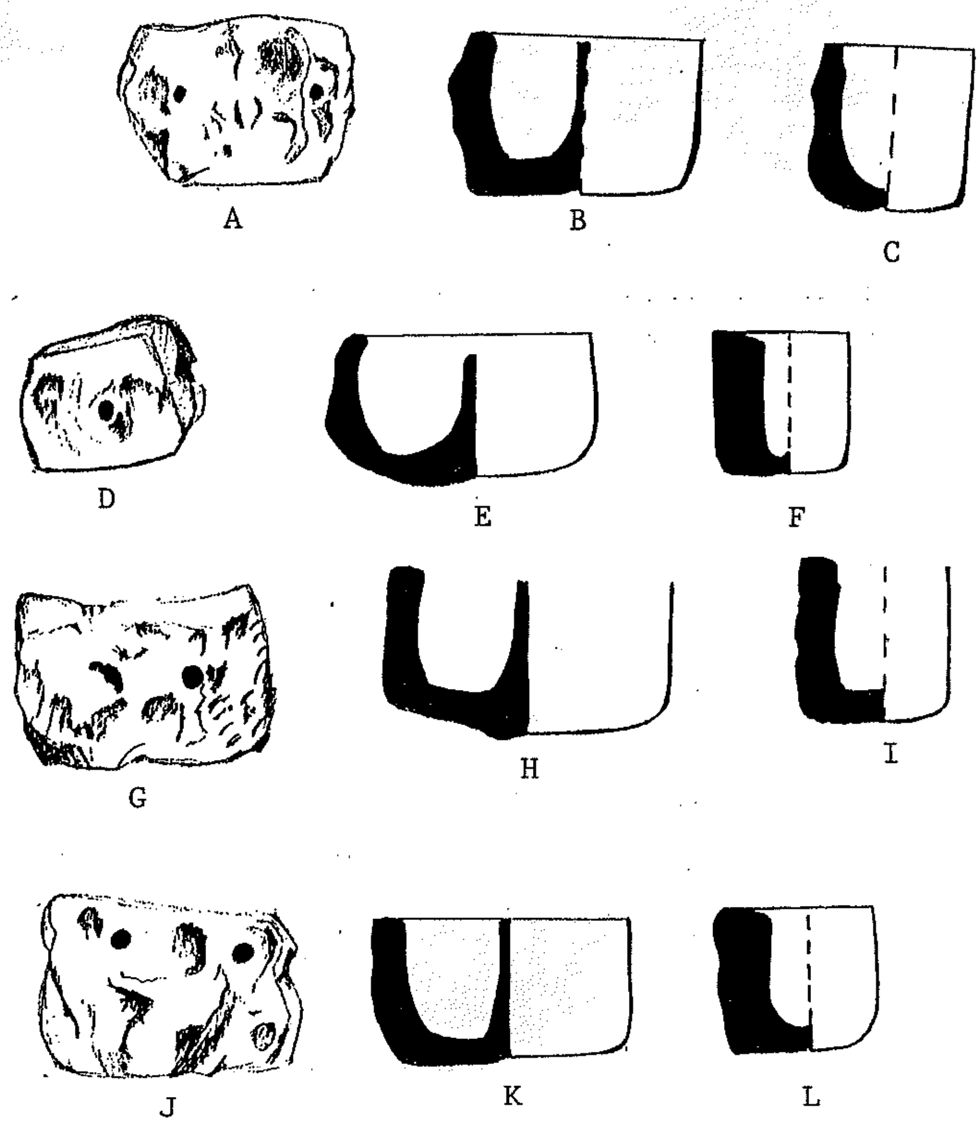
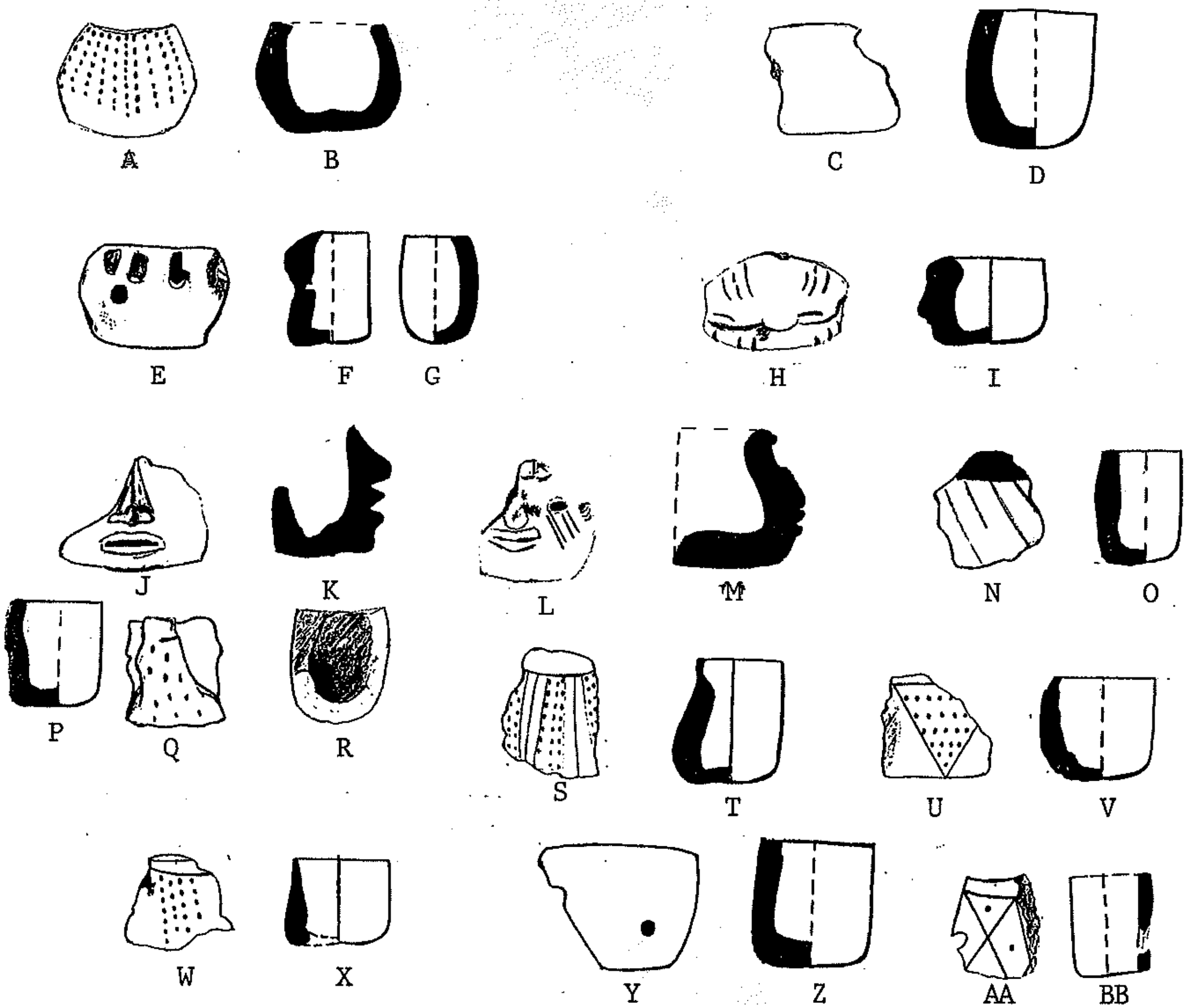


Figure 285

Figure 286





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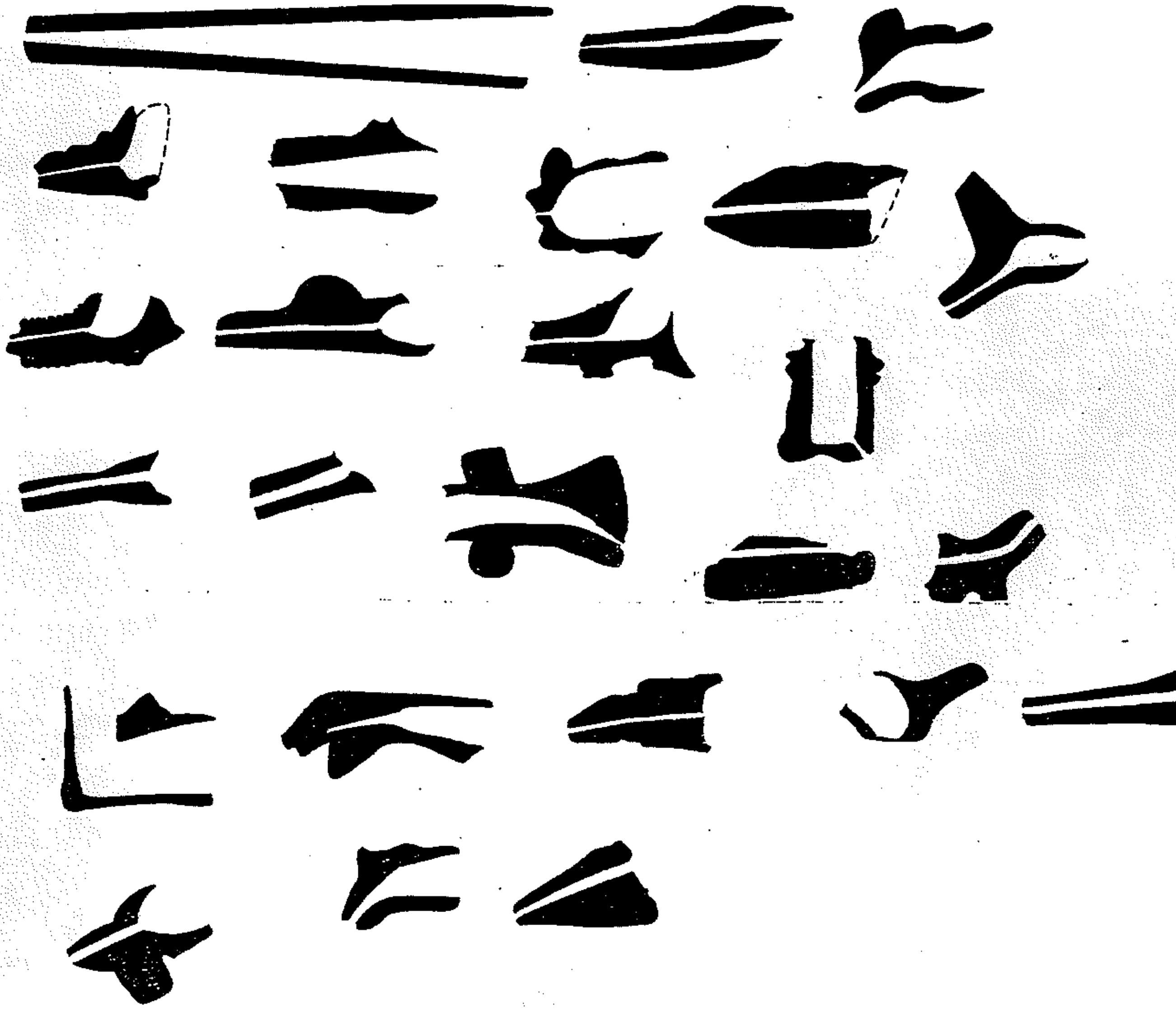
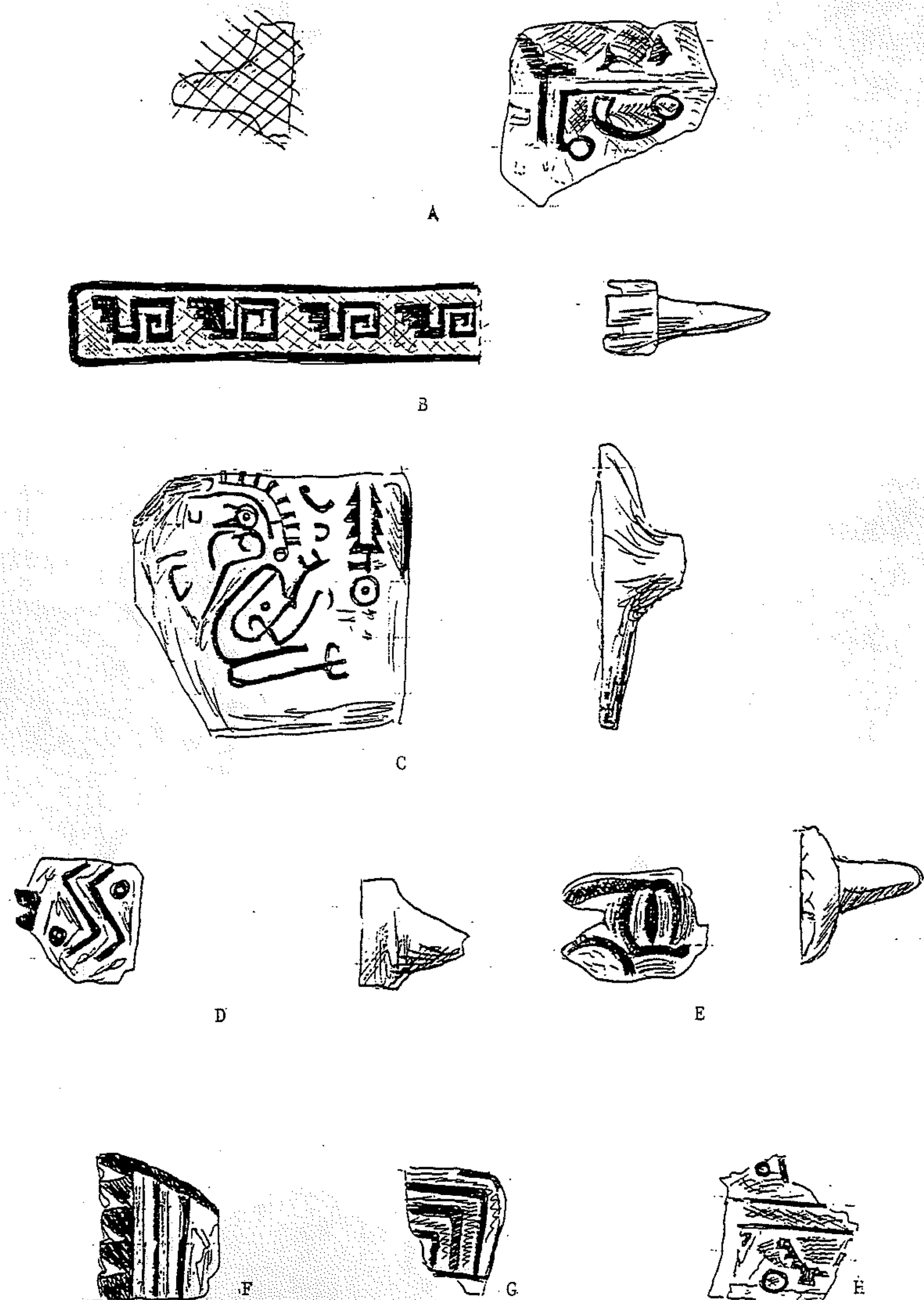


Figure 288

Figure 289



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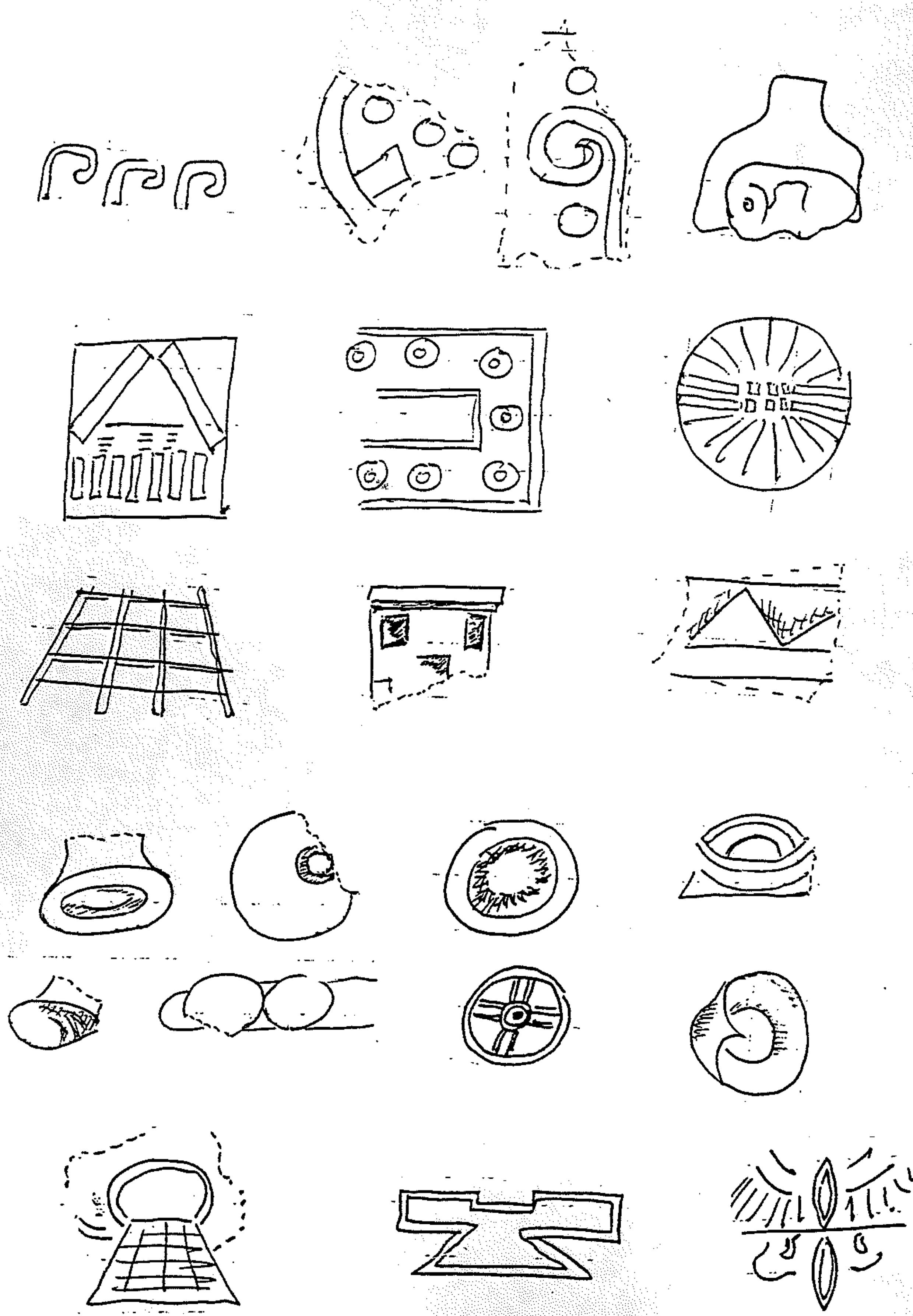

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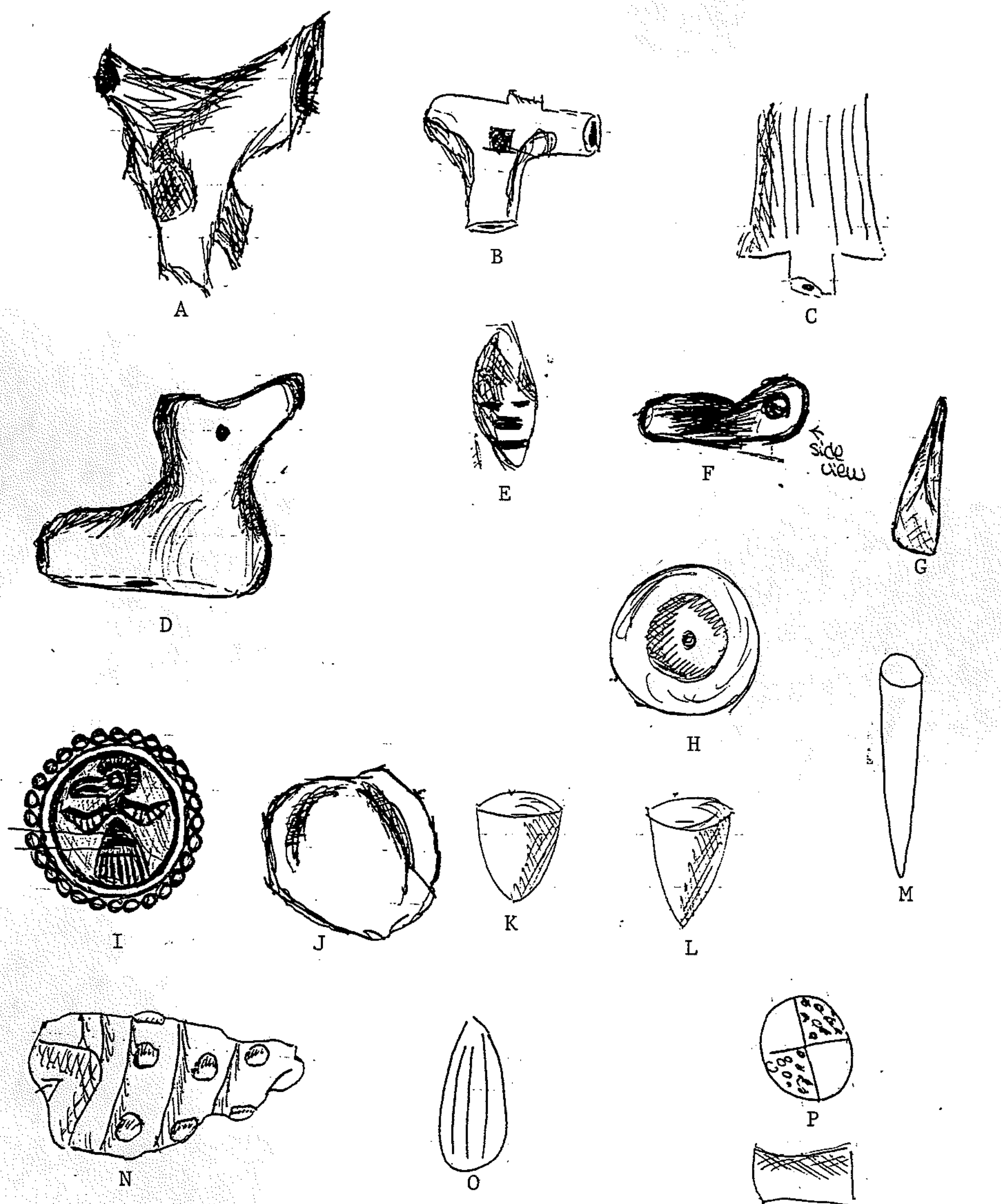

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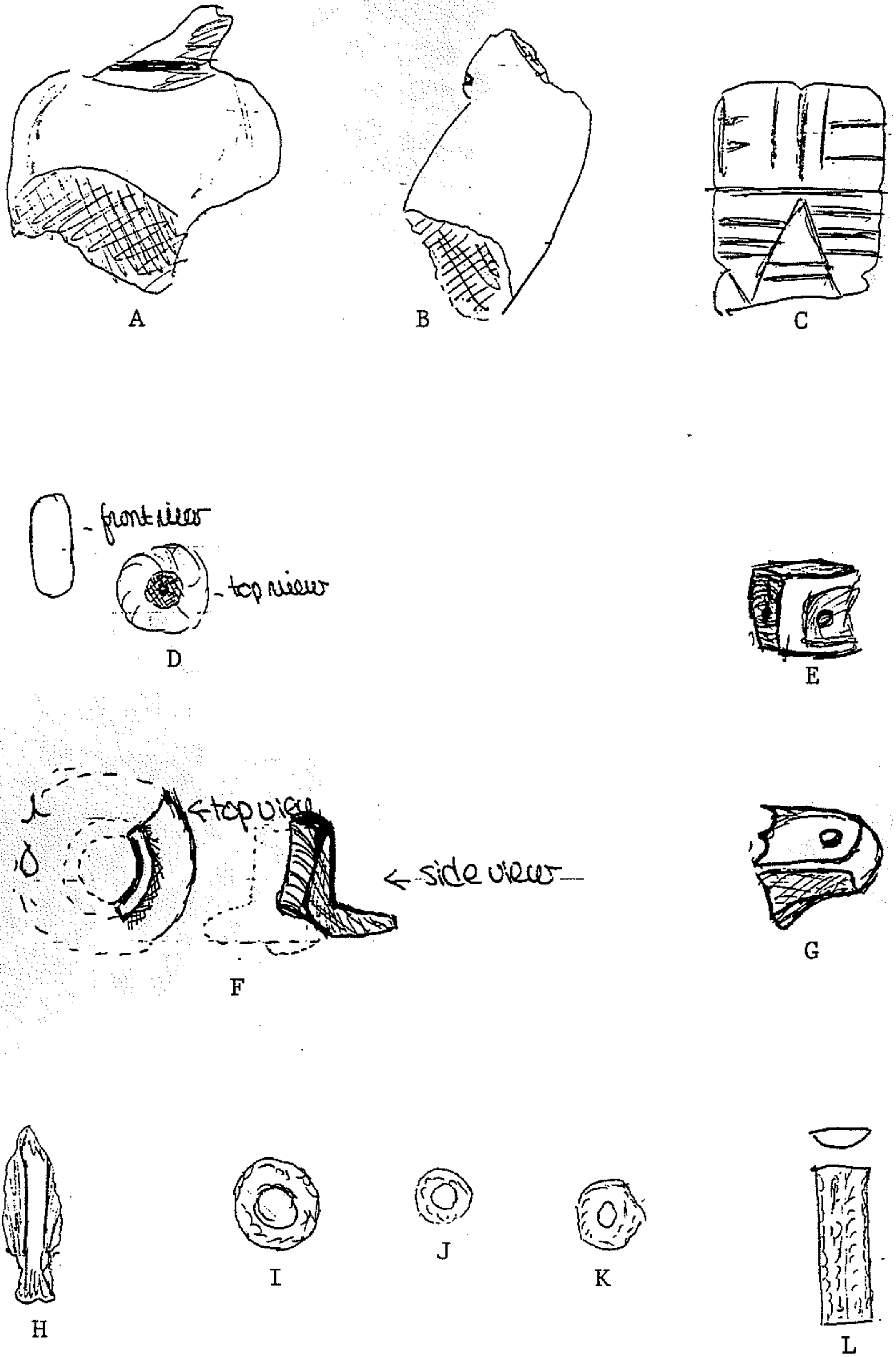

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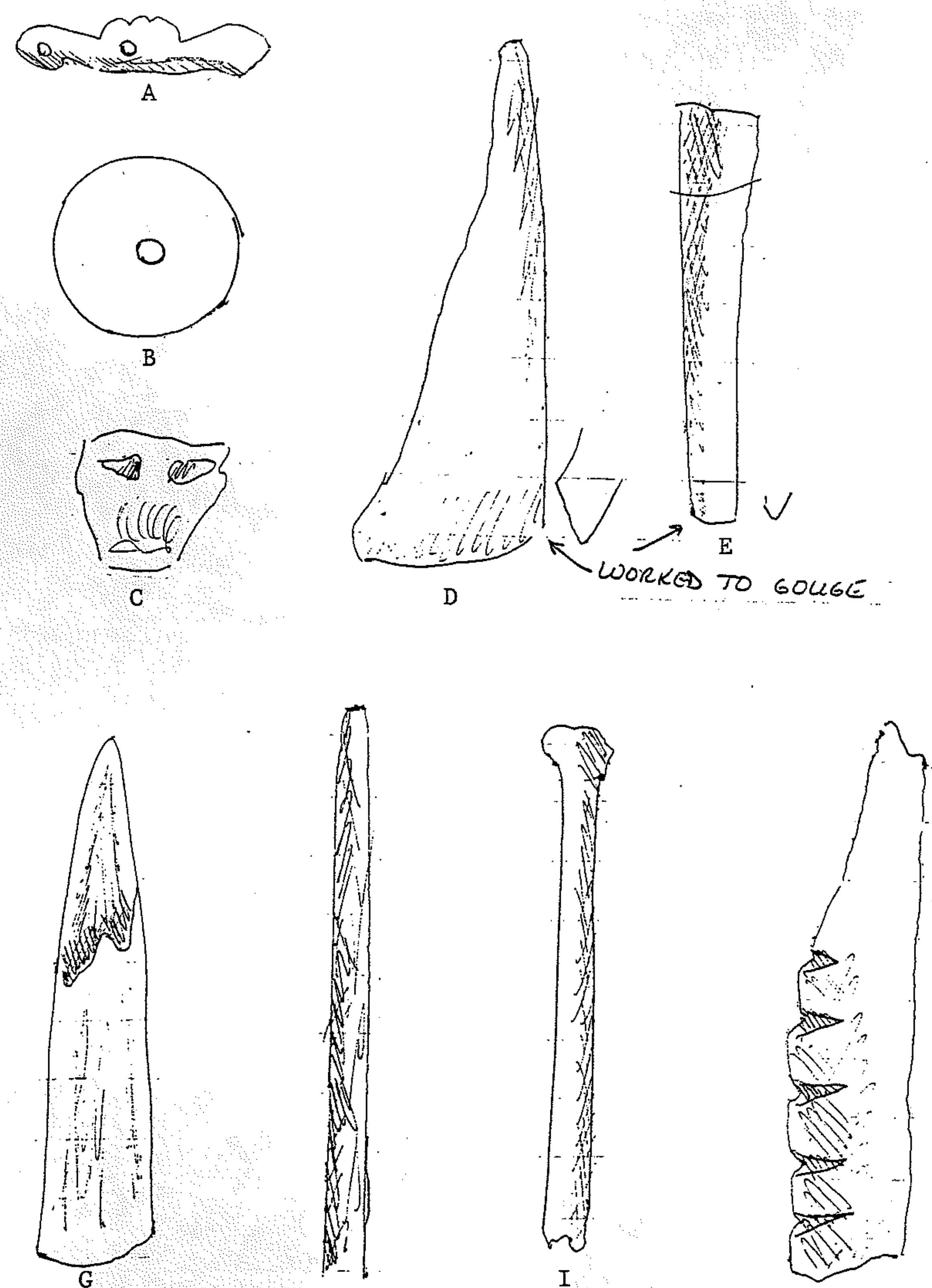

Figure 294

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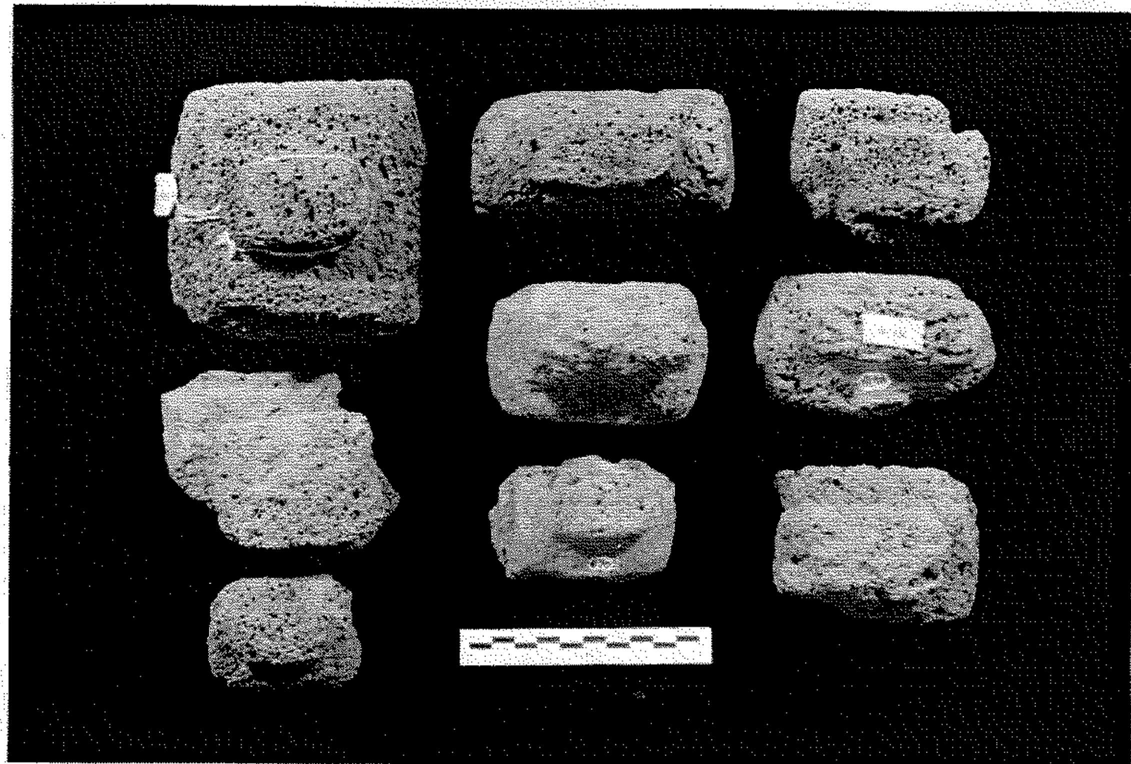

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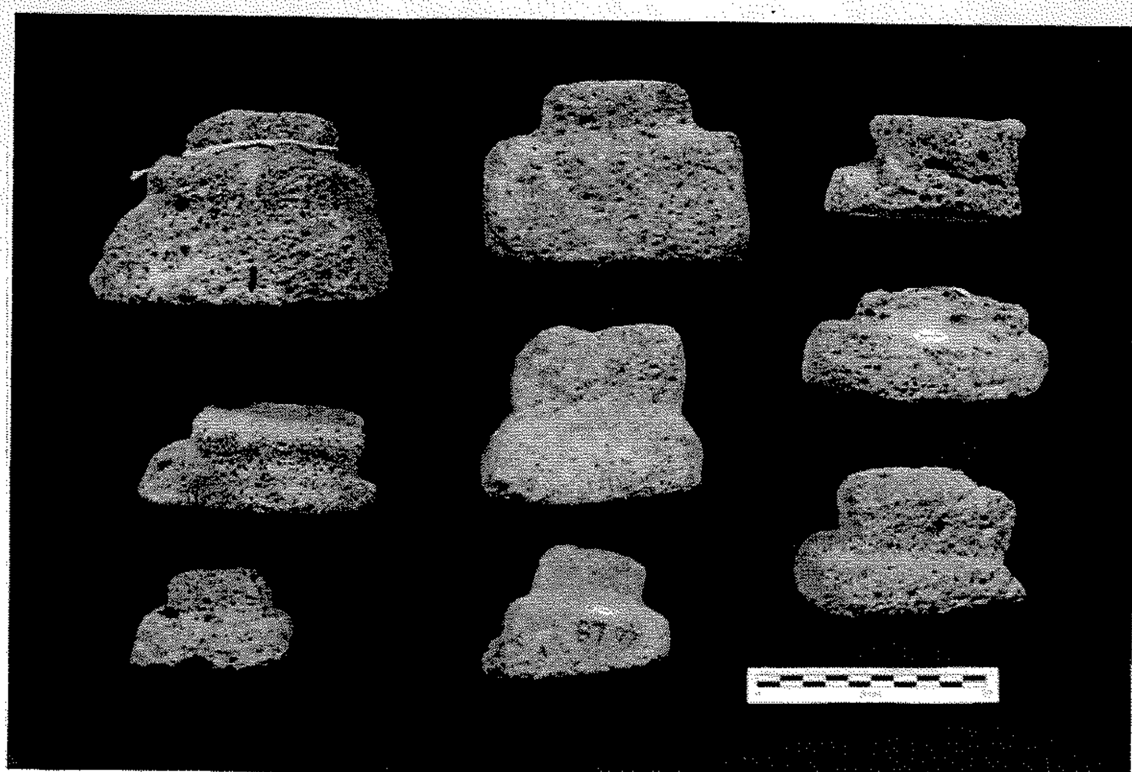
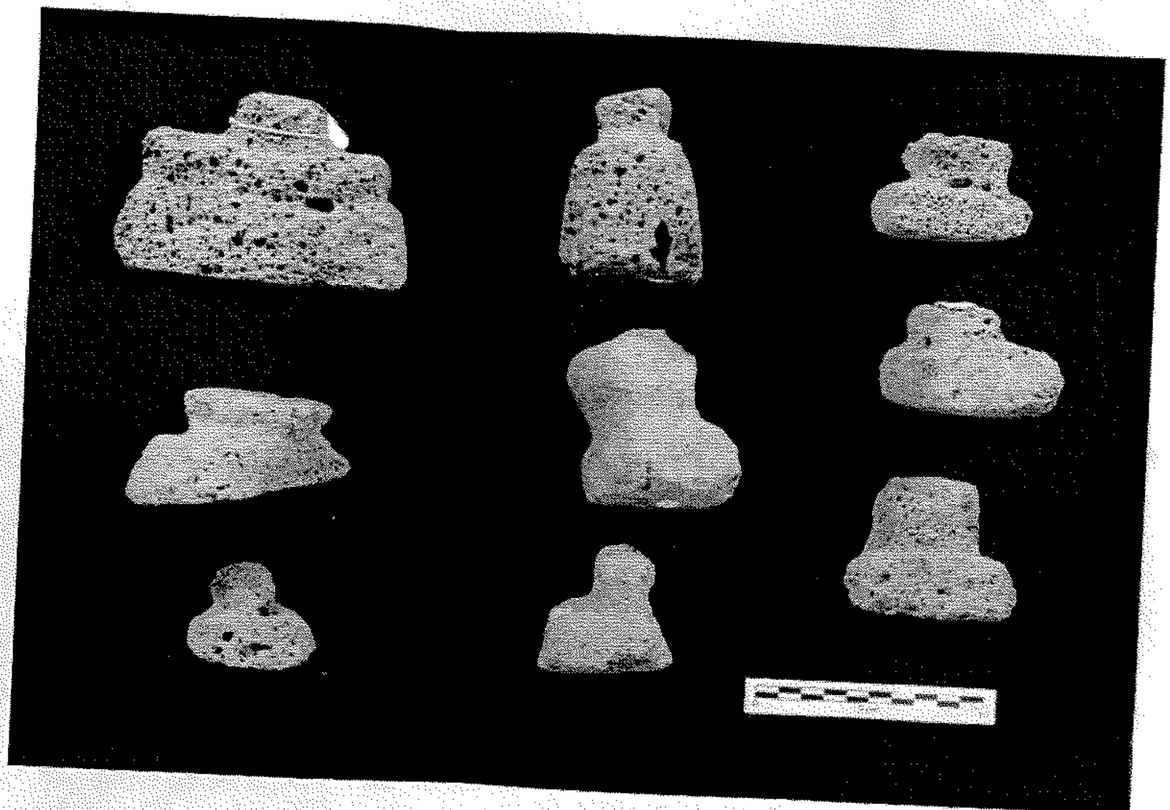


Plate 166

A



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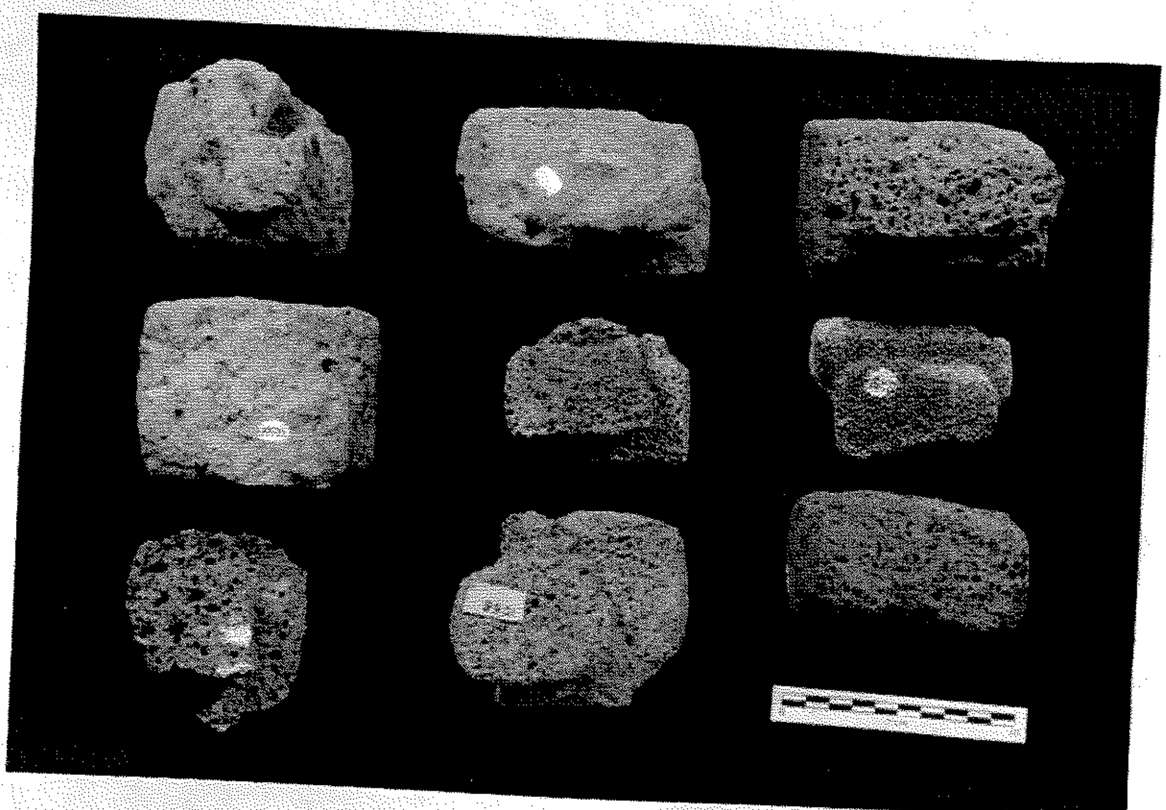
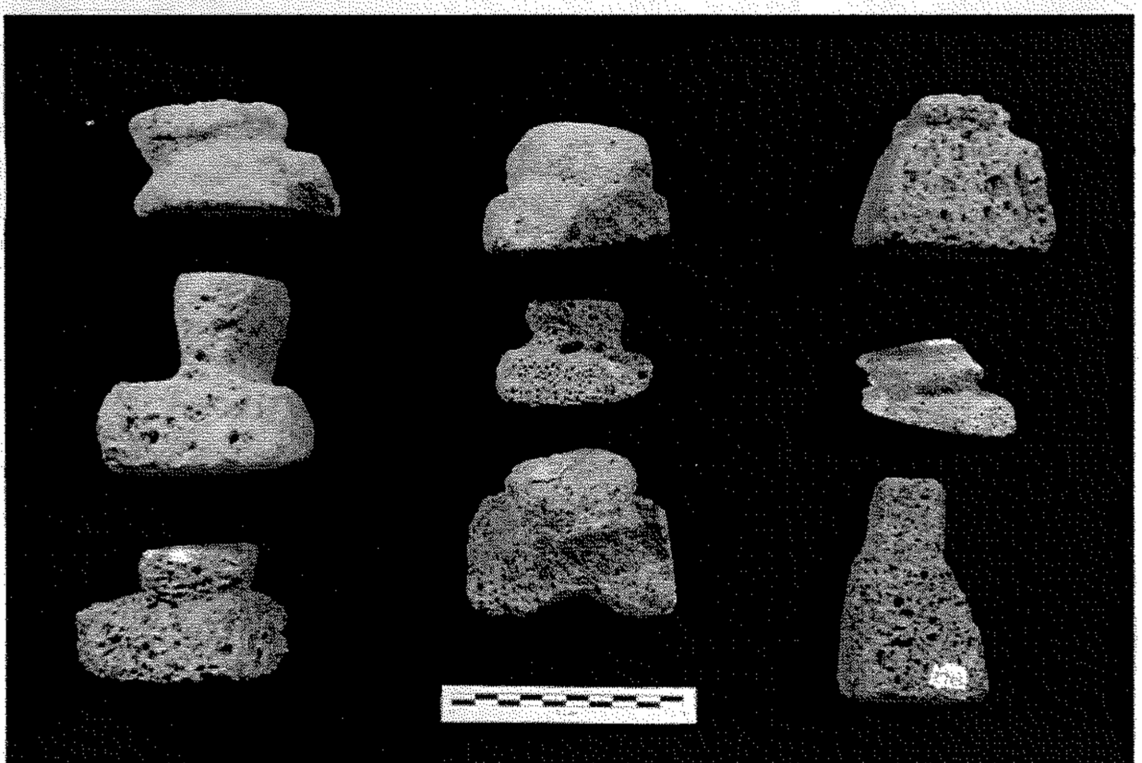


Plate 167

A

B



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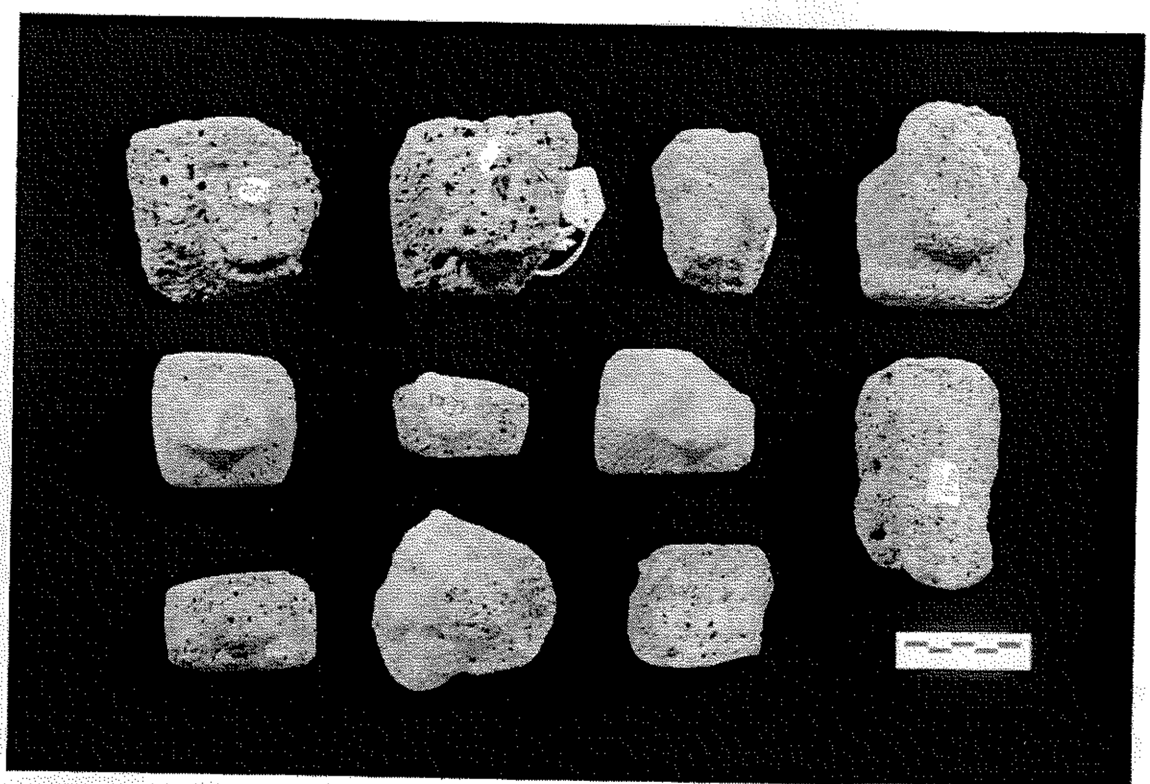

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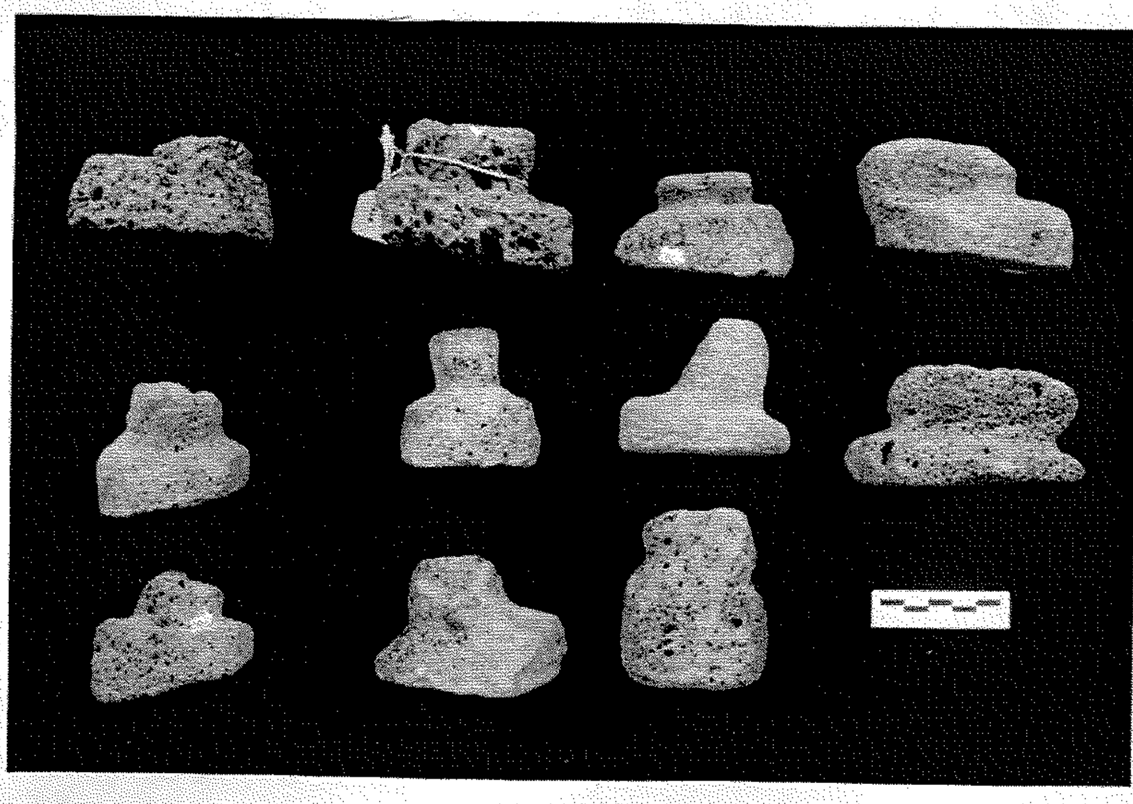

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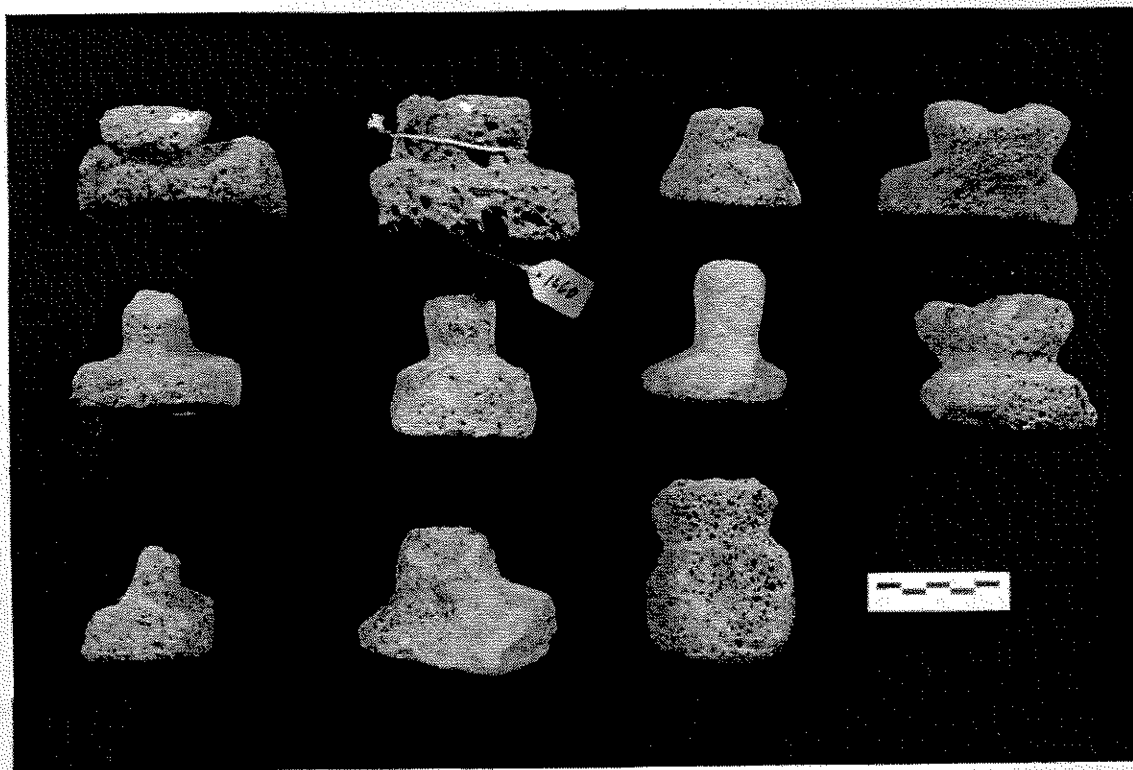

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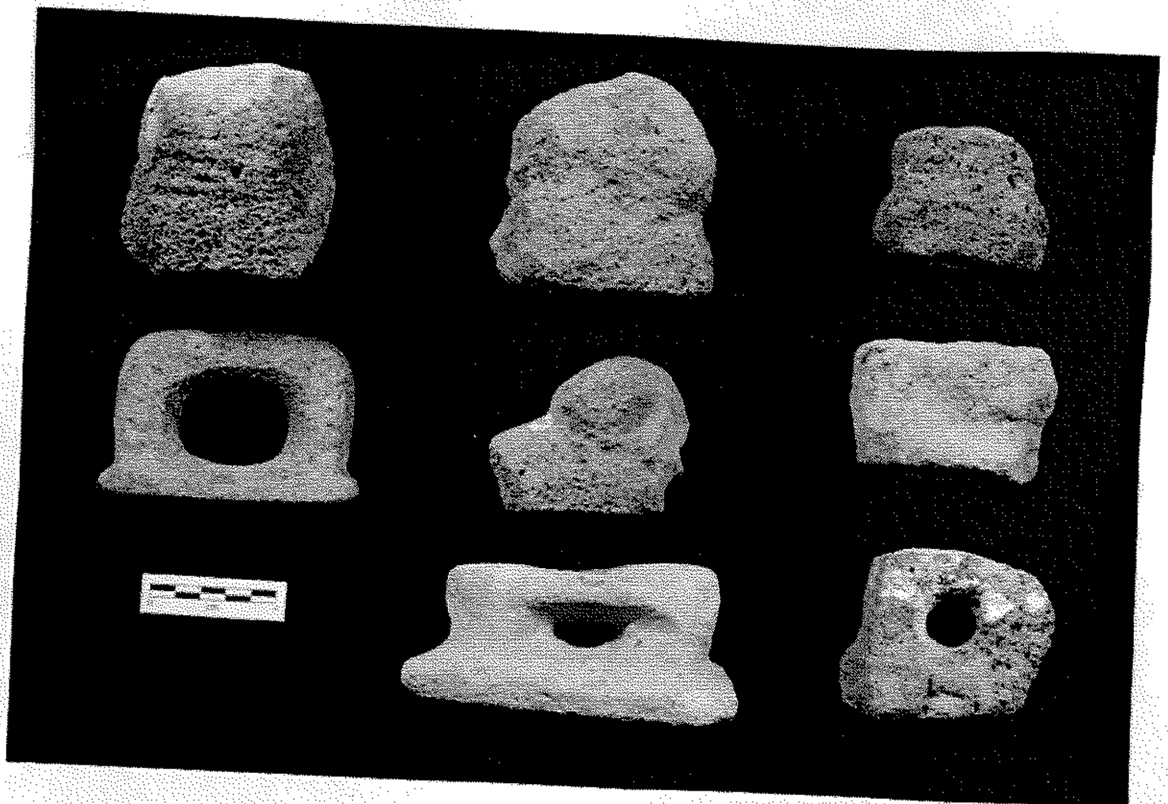

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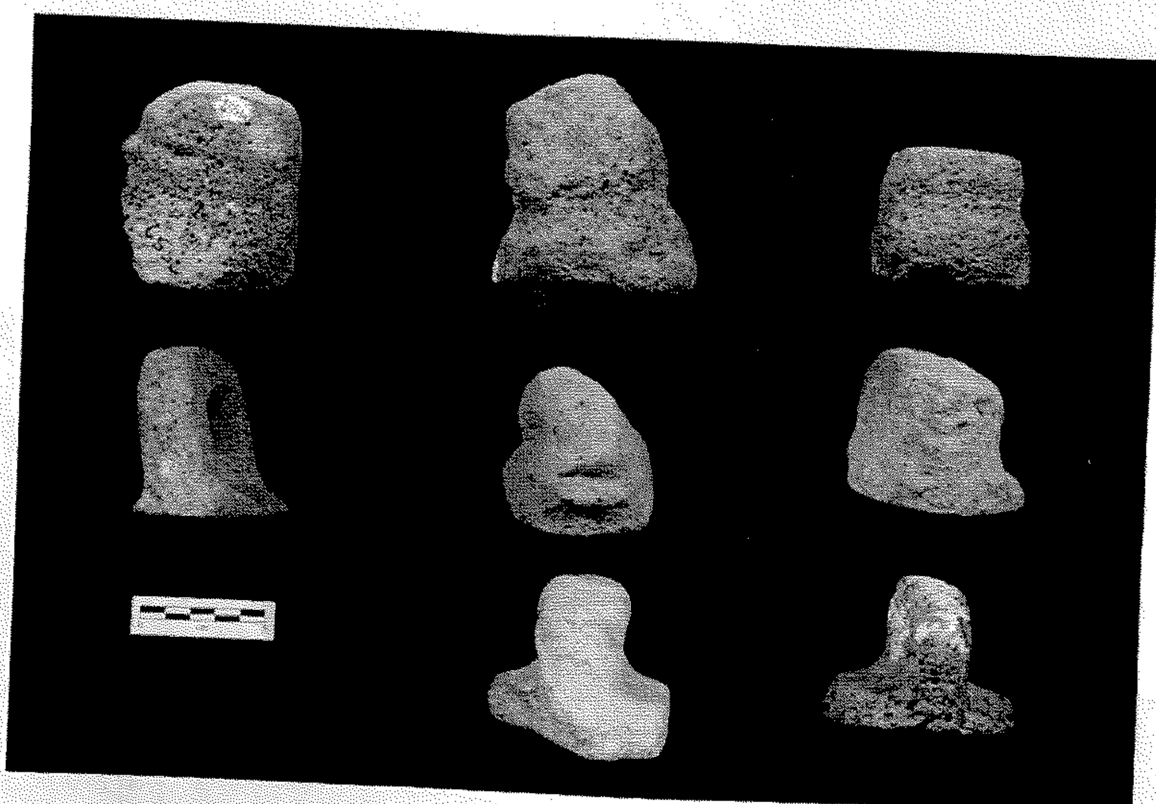

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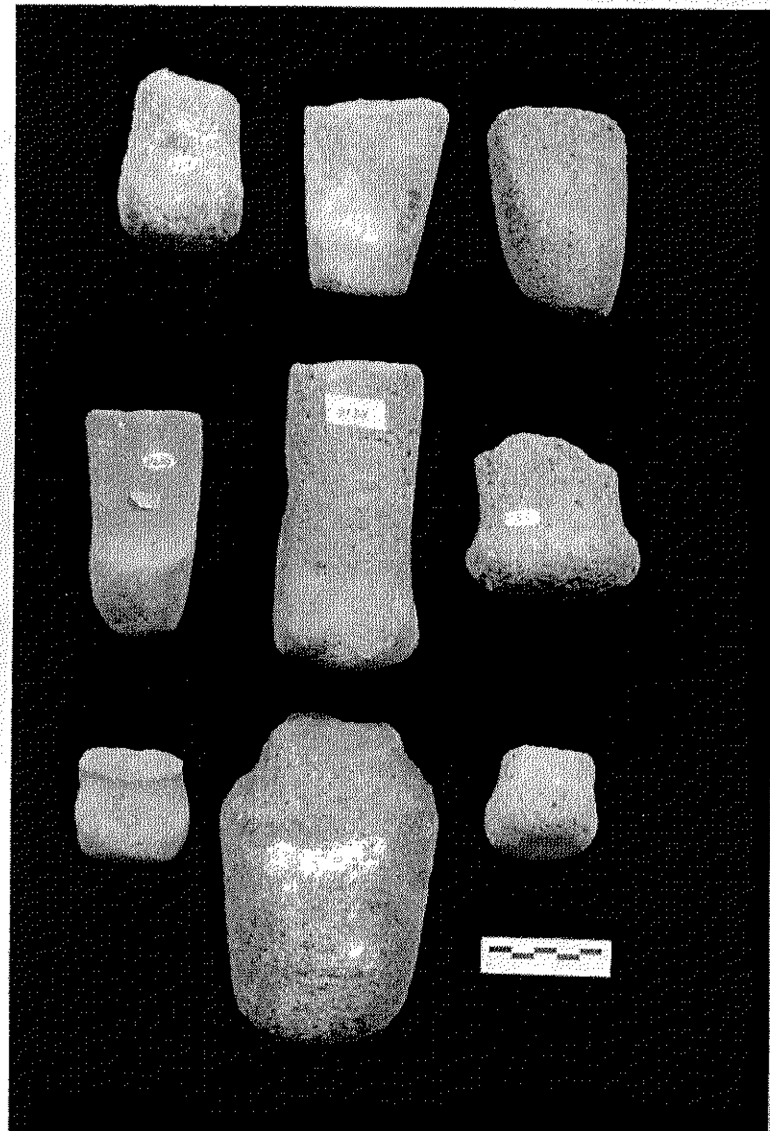

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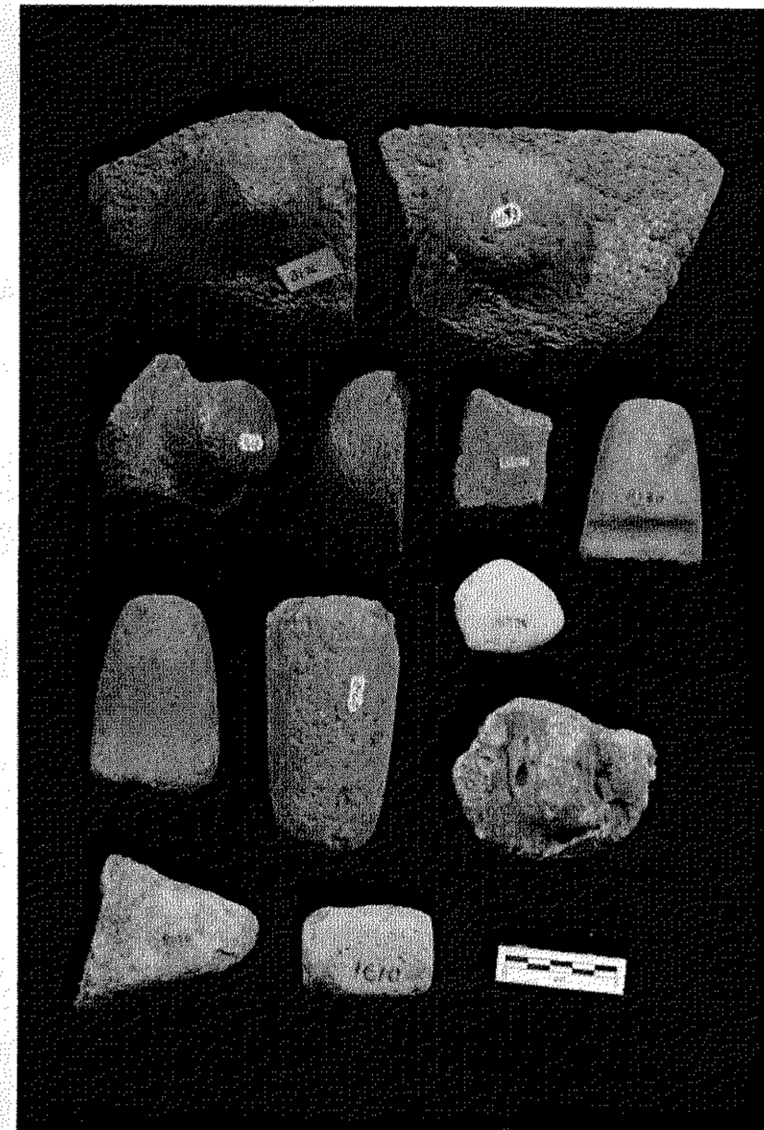

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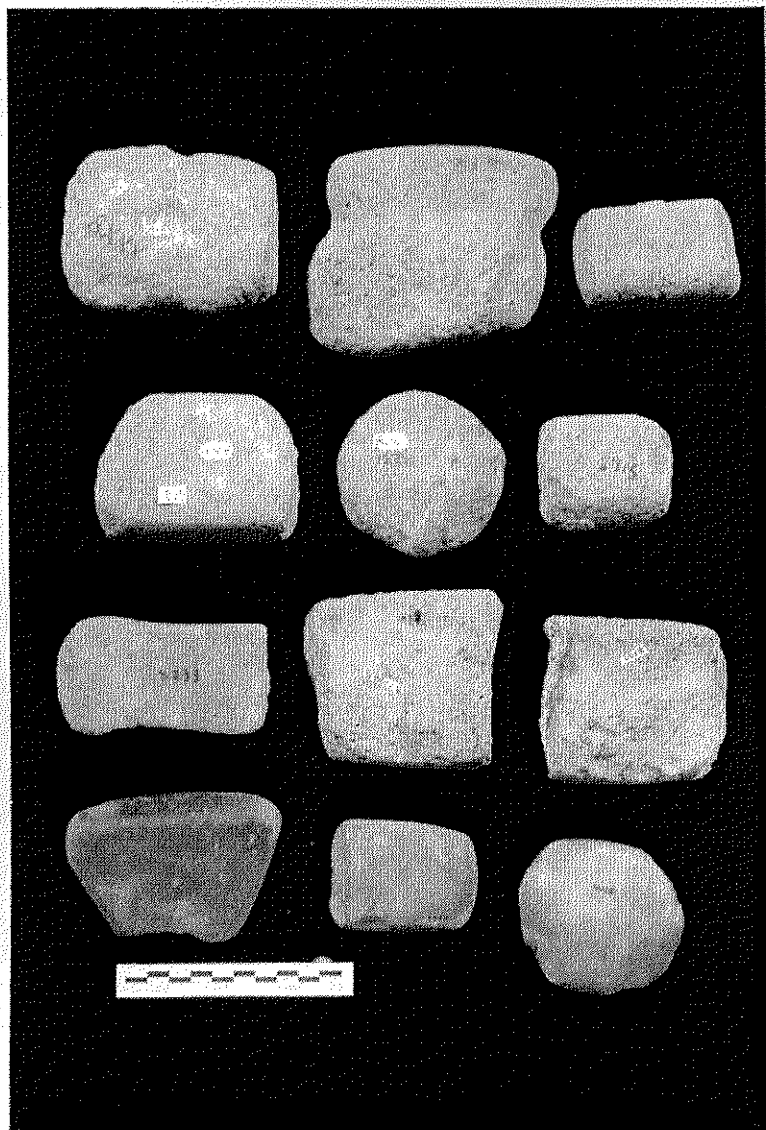
Plate 172



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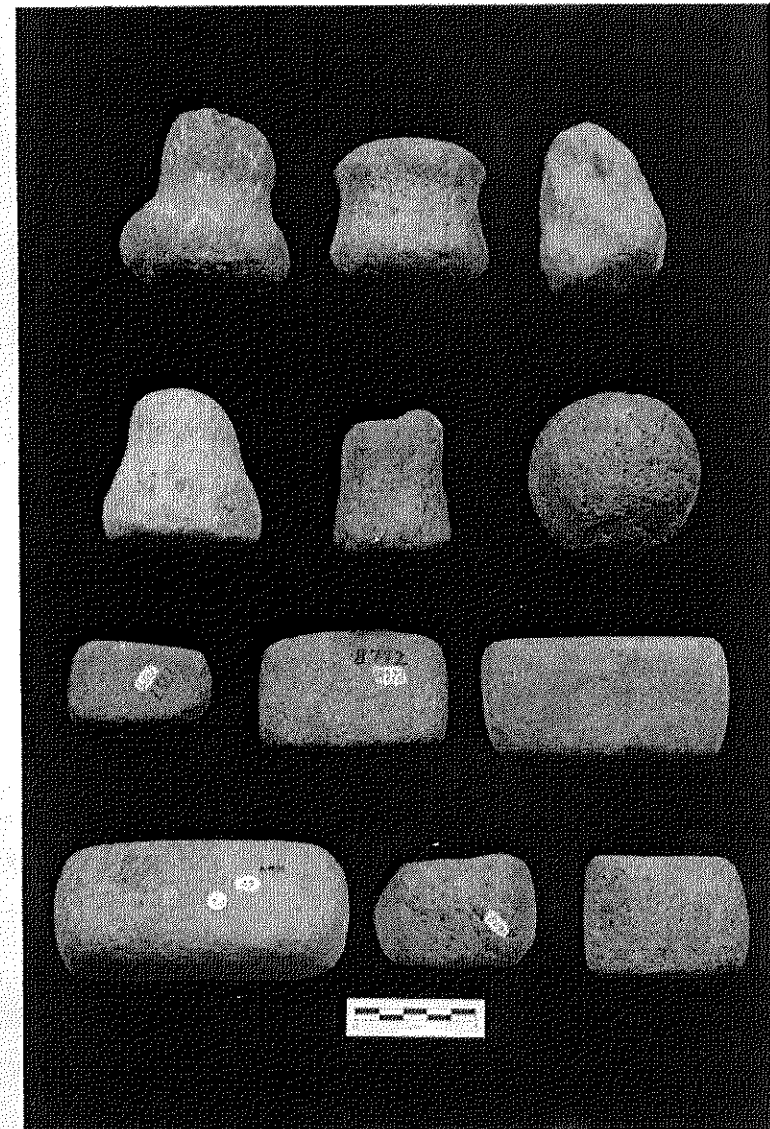

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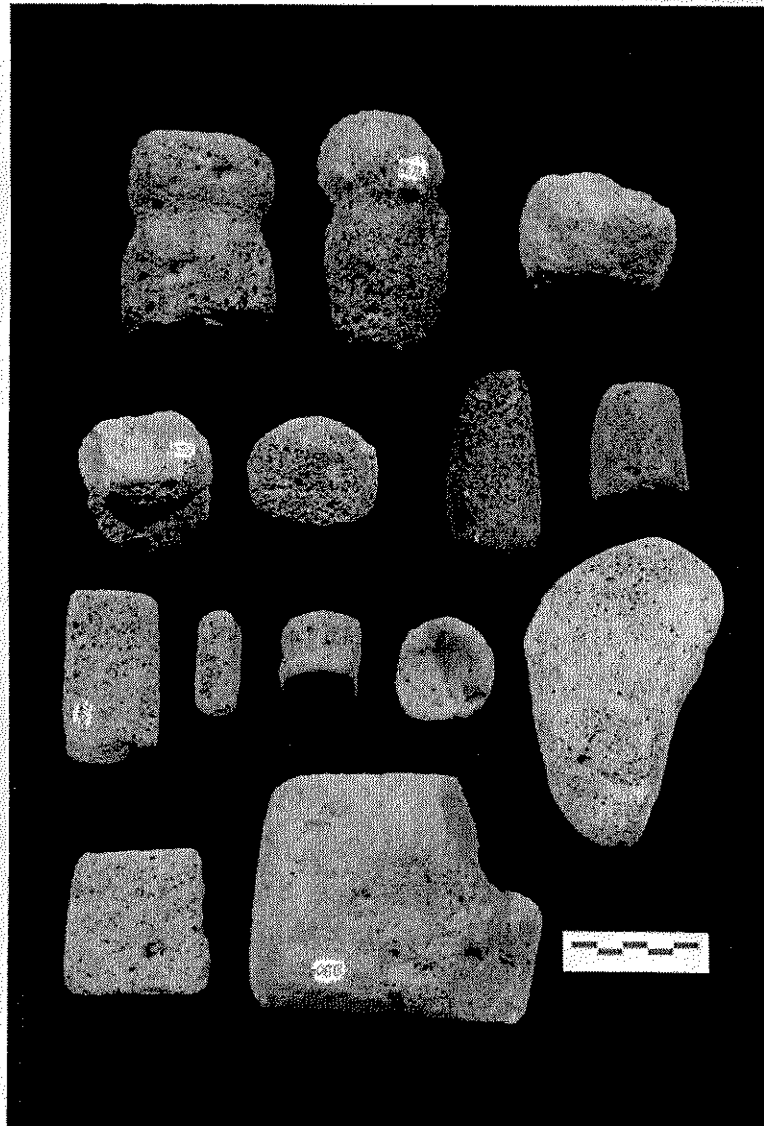
Plate 173



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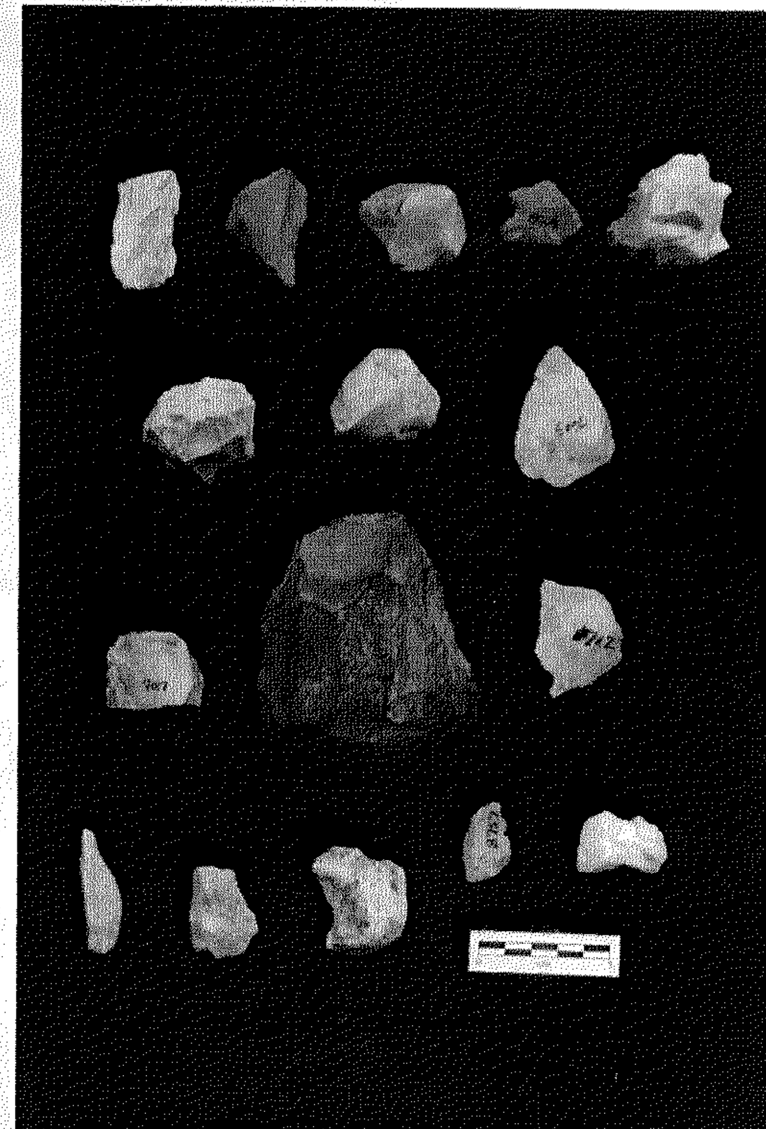

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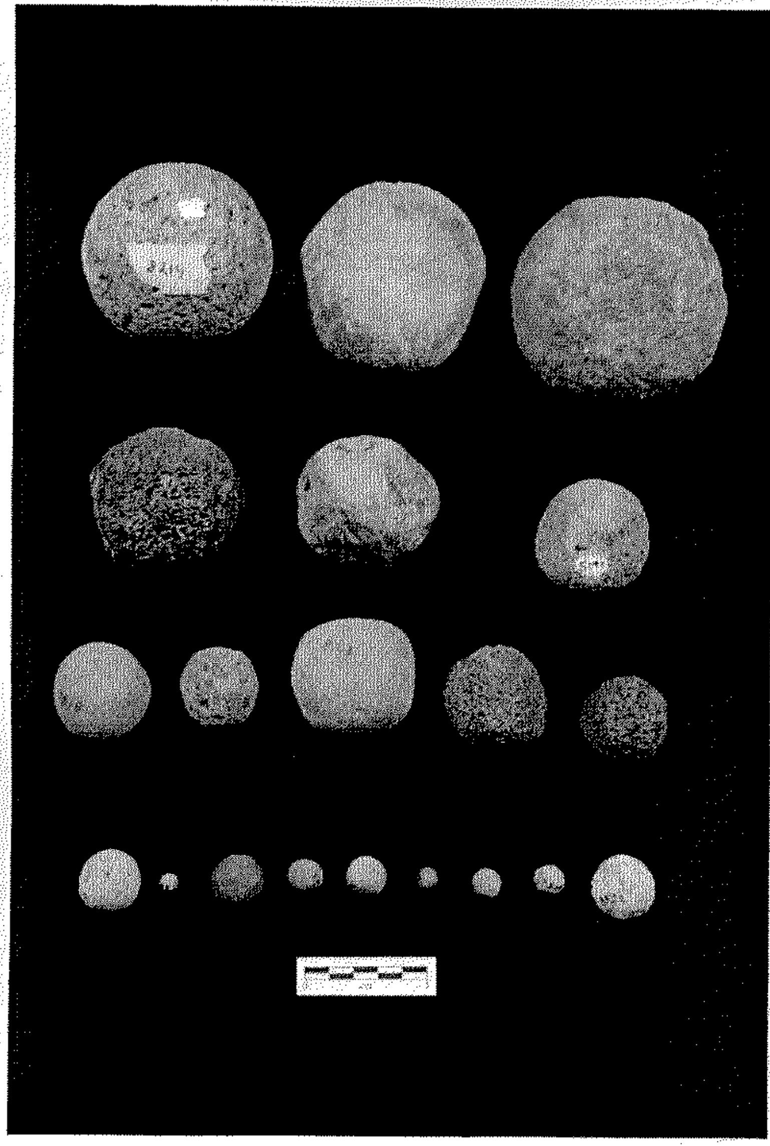
Plate 174



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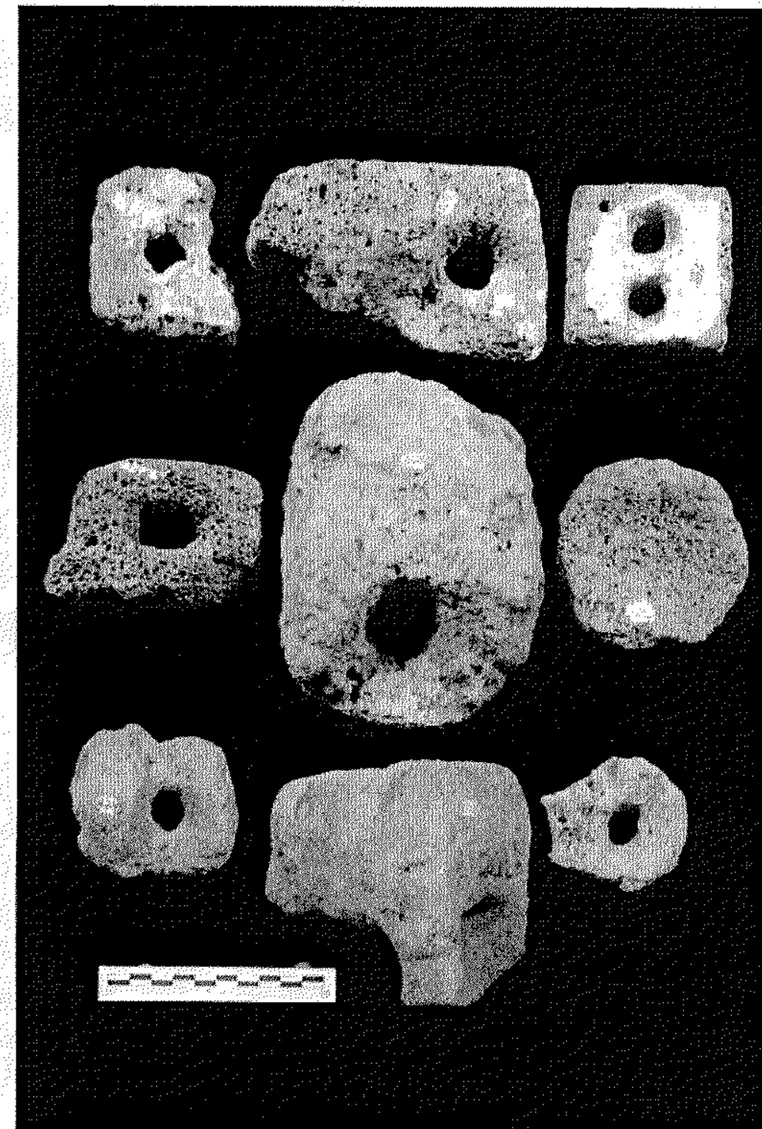

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Plate 175

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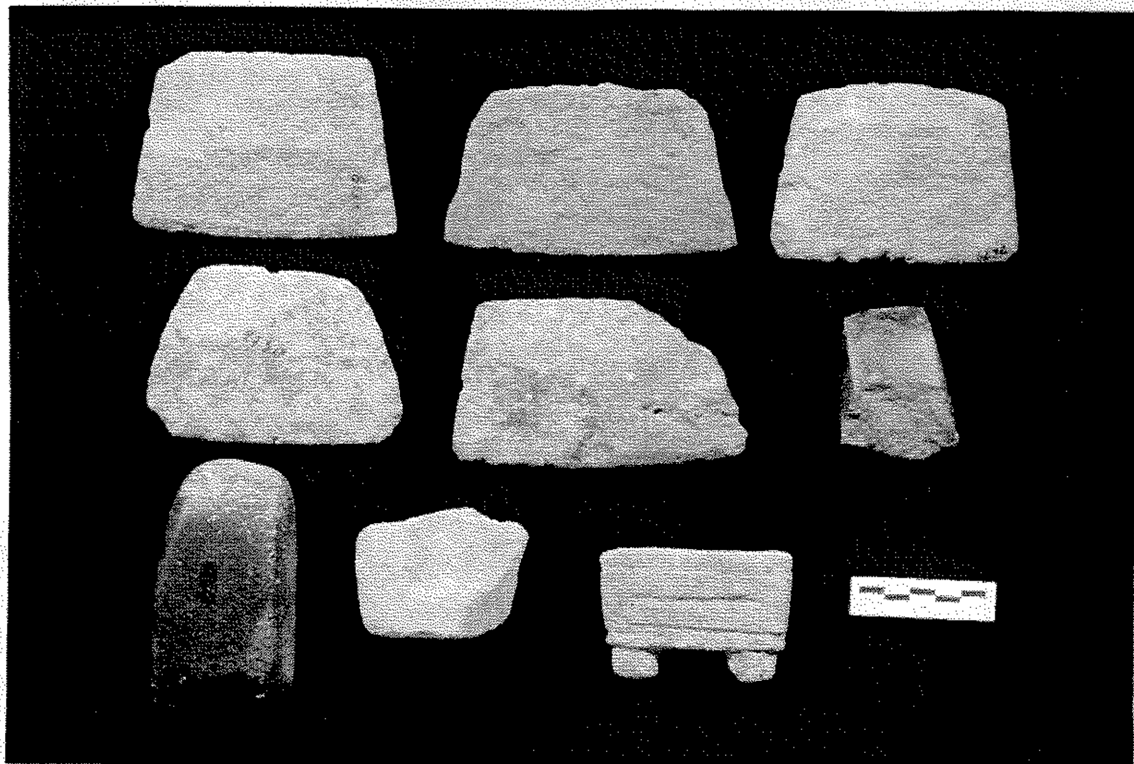

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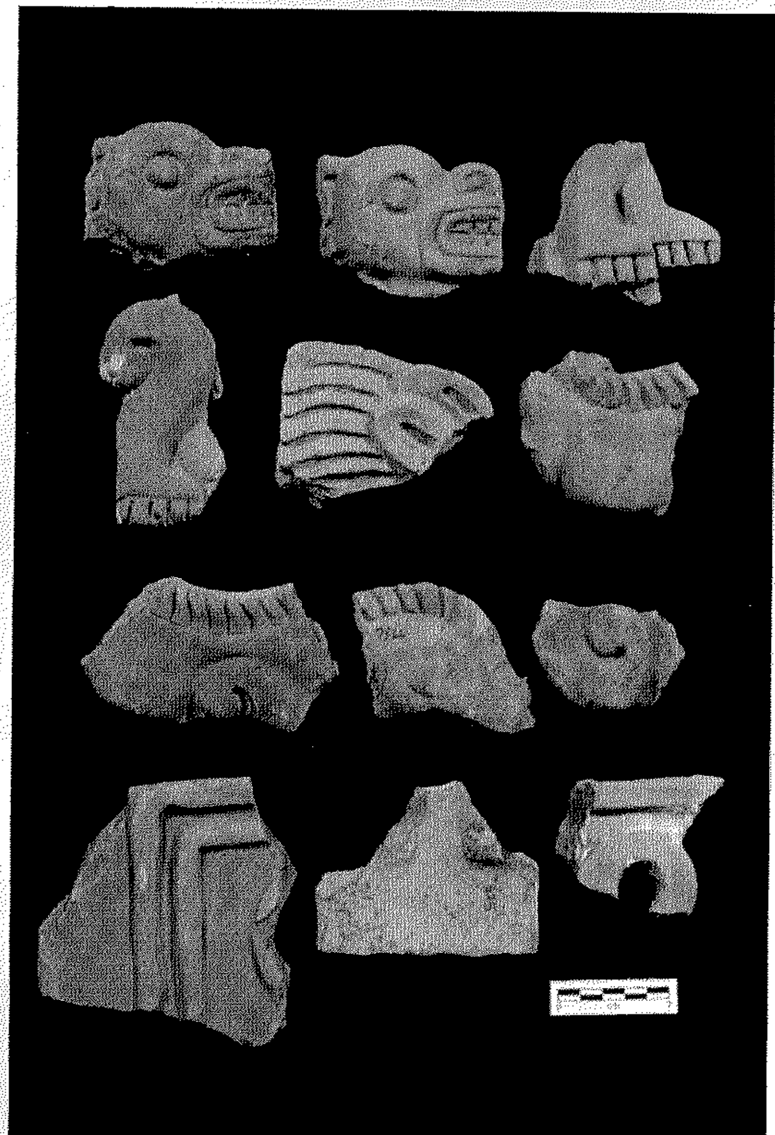
Plate 176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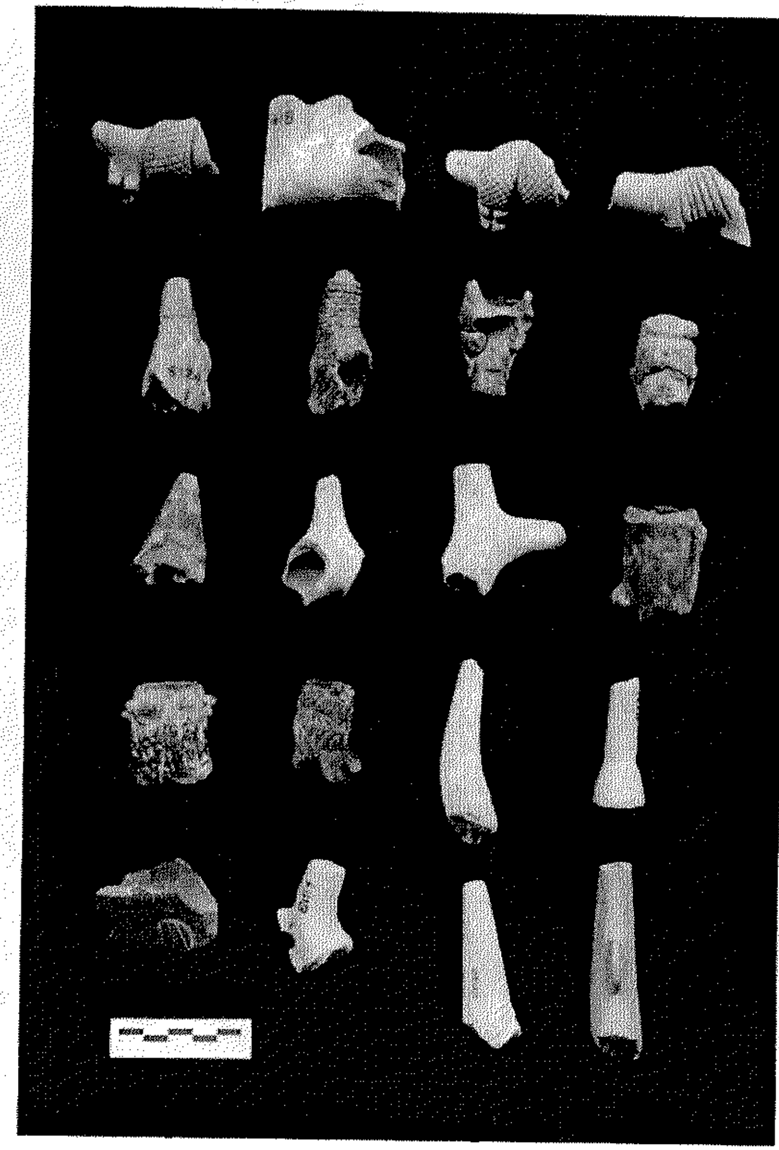
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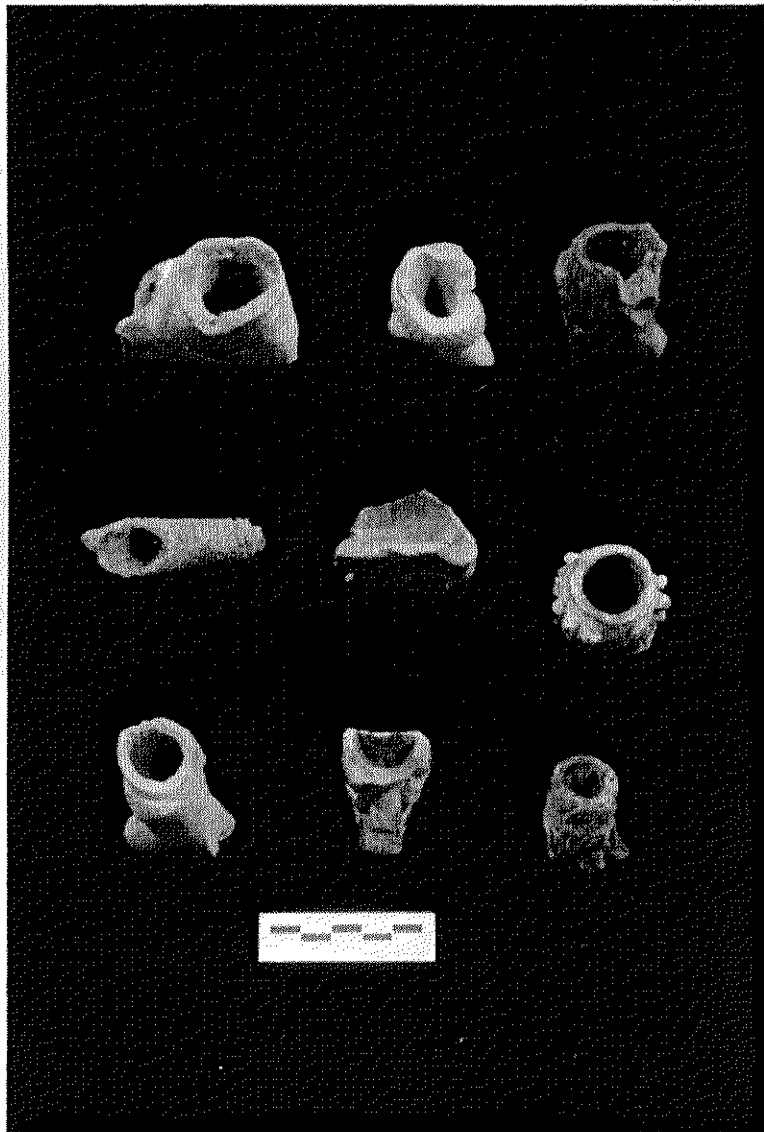
Plate 177



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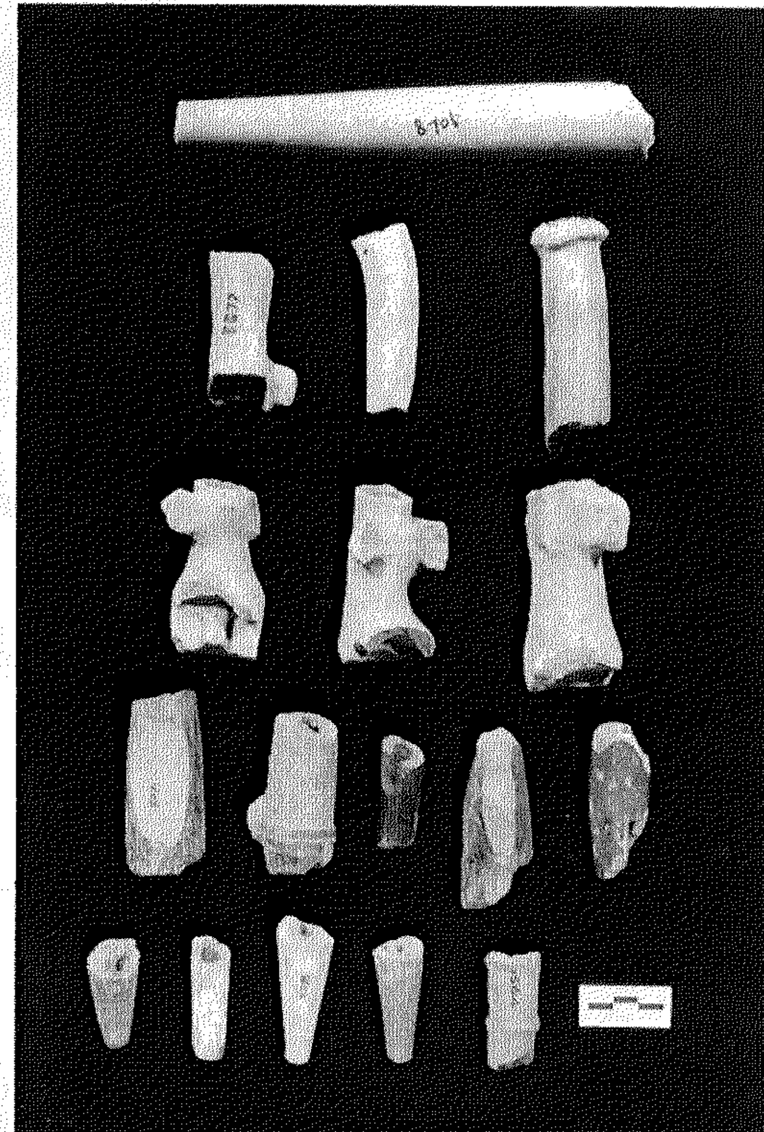

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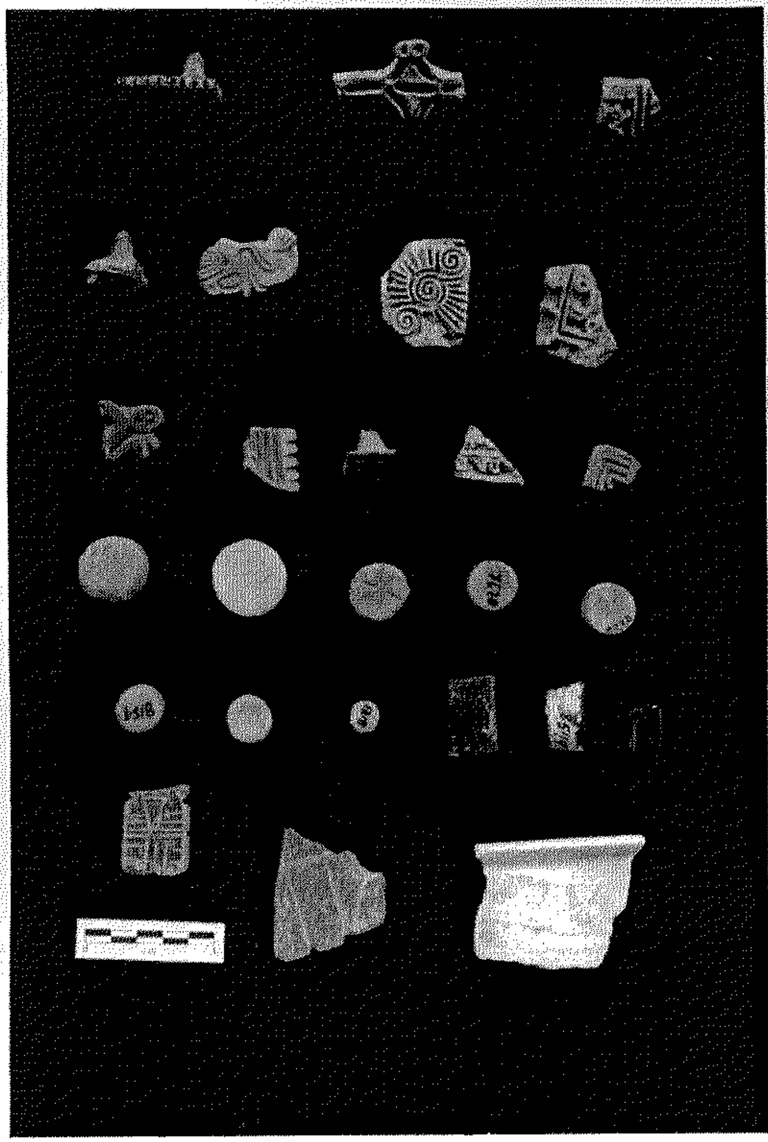
Plate 178



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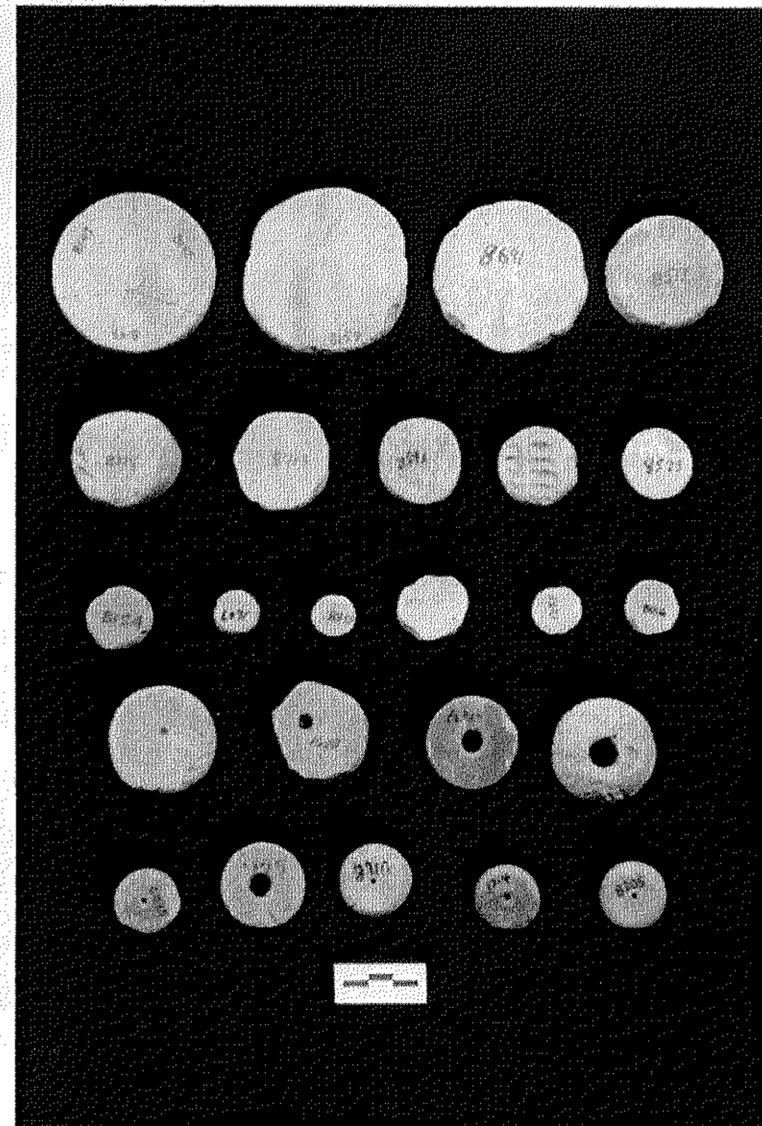

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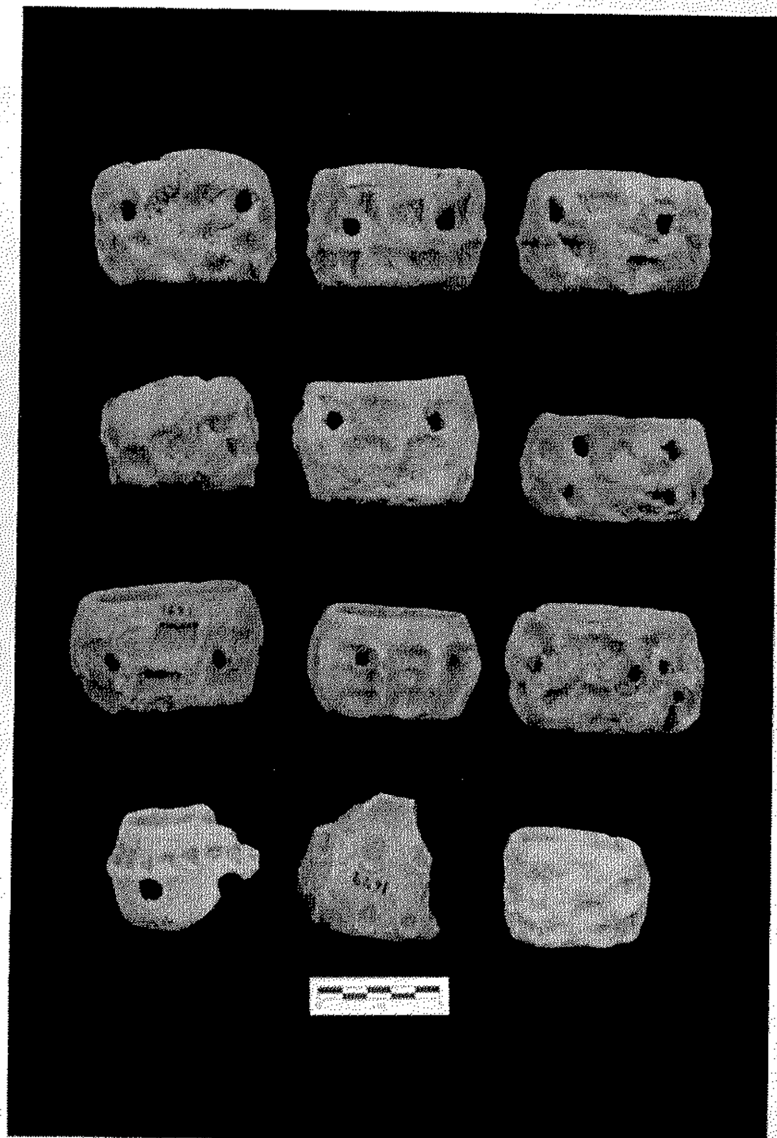
Plate 179



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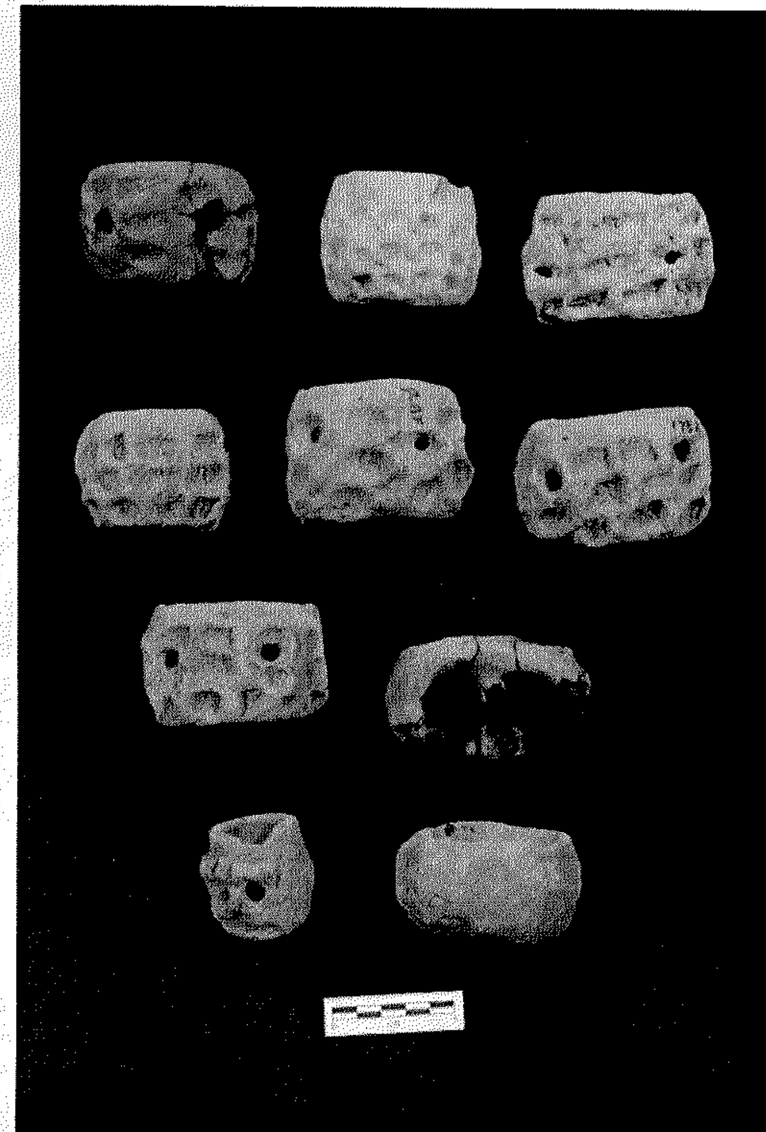

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Plate 180

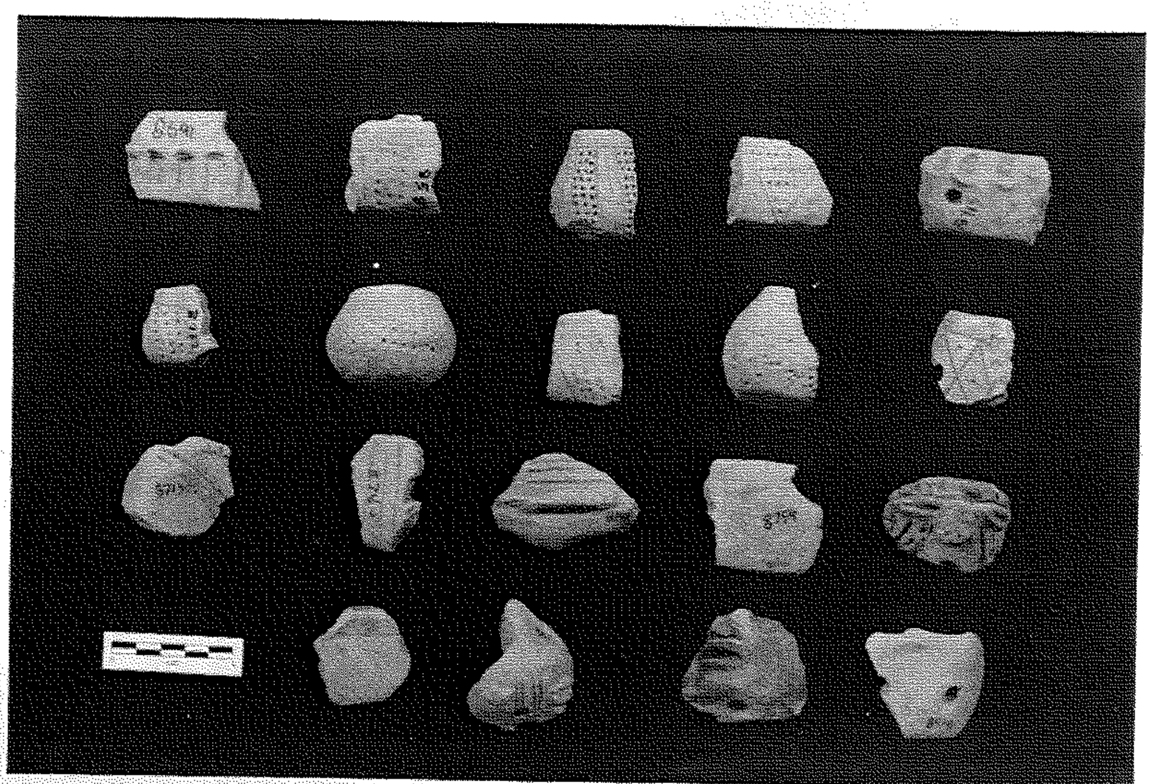
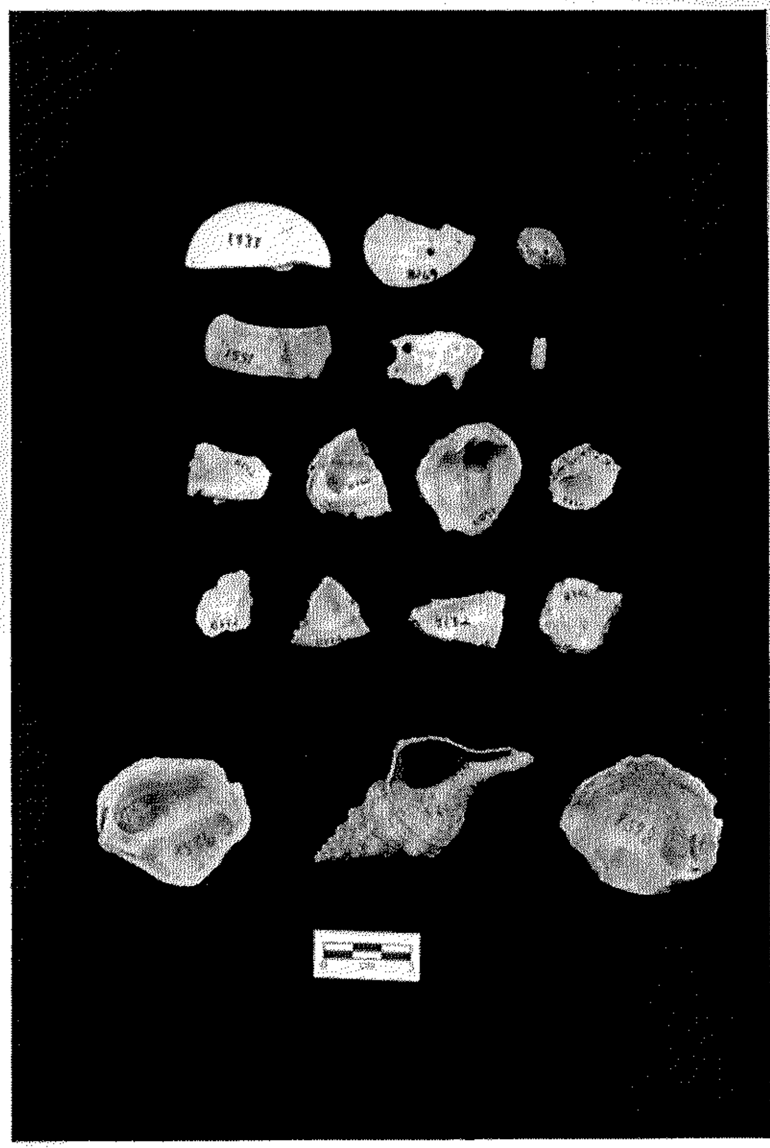


Plate 181



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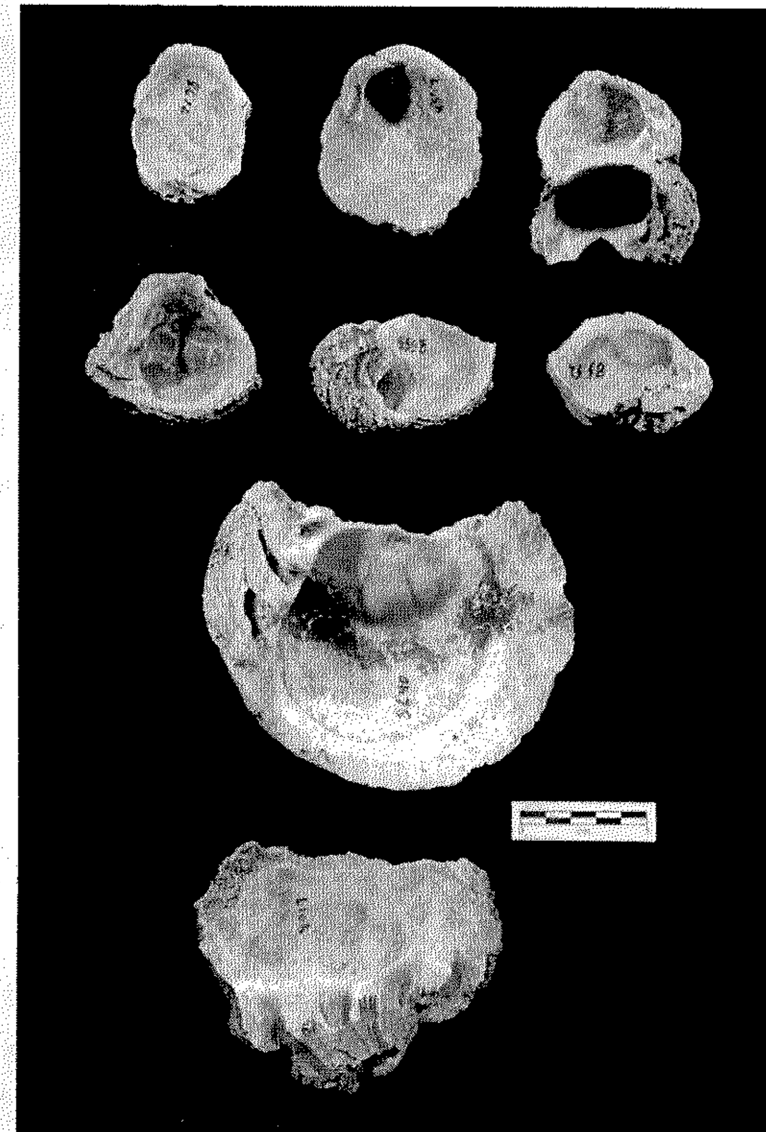


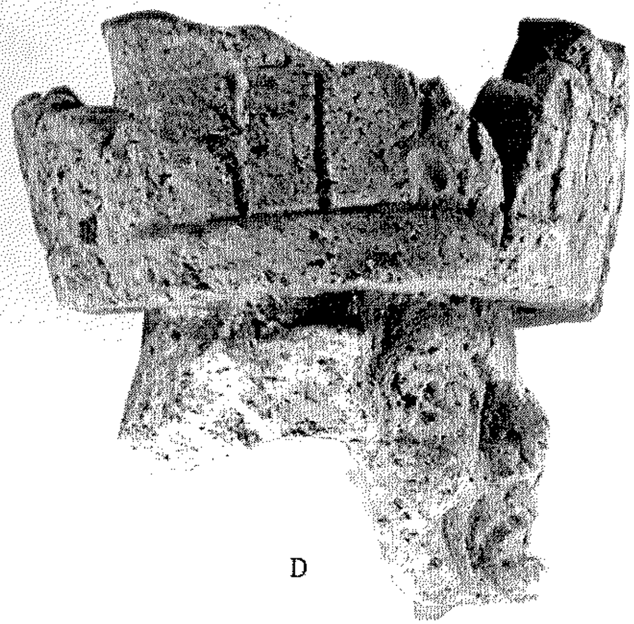
B

Plate 182

A

B

C



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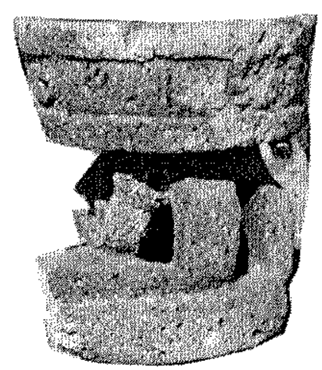
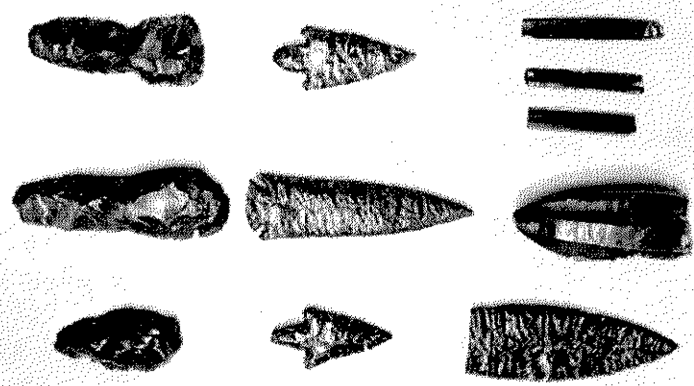


E

F

Plate 183



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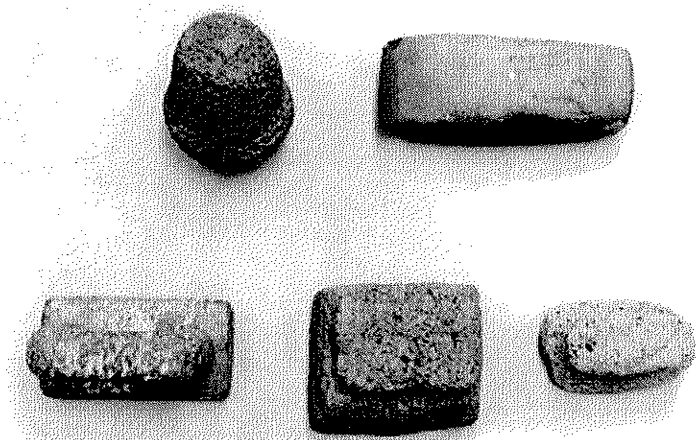

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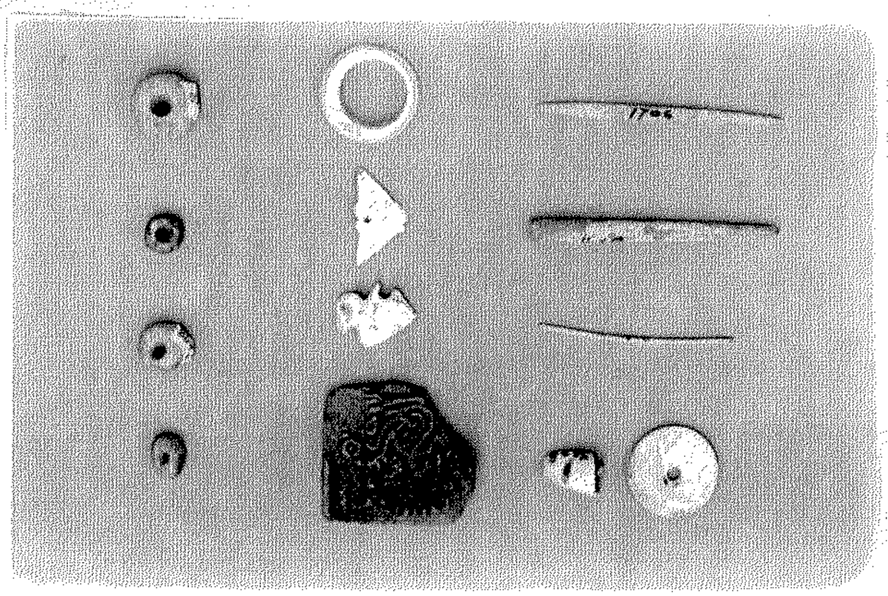

B

D

Plate 184

CHAPTER 12

A REANALYSIS OF THE PACHUCA OBSIDIAN HYDRATION SAMPLES

FROM THE 1961-62 TC-8 EXCAVATIONS

By

AnnCorinne Freter
And
William C. Ciesielczyk Jr.

A. INTRODUCTION

In 1966, Joseph Michels received funding from the National Science Foundation for a grant Titled "The Structure and Function of the Prehispanic Obsidian Industry of the Valley of Mexico" (NSF Grant # GS 1256). This research involved the collection and analysis of 3000 obsidian artifacts from 38 sites within the Valley of Mexico. The analyses conducted on this sample included a detailed lithic functional attribute and wear pattern study, obsidian sourcing based on the then relatively new neutron activation analysis and obsidian hydration dating (Michels 1971; Michels and Bebrich 1971). The results of the obsidian hydration analysis in particular were quite mixed. Hydration dating in the mid-1960's was in its infancy and the relative affects of obsidian chemical composition (source), effective hydration temperature (EHT), relative humidity (RH) and soil pH on the process of obsidian hydration were not yet known or were just beginning to be investigated (Freter 1993).

Included in this large sample of lithic artifacts were 395 specimens from the 1961-62 Maquixco Bajo (TC-8) excavations directed by William T. Sanders. This sample of obsidian artifacts was selected by Michels (1971) for both their artifact type and chronological placement. All 395 samples from Maquixco Bajo were processed for obsidian hydration dating by Carl Bebrich in 1967 and their rim micron measurements were recorded. They were divided into "green" and "gray" obsidian sources, and hydration rates ("Green" = 11.45 H2/1000 years; "Gray" = 4.5 H2/1000 years) for these two colors of obsidian were calculated based on empirical data from the site of Chiconautla, excavated by George C. Vaillant, and extrapolated to the rest of the Valley of Mexico sites encompassed by the study (Michels 1971).

This empirical method to estimate chronometric hydration rates, while the best available at the time, did not take into account differences in the Chemical composition of the "gray" obsidian artifacts, nor site specific EHT < RH or pH conditions. However, despite this, the results, while mixed, were at least encouraging, and these preliminary findings contributed greatly to the refinement and continued research into hydration dating as an archaeological tool (Freter 1993).

B. REANALYSIS METHODOLOGY

In 1990, during a discussion on the potential of Pachuca obsidian hydration dating to aid in the reconstruction of the complex chronology in the Basin of Mexico, Joseph Michels kindly offered Freter access to all the field notes, original micron readings, and microslides amassed during his earlier work on the Basin of Mexico obsidian industry. As part of this research, a reanalysis of the Pachuca "green" obsidian hydration slides from Maquixco Bajo was undertaken by the authors at the Ohio University Obsidian Hydration Dating Laboratory in 1992-93.

In 1972, Jane Pires-Ferreira at the University of Michigan Neutron Activation Analysis Laboratory sourced four of the Maquixco Bajo specimens. Two were green obsidian, and both were identified as originating from the Cerro de las Navajas flow in the Pachuca Sierra range. Of the two "gray" obsidian samples, one was sourced to Guadalupe Victoria, and the other fell equally between the Ixtepeque and Barranca de los Estetes sources and could have been from either.

Based on these findings and our general understanding of the numerous "gray" obsidian sources employed in the Basin of Mexico, the "gray" Maquixco Bajo obsidian microslides were removed from the sample. They clearly originated from a variety of obsidian sources and the original artifacts were no longer obtainable for chemical characterization to identify each specific source. The 209 "green" or Pachuca obsidian artifacts, however, appeared to have originated from a single obsidian flow (Cerro de las Navajas) in the Pachuca Sierra range; therefore their chemical composition was uniform, and they represented a controlled sample for the purposes of hydration dating. Of the 209 "green" obsidian samples, the contexts of 184 of them could be reconstructed with certainty and were reanalyzed.

1. Slide Preparation:

In 1967, Carl Bebrich prepared the Maquixco Bajo obsidian artifacts for hydration dating employing the standard methodology later outlined in Michels (1986), and still in use. Thin sections of each artifact were prepared by first cutting out a small wedge from each specimen with a lapidary saw. Each wedge was then ground with a microgrit-water slurry on each side to remove any shatter, adhered to a standard geology microslide with Canada Balsam resin, and further ground down to a thickness of less than 100 microns on a rotating glass lapidary surface with the microgrit-water slurry. A slip cover was then affixed with additional Canada Balsam, and the microslide's hydration rim was measured under an optical microscope (Michels 1986:98). It is important to note that the use of Canada Balsam as the adhering agent worked extremely well, and despite the passing of nearly 30 years since their preparation, the Maquixco Bajo microslides were in excellent condition and easily reanalyzed.

2. Rim Measurements:

Carl Bebrich measured all the microslides on a geology microscope with image-shearing micrometry, using a 1000X oil immersion lens under cross-polarized light. The optical properties and overall precision of microscopes, however, has improved greatly over the last 30 years, necessitating that all the microslides be re-measured. The hydration rims on all samples selected for reanalysis were re-measured on a Vickers M17 microscope using an electronic image-shearing readout unit, with a 1000X oil-immersion lens under cross-polarized light. Between 16 and 20 rim measurements were taken on each microslide. These were averaged to produce the final measurement employed in this reanalysis. All samples, their proveniences, and micron re-measurements are presented in Table 102.

While our rim measurements were very similar to those recorded by Carl Bebrich, notable deviations did occur. In several cases, artifacts in surface contexts produced evidence of re-utilization or fire exposure, which resulted in either multiple hydration rims or a single, extremely irregular one. We were able to identify and note these as separate hydration rim formations, while 30 years ago these secondary variables affecting a hydration rim's preservation were just starting to be identified (Freter 1993).

In addition, a test designed to determine the measurement error associated with the slide preparation and hydration rim measurement was conducted. Ten separate microslide thin sections were processed, (employing the same preparation procedures employed by Bebrich) from a single Pachuca obsidian blade from the Aztec period site of Cihuatecpan, excavated by Susan Evans (1989) and the hydration rim of each microslide was measured. The standard deviation of the ten slides' hydration rim measurements was 0.045 microns (H), well within the optical resolution of the Vickers M17 microscope. This experiment allowed us to analytically estimate the combined errors associated with the slide preparation and the measurement of the hydration rim itself.

C. THE CALCULATION OF THE CHRONOMETRIC DATA ESTIMATES

Obsidian hydration analysis is based on the chemical process that a freshly exposed obsidian surface gradually absorbs hydrogen from its environment at a regular rate (Friedman and Smith 1960; Friedman and Evans 1968). This rate depends upon the chemical characteristics of the particular type of obsidian (Tsong et al. 1978), the temperature of the local environment (Friedman and Long 1976), and to a certain degree may be dependent upon the soil RH (Mazer et al. 1991; Ridings 1991) and pH conditions (Webster et al. 1993).

Since obsidian hydration dating is a chemical dating process that can be affected by several site specific environmental variables, the micron measurements are directly employed in relative dating applications only when all environmental variables (EHT, RH < pH, Source) are constant over the site. Chronometric hydration dates can be calculated if several environmental factors are known, are uniform over the sample, or can be realistically estimated (Freter 1993:291-298).

The rate at which a particular type of obsidian will absorb hydrogen can be experimentally determined by inducing hydration under laboratory conditions employing either a pressure reaction vessel (Michels and Tsong 1980; Michels et al. 1983) or a saturated vapor environment (Bates et al. 1988; Stevenson et al. 1989). From these induction experiments the hydration rate of a particular obsidian source under known, constant EHT, RH and pH conditions can be derived.

In this case, we calculated calendar year estimates based on the experimentally derived rate constant for the Cerro de Las Navajas flow in the Pachuca Sierra range produced by Michels (1986b). This induction experiment was conducted in a pressure reaction vessel using a hydrothermal solution under 100% RH conditions, and a solution pH between 6-8. The hydration rate constant derived by this experiment (Michels 1986b) has been successfully applied and cross-checked at both the Aztec site of Cihuatecpan (TAB1) in the Basin of Mexico (Evans and Freter 1989) and the Maya site of Copan, Honduras (Freter 1992; 1993). In both these cases, which represent differing time periods and environmental conditions, the Cerro de Las Navajas rate constant (Michels 1986b) has produced chronometric hydration dates in excellent agreement with all the ethnohistoric, iconographic, ceramic and/or C14 chronological data available from these sites.

It should be noted that a study based on the saturated vapor induction technique (Stevenson et al. 1989) has produced a different induced hydration rate for Pachuca obsidian (Smith and Doershuk 1991). This rate was not employed here, however, since it produced anomalous results which could have been due to several factors; the induction experiment itself, chemical variations within the Pachuca obsidian source, and/or microenvironmental conditions that might have created the significant with-in deposit variations reported.

To calculate a site specific Pachuca hydration rate for Maquixco Bajo, the EHT, soil RH and soil pH needed to be estimated. Since the excavations were conduced prior to the introduction of thermal cells (Ambrose 1984), direct thermal cell soil temperature data is unavailable for the site of Maquixco Bajo. There are two EHT data sources currently available to approximate the EHT at the site. First, Maquixco Bajo is located 18 km from but at nearly the same elevation, as the Aztec village of Cihuatecpan (TAB1). Two thermal cells were implanted in 1988-89 by Susan Evans at a depth of 50 cm at Cihuatecpan, and produced a EHT estimate of 15.23 degrees C (288.39 degrees K). The other sources of temperature data is from the 23 year collection of ambient air temperatures at the weather station in Teotihuacan, only 3 km from Maquixco Bajo, but 180 m lower in elevation. Based on these recorded air temperatures, the EHT is 16.17 degrees C (298.33 degrees K). This is almost a full degree C warmer than the estimate based on the thermal cell readings, a finding that substantiates the conventional wisdom concerning the relationship between temperature and altitude in the Basin, that with each 150 m in elevation, the temperature declines by one degree (Vivo' Escoto 1964:188).

Since the Cihuatecpan thermal cell EHT data are based on direct soil measurements and better approximate the Maquixco Bajo site elevation and depositional characteristics, we decided to employ that EHT as our estimate. Based on this EHT and the induced hydration rate constants derived by Michels (1986B), the particular hydration rate for Cerro de las Navajas Pachuca obsidian under 100% soil RH and a soil pH between 4-9, at the site of Maquixco Bajo was estimated to be 6.22 H2/1000 yrs. All chronometric dates listed on Table 1 were calculated based on that rate and using the year 1970 as the year of processing/excavation (see Freter 1993 for method and equations).

Probable Errors Associated With The Hydration Dates

The hydration dates can be employed in one of two ways, relative or chronometric, each having a specific error range associated with them. If the dates are used as relative dates by the comparison of their micron readings, then the error range associated with each relative date is $\pm$ 0.045 microns (the slide preparation and measurement error). The environmental conditions at Maquixco Bajo do conform to the assumptions inherent in relative hydration dating. The dates all come from the same basic area of the site, thus soil RH and pH across the sample should be relatively uniform; they all originated from the same obsidian flow, so the chemical composition is held constant over the sample; and their deposit depths were relatively uniform, most between 30-100 cm below surface, a range which appears quite stable in terms of EHT Leach and Hamel 1984; Ridings 1991). For these reasons, we believe that the hydration rim values can be employed with confidence as relative dates to reconstruct the sequence of construction and the occupation of the site.

A standard error range for the chronometric hydration dates was estimated based on two factors, the slide preparation/measurement standard deviation of $\pm$ 0.5 degrees C. The $\pm$ 0.045 microns (H) measurement/slide preparation standard deviation translates into an error of $\pm$ 40 years under the Maquixco Bajo site conditions. A $\pm$ 0.5 degrees C EHT error range translates at Maquixco Bajo into an error of $\pm$ 70 years. To combine these two uncorrelated random errors, one takes the square root of the sum of the squares of the individual deviations (George Cowgill, personal communication 1992) which in this case yields a 1 sigma standard deviation of $\pm$ 80 years, or a 2 sigma standard deviation of $\pm$ 160 years. It is this conservative 2 sigma error range incorporating realistic, measurable, uncertainties in EHT, rim measurement, and slide preparation which we have assigned to each chronometric date presented in Table 1.

It is important to note that several other error factors could also affect these chronometric hydration dates. First, the induction experiment on which this hydration rate is based was conducted under 100% RH conditions. If the soil RH conditions at Maquixco Bajo, below 30 cm are significantly less than 100%, then a systematic error will result. However, both Ridings (1991) and Leach and Hamel (1984) noted that soil RH conditions even in semi-arid and arid climates in New Mexico and Colorado reached 100% by 30 cm below ground surface, and the vast majority of the Maquixco Bajo samples were located below this depth. Second, soil pH conditions lower than 4 or higher than 9 could systematically affect the hydration rate (Freter 1993:289; Webster et al. 1993). In this case, however, it appears unlikely that soil ph readings are that extreme. Third, sub-source chemical variation in the Cerro de las Navajas obsidian flow could introduce a systematic error, if present. Currently, however, this too appears unlikely, since all green obsidian artifacts from the Basin of Mexico sourced by INAA thus far have originated from the Cerro de las Navajas flow (Glascock, personal communication 1992). Additional possible errors include secondary variables which could have affected the hydration rim preservation, such as artifact re-utilization, exposure to fire or high temperatures, and surface erosion due to wind and air-borne dust. These secondary variables clearly were present in the surface samples at Maquixco Bajo, and for this reason, we believe that all dates from samples with multiple hydration rims, or very irregular rims should be viewed as "disrupted" hydration rim formations and not employed for the purposes of relative or chronometric dating. They are included in Table 1 for completeness, and to illustrate how artifact re-use, varied environmental surface conditions, exposure to fire and/or wind erosion can affect a hydration rim.

In spite of these potential sources error, we have confidence in the general accuracy of the relative and chronometric dates presented here within their respective error ranges, but caution the reader to regard the chronometric dates as best estimates, subject to future refinement when more accurate temperature and soil chemistry data becomes available.

D. CONCLUSIONS

This reanalysis of the Pachuca Maquixco Bajo obsidian hydration samples yielded several significant results. The dates themselves can be employed as either very accurate relative dates, or as estimated chronometric dates to aid in the reconstruction of the occupation and construction histories of Mounds 1-4 at Maquixco Bajo. They indicate that the site was founded during the height of Teotihuacan and was occupied through to the Aztec period, although occupation may not have been continuous. This is very consistent with the ceramic assemblage found at the site and the general reconstruction of Maquixco Bajo as a Middle Horizon village (Sanders et al 1979). The relative sequencing of the hydration dates also appears to be internally consistent, with lower floor levels dating earlier than subsequent ones. The hydration dates also reflect the complex depositional characteristics of the site, and much admixing of contexts due to subsequent re-building or reuse is evident, as the very early dates in the temple trench and some mound fill contexts demonstrate. This finding is quite consistent with the mixed ceramic assemblages reported for the site (Kolb 1979, Sanders 1995).

In addition to the general usefulness of the hydration dates to help interpret the complex chronology of Maquixco Bajo, this reanalysis has demonstrated that hydration dating can be successfully conducted on archived samples when very specific, relatively uniform environmental conditions exist. This finding is especially encouraging for future archaeological research in the Basin of Mexico, since many of the sites previously excavated no longer exist, having been destroyed by the growth of Mexico City. Therefore, for many important sites within the Basin, the only possible line of further chronological refinement lies with artifacts in museum collections. Obsidian artifacts for many sites are still archived, and hydration dating, coupled with INAA source characterizations on these collections, many yield extremely valuable new chronological information. The results of this reanalysis, therefore, represent a first step in that direction.

Table Key

Lab #

The number assigned to each specific artifact in the hydration lab. These numbers were etched onto each microslide.

Lot #

This was the field lot number assigned to each context by the excavators. It was re-checked during the re-analysis by employing the original lot map, along with field notes.

Mound

Which mound at Maquixco Bajo the sample was excavated from. Note that Mounds 1 and 2 were identified as separate mounds during the survey, but when excavated were found to share a common courtyard and were consolidated into Mound 1-2.

Square

The grid unit assigned to each lot. Discrepancies on square numbers did occur between the lot map and field notes, when this happened we employed the lot map numbers.

Level

The level assigned to each lot.

Depth

The depth below ground surface recorded by the excavator. In several cases an "X" was recorded which we retained, however, what "X" refers to is somewhat problematical.

Context

When any additional contextual information was recorded on any lot, we included that information under this heading.

Microns

The 1992-93 re-analysis micron measurement for each artifact. Each Micron measurement has $\pm$ 0.045 micron Standard Deviation associated with it.

Date A.D.

This is the chronometric date calculated for each micron measurement based on the 6.22 H2/1000 yrs. hydration rate calculated for Maquixco Bajo. Each chronometric date has a $\pm$ 160 2-sigma standard deviation error range associated with it. All dates are A.D., except where noted as B.C.

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Comments by William T. Sanders

When we completed the Teotihuacan Valley Project, the Late Teotihuacan Phase was tentatively dated at approximately 600-750 A.D., possibly as early as 550-650 A.D.; the Xometla or Early Toltec Phase 750-950, possibly 650-900; the Mazapan or Late Toltec Phase from 900-1200, possibly ending at 1100; and the Aztec Period began either 1100 or 1200 A.D. and extended to the Spanish Conquest or somewhat later. Our excavations and the surface samples from TC-8 suggested that the site core was occupied first during the Tzacualli Phase, had continuing occupation throughout the various phases of Teotihuacan, perhaps peaking in the Middle Phase; had little or no occupation during the Xometla Phase, was reoccupied during the Mazapan Phase but very lightly; and finally, the Aztec occupation was substantial over the old core of the site. Most of the Aztec ceramics dated from Phases 3-4, very Late Prehispanic and the Early Colonial Phase and the expected dates were 1300 to 1600 A.D. Following this assessment we expected the sample of obsidian hydration dates to have shown the pattern exhibited in Fig. 295.

Fig. 296 shows the actual distribution of the approximately 200 obsidian hydration dates determined by the authors. In the following analysis I have excluded the few pre-A.D. dates, and when two or more dates were found on a single artifact, I counted them as separate dates. Fig. 296 shows little resemblance to our original prediction. Particularly unexpected was the strong representation of dates, apparently from the Xometla Phase, regardless of which of the starting and concluding dates we used; and the virtual absence of Aztec, particularly Late Aztec dates. The study also revealed a much heavier representation of Mazapan Phase dates than predicted. Considering the fact that the Mazapan occupation, based on excavated and surface samples, occurs primarily on the periphery of the core of the Teotihuacan Period site, they should have made up only a small minority of the dates from our excavations.

A particularly confusing problem in the analysis of these dates are the constant changes occurring in the absolute chronology of the Basin of Mexico. Recent C-14 dates suggest that the Late Teotihuacan Phase may end as early 600 A.D., possibly 500 A.D. Furthermore, many dates, associated with the Xometla Phase fall into the 600-800 A.D. range and a number of Mazapan dates are earlier than 900 A.D. This constant reassessment of the Basin of Mexico chronology obviously makes the testing of the accuracy of the obsidian hydration dating even more difficult.

One potential deranging factor may be the hydration rate of obsidian from the Pachuca quarry. In 1992 I visited the Pachuca site, for the first time, with Alejandro Pastrana, who was conducting an intensive study of the Pachuca obsidian mines. On the basis of discussion with him it appeared that most of the Teotihuacan obsidian was quarried from very shallow excavations at the upper slope of the Cerro de las Navajas. During Aztec times these resources were apparently depleted and mining shifted to the lower flanks of the hill, where the obsidian occurs at much greater depths. Here he found many shaft mines 40 to 50 feet deep, excavated by the Aztec Period miners to reach the obsidian deposits.

It may be that the obsidian from the upper and lower slopes of the Pachuca mines have somewhat different chemical and physical structures and hence hydration rates. Previously, Joseph Michels had analyzed a large sample of obsidian from our TA-40 excavations on the North Slope of the Cerro Gordo (and it should be stressed that this was done before we realized that trace elements affect hydration rates), a site that dated entirely from the Late Aztec Phase, and our sample included much Aztec 4 pottery that may have dated after the Spanish Conquest. The dates clustered very well, suggesting a single phase occupation, but the mode of the dates was from 1000 to 1200 A.D. approximately 300 years too early. As at TC-8, at TA-40 there was no Mazapan occupation within hundreds of meters of the excavation. What this means is that the sample of

66 dates at TC-8 from between 1005-1275 perhaps should be recalculated 250 years later and pertain to the 14th, 15th and even into the 16th Century. In addition, if we are correct, it might mean that the obsidian hydration rate for the Teotihuacan Period samples needs to be recalculated so that most of the 9th and 10th Century dates, found in the sample, should be pushed back at least two centuries.

If the Pachuca obsidian is not uniform in its chemical and physical characteristics that affect obsidian hydration dating then we have a serious problem. We will have to do one of two things, either conduct trace element analyses for each artifact dated, or sample the two separate quarry sites and try to find out if they are different. We could then apply the two separate rates for samples for single component Aztec and Teotihuacan Period sites. We will always have the problem, however, in dating samples from multi-component sites.

*Editors Note: A recent communication, since writting these comments, from Robert Cobean verified the latter possibility. In a sample from the Pachuca mines trace element analyses do show significant heterogeneity in the source.

Table 102 Obsidian Hyradation Dates from TC-8

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-5	1507	Temple	W0-1	1	0-30 cm	trench	3.05	474
1-6	1524	Temple	W2-3	2	30-60 cm	trench	3.15	374
1-10	1546	1-2	E2 S13	2	40 cm	to floor	3.32	197
1-19	1600	Temple	-	-	-	trench	4.05	667 BC
1-21	1600	Temple	-	-	-	trench	3.42	90
1-22	1600	Temple	-	-	-	trench	3.45	56
1-23	1600	Temple	-	-	-	trench	4.02	628 BC
1-24	1606	1-2	W2 S20	1	X-X	-	2.36	1075
1-25	1607	1-2	W6 S16	1	0-30 cm	-	2.48	981
1-26	1614	1-2	W6 S18	1	0-30 cm	-	2.42	1028
1-27	1618	1-2	W4 S22	1	0-X	-	Irregular	N.D.
1-28	1619	1-2	W2 S22	1	0-40 cm	-	2.66	832
1-29	1625	1-2	W6 S22	1	0-27 cm	-	2..76 / 2.23	745 /1171
1-30	1631	1-2	W8 S24	1	0-27 cm	-	2.44 / 2.14	1013 / 1233
1-31	1634	1-2	W2 S12	2	20-61 cm	-	2.38	1059
1-34	1653	1-2	W8 S14	2	X-72 cm	-	2.52	949
1-35	1670	1-2	E2 N6	1	0-20 cm	-	3.85 / 2.82	413 BC 691 AD
1-36	1678	1-2	E2 N6	2	20-60 cm	-	2.48	981
1-37	1678	1-2	E2 N6	2	20-60 cm	-	2.62	866
1-38	1679	1-2	W0 S20	2	X-24 cm	-	2.65	841
1-39	1679	1-2	W0 S20	2	X-24 cm	-	2.35	1082
1-40	1685	1-2	E6 S13	2	X-14 cm	-	2.84	673
1-41	1687	1-2	W10 S22	1	X-X	-	4.30	1002 BC

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-43	1719	1-2	E2 S18	3	x-79 cm	-	2.81	701
1-44	1721	1-2	W8 S24	2	27-47 cm	-	2.12	1274
1-45	1727	1-2	W0 S18	4	49-81 cm		2.76	745
1-46	1738	1-2	E4 S24	3	X-63 cm	-	2.76 / 2.26	745 / 1149
1-48	1750	1-2	E2 S30	1	(I)	-	2.63	858
1-49	1757	1-2	E6 S26	2	(II)	-	2.42	1028
1-50	1761	1-2	W0 S20	2	(II)	-	2.63	858
1-51	1785	1-2	E0 S32	2	X-52 cm	-	2.83	682
1-52	1788	1-2	E8 S28	1	0-7 cm	-	2..67 / 2.46 / 1.98	824 / 997 / 1340
1-53	1794	1-2	E6 S30	1	0-20 cm	-	--	N.D.
1-56	7500	4	E20 S2	1	0-20 cm	-	3.28	240
1-57	7506	4	E18 S2	1	0-27 cm	-	2.86	655
1-58	7511	4	E32 S0	1	0-40 cm	-	2.44	1013
1-59	7511	4	E32 S0	1	0-40 cm	-	2.57	908
1-60	7514	4	E20 S6	1	0-27 cm	-	2.46	997
1-65	7539	4	E22 S2	3	-	step - floor	2.30	1120
1-66	7540	4	E20 S2	2	27-floor	floor	2.32	1105
1-67	7542	4	E20 S0	3	steps-21 cm	step-floor	2.15	1227
1-68	7547	4	E22 S0	5	steps-floor	patio floor	3.04	484
1-69	7552	4	E20 S0	4	steps-20 cm	-	3.20	324
1-70	7553	4	E22 N0	2	steps-20 cm	-	2.34	1090
1-71	7555	4	E20 S0	5	steps-floor	-	2.45	1005
1-74	7594	4	E16 N2	1	0-20 cm	-	2.56 / 2.10	916 / 1261

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-75	7608	4	E14 S4	2	20 cm - steps	-	2.52	949
1-76	7608	4	E14 S4	2	20cm-top step	-	2.63	858
1-77	7608	4	E14 S4	2	20cm-top step	-	2.97	552
1-79	7626	4	E14 S0	1	0-20 cm	-	2.42	1028
1-80	7631	4	E30 S0	1	0-20 cm	-	2.75	754
1-81	7648	4	E12 S6	1	0-floor	-	2.40	1044
1-82	7654	4	E14 S6	1	0-floor	-	1.98	1340
1-83	7667	4	E20 N8	1	0-floor	-	2.87	646
1-84	7674	4	E18 N6	1	0-floor	-	2.65	841
1-86	7694	4	E8 S2	1	0-floor	-	2.09	1268
1-88	7709	4	E16 S8	1	0-floor	-	2.62	866
1-89	7711	4	E8 S8	1	0-floor	-	2.45	1005
1-92	7719	4	E12 S12	1	0-floor	-	2.36	1075
1-95	7722	4	E26 S12	1	0-floor	-	2.42	1028
1-98	8026	3	W6 N40	1	0-25 cm	-	2.50	965
1-99	8044	3	W8 N38	1	0-25 cm	-	2.62	866
1-100	8048	3	W10 N40	2	25-50cm	-	2.34	1021
1-102	8060	3	W12 N40	1	0-25 cm	-	2.35	1082
1-103	8061	3	W10 N38	1	0-25 cm	-	2.42	1028
1-104	8068	3	W12 N40	3	50-75 cm	-	2.72	781
1-105	8070	3	W8 N36	3	50-75 cm	-	2.68	815
1-107	8089	3	W12 N38	3	50-75 cm	-	2.62	866
1-108	8096	3	W10 N36	3-4	50-85 cm	floor	2.79	719

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-109	8015	3	W6 N32	1	0-25 cm	-	2.51	957
1-110	8121	3	W16 N40	4	90-120 cm	-	2.48	981
1-111	8124	3	W18 N40	1	0-30 cm	-	2.63	858
1-112	8124	3	W18 N40	1	0-30 cm	-	2.82	691
1-113	8143	3	W18 N38	1	0-25 cm	-	2.36	1075
1-114	8163	3	W2 N26	1	0-25 cm	to wall	2.42	1028
1-115	8166	3	W18 N36	1	0-25 cm	-	2.37	1067
1-118	8176	3	W18 N34	1	0-25 cm	-	2.62	866
1-222	8202	3	W0 N24	3	50-75 cm	burial	2.97	552
1-125	8256	3	W12 N42	1	0-25 cm	-	2.52	949
1-126	8264	3	W14 N42	2	25-50 cm	-	-	N.D.
1-127	8265	3	W14 N42	2	52-50 cm	-	2.72	781
1-131	8274	3	W14 N36	3	60-90 cm	-	2.82	691
1-132	8283	3	W14 N38	1	0-25 cm	-	2.32	1105
1-134	8317	3	W16 N32	1	0-30 cm	-	2.68	815
1-135	8317	3	W16 N32	1	0-30 cm	-	2.75	754
1-136	8314	3	W14 N38	3	69-90 cm	-	2.78	727
1-137	8345	3	W12 N28	1	0-25 cm	north half	2.60	883
1-138	8345	3	W12 N28	1	0-25 cm	north half	2.45	1005
1-139	8261	3	W8 N28	1	0-25 cm	-	2.85	664
1-140	8501	1-2	W4 S32	1	0-9 cm	-	3.34 / 2.72 / 2.32	122 / 781 / 1105
1-143	8522	1-2	W8 S32	1	0-28 cm	-	2.85	664
1-144	8535	1-2	W6 S28	1	0-31 cm	-	2.78	728

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-145	8538	1-2	W8 S26	1	0-18 cm	-	2.81 / 2.45	701 / 1005
1-146	8553	1-2	W8 S28	3	34-70 cm	-	3.36 / 2.89	155 / 627
1-147	8554	1-2	W10 S26	1	0-22 cm	-	2.90 / 2.51	681 / 957
1-148	8556	1-2	W10 S26	2	22-52 cm	-	2.85 / 2.32	664 / 1105
1-149	8557	1-2	W10 S28	1	0-18 cm	-	2.97 / 2.36	552 / 1075
1-151	8562	1-2	W12 S24	1	0-29 cm	-	3.09 / 2.35	434 / 941
1-152	8569	1-2	W12 S24	3	60-85 cm	-	3.06	465
1-153	8569	1-2	W12 S24	3	60-85 cm	-	3.21	313
1-155	8578	1-2	W12 S26	3	60-80 cm	-	3.08	445
1-156	8578	1-2	W12 S26	3	60-80 cm	-	3.18	344
1-157	8578	1-2	W12 S26	3	60-80 cm	-	2.85 / 2.47	664 / 989
1-159	8580	1-2	W10 S30	1	0-35 cm	-	2.58	900
1-160	8580	1-2	W10 S30	1	0-35 cm	-	2.57	908
1-163	8587	1-2	W10 S24	3	55-87 cm	-	3.08	445
1-164	8588	1-2	W14 S26	1	0-30 cm	-	2.52	949
1-165	8589	1-2	W10 S30	2	35-60 cm	-	2.58	900
1-166	8593	1-2	W10 S30	3	60-90 cm	to floor	2.96	561
1-167	8593	1-2	W10 S30	3	60-90 cm	to floor	3.02	504
1-170	8606	1-2	W18 S30	1	0-X	-	2.30	1120
1-172	8609	1-2	W12 S22	3	X-85 cm	-	3.01 / 2.26	513 / 1149
1-173	8612	1-2	W18 S30	1	X-X	-	2.60 / 2.37	883 / 1067
1-174	8612	1-2	W18 S30	1	X-X	-	2.62	866
1-175	8612	1-2	W18 S30	1	X-X	-	2.59	892

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-177	8616	1-2	W12 S30	3	X-X	-	3.06 / 2.26	465 / 1149
1-178	8620	1-2	W12 S30	4	X-75 cm	-	3.30	219
1-179	8626	1-2	W14 S30	2	20-40 cm	-	3.07 / 2.65	455 / 841
1-180	8627	1-2	W12 S28	1	0-25 cm	-	Irregular	N.D.
1-181	8631	1-2	W14 S30	3	40-56 cm	-	2.79	719
1-182	8632	1-2	W 12 S 20	2	25-55 cm	-	2.67	824
1-183	8633	1-2	W 18 S 28	1	0-25 cm	-	2.80	710
1-185	8634	1-2	W12 S28	3	45-72 cm	-	3.18	344
1-186	8639	1-2	W18 S28	2	25-50 cm	-	2.60	883
1-188	8644	1-2	W16 S26	2	25-56 cm	-	2.54	933
1-190	8652	1-2	W22 S28	2	18 -X cm	-	2.66	832
1-192	8654	1-2	W16 S26	3	56-X cm	-	3.05	474
1-193	8655	1-2	W20 S20	1	0-30 cm	-	2.71 / 2.42	789 / 1029
1-194	8668	1-2	W18 S22	1	0-25 cm	-	3.03 / 2.23	494 / 1171
1-195	8672	1-2	W24 S22	1	0-25 cm	-	2.54 / 2.15	933 / 1227
1-196	8677	1-2	W10 S32	4	60-90 cm	to floor	3.04	484
1-198	8677	1-2	W10 S32	4	60-90 cm	to floor	3.08	445
1-199	8688	1-2	W24 S18	1	0-X	-	2.74	763
1-200	8691	1-2	W24 S18	2	X-70 cm	to floor	2.46 / 2.22	997 / 1178
1-201	8693	1-2	W22 S24	1	0-26 cm	-	2.13	1241
1-202	8693	1-2	W22 S24	1	0-26 cm	-	2.08	1274
1-204	8715	1-2	W20 S26	2	25-45 cm	-	2.44	1013
1-206	8733	1-2	W10 S20	2	30-60 cm	-	2.66	832

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-207	8734	1-2	W20 S28	2	22-60 cm	-	2.57	908
1-209	8748	1-2	W10 S20	4	90-112 cm	-	3.31	209
1-210	8749	1-2	W26 S26	2	25-50 cm	-	2.15	1227
1-213	8762	1-2	W20 S30	2	25-45 cm	-	Irregular	N.D.
1-214	8775	1-2	W18 S24	3	60-X cm	-	3.01	513
1-215	8778	1-2	W12 S32	2	28-60 cm	-	2.92	599
1-216	8778	1-2	W12 S32	2	28-60 cm	-	3.03 / 2.75	494 / 754
1-217	8781	1-2	W12 S32	3	60-90 cm	-	3.10	425
1-218	8781	1-2	W12 S32	3	60-90 cm	-	Irregular	N.D.
1-219	8782	1-2	W16 S32	1	0-25 cm	-	2.58	900
1-221	8786	1-2	W22 S32	1	0-27cm	-	2.54	933
1-222	8788	1-2	W12 S32	4	90-120cm	-	--	N.D.
1-224	8811	1-2	W20 S32	2	20cm-X	-	2.57 / 2.29	908 / 1127
1-225	8819	1-2	W18 S34	2	X-X	-	3.38 / 2.80	133 / 710
1-1018	1502	1-2	TC-8 Surf.	2	surface	-	2.40	1044
1-1024	1518	1-2	W0 S16	1	0-30cm	-	2.58 / 2.15	900 / 1227
1-1044	1654	1-2	W8 S12	1	0-14cm	-	1.86	1414
1-1049	1699	1-2	E2 S20	3	21-61cm	-	2.75	754
1-1050	1700	1-2	W2 S12	1	0-4cm	-	2.29	1127
1-1054	1728	1-2	W4 S22	3	X-70cm	-	3.22 / 3.05 / 2.20	303 / 474 / 1192
1-1056	1763	1-2	W2 S20	2	30-42cm	-	2.21	1185
1-1061	1822	1-2	E2 S20	4	X-89cm	-	2.19	1199
1-1107	8501	1-2	W4 S32	1	0-9cm	-	2.45 / 2.20	1005 / 1192

Table 102 (Continued)

Lab #	Lot #	Mound	Square	Level	Depth	Context	Microns	Date A.D.
1-1109	8509	1-2	W4 S26	1	0-30cm	-	2.42 / 2.15	1028 / 1227
1-1110	8527	1-2	W8 S32	2	28-55cm	-	2.41	1036
1-1111	8529	1-2	W6 S26	1	0-27cm	-	2.82 / 2.23	691 / 1170
1-1114	8543	1-2	W8 S26	2	18-31cm	-	2.43 / 2.15	1021 / 1227
1-1115	8545	1-2	W8 S28	1	0-17cm	-	2.53	941
1-1117	8554	1-2	W10 S26	1	0-22cm	-	2.76 / 2.37	745 / 1067
1-1118	8557	1-2	W10 S28	1	0-18cm	-	2.33	1097
1-1122	8572	1-2	W10 S28	5	75-95cm	-	2.96	561
1-1125	8589	1-2	W10 S30	2	35-60cm	-	2.63	858
1-1129	8613	1-2	W12 S22	1	0-X	-	2.36	1075
1-1130	8616	1-2	W12 S30	3	X-X	-	2.46	997
1-1131	8628	1-2	W14 S24	4	82-115 cm	-	2.84 / 2.68	673 / 815
1-1133	8636	1-2	W14 S30	4	56-75 cm	-	2.75	754
1-1134	8651	1-2	W18 S20	2	30-49 cm	-	--	N.D.
1-1138	8676	1-2	W24 S20	2	30-60 cm	-	2.73	772
1-1140	8678	1-2	W24 S22	2	25-60 cm	-	2.25	1156
1-1142	8682	1-2	W18 S26	4	85-125cm	-	2.82	691
1-1143	8685	1-2	W22 S18	2	30-55 cm	-	2.81 / 2.41	701 / 1036
1-1146	8716	1-2	W16 S18	1	0-28 cm	-	2.34 / 2.04	1090 / 1301
1-1147	8717	1-2	W24 S16	4	85-125 cm	-	Irregular	N.D.
1-1157	8768	1-2	W18 S24	2	30-60 cm	-	2.51	957
1-1158	8781	1-2	W12 S32	3	60-90 cm	-	2.37	1067

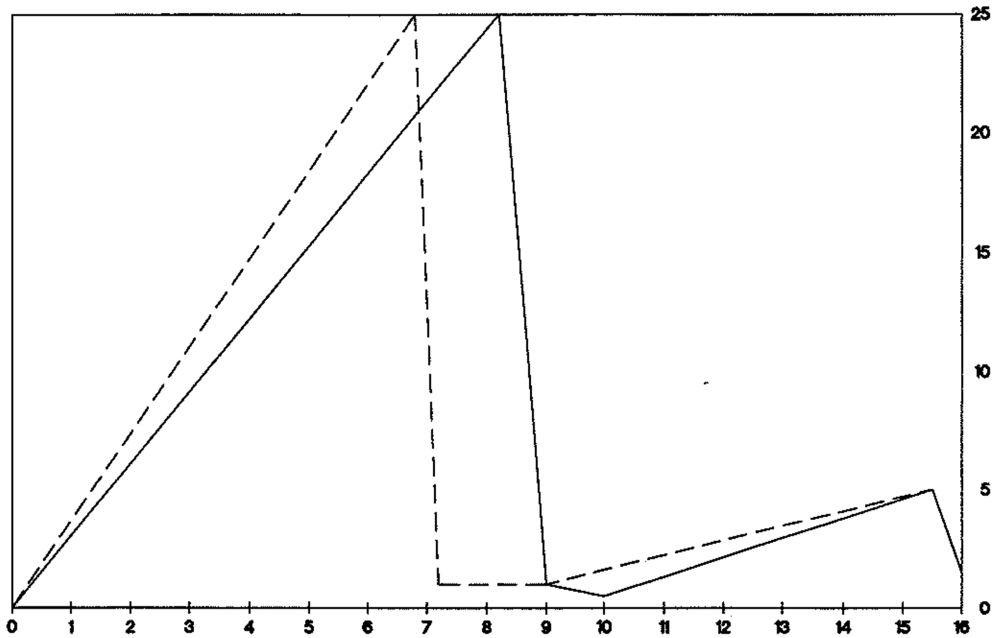


Figure 295 - Obsidian Hydration Dates from TC-8:
Two Expected Distribution Curves.
The Two Peaks are Late Teotihuacan and Late Aztec.

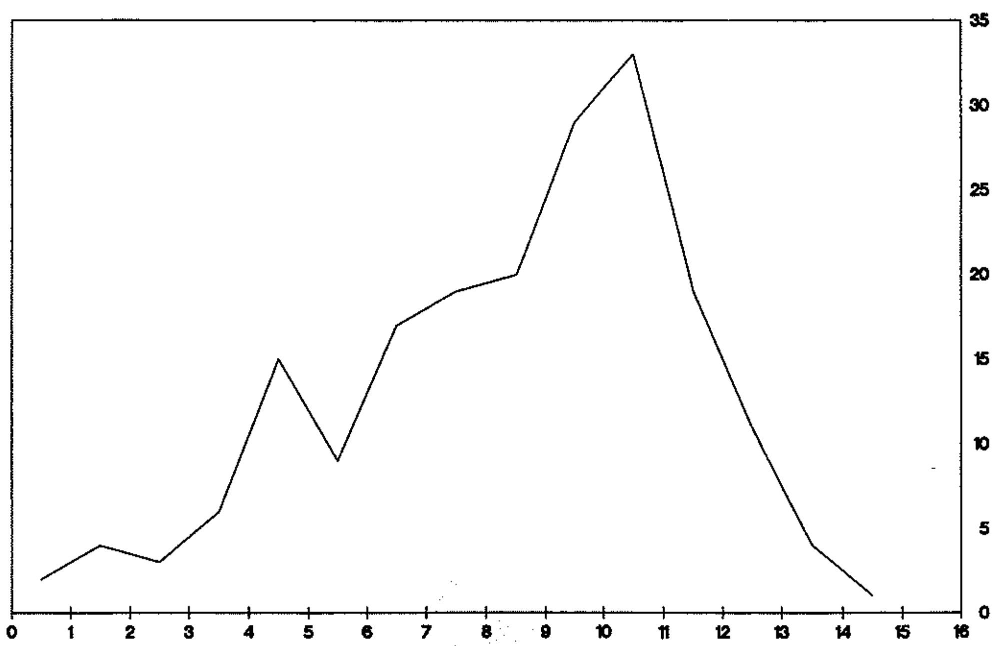


Figure 296 - Obsidian Hydration Dates, Actual Distribution.
(Method of Enumeration - Total Count of All Dates Within a Century Placed as a Point on the Mid-Point of the Century on the Graph)

CHAPTER 13

EXCAVATIONS AT MIXCUYO (TC-5)

By

Jeffrey R. Parsons

and

William T. Sanders

A. THE SITE

Cerro Calaveras, on the lower flank of which TC-8 is located, is the easternmost of a chain of small, heavily eroded volcanic cones, that define the northern border of the Teotihuacan Valley. The volcanoes are located two kilometers north and west of the edge of the Lower Valley Alluvial Plain. Proceeding from east to west the cones are, Cerro Calaveras, Cerro Maravillas, Cerro Mixcuyo and Cerro Cotla. On the lower west flank of Cerro Cotla is the small village of Zagualuca (see Figures. 172, 239). The base of the range is at the 2300 m. contour. Cerro Mixcuyo has a maximum elevation of approximately 2400 m., and runs NNW-SSE for a distance of two kilometers. Three small Teotihuacan period village sites are located on the south and west flank of the range, TC-8 the furthest to the east, and TC-5, or Mixcuyo, the westernmost.

The surface of Cerro Mixcuyo is extensively reworked by hundreds of artificial structural features (see Figure 297). The entire northern, eastern and southern flanks of the hill are covered by continuous lines of narrow, stone faced terraces. These also occupy the upper third of the west flank of the hill. At the time of the survey, and during the period of our excavations they were unutilized. Most of the western flank of the hill, in contrast, was covered by parallel lines of well spaced, individual U-shape terraces or platforms, each averaging about 2-3 meters in diameter, with retaining walls consisting of one or two tiers of stones. They occur in very regular lines along the slope contours and run directly into and merge almost imperceptibly with the continuous linear terraces on the other sides of the hill. About half way up the west slope, is a much larger (15 meters in diameter) U-shaped terrace with a typical smaller one on its summit. On the summit of the hill and above the linear terraces are scattered U-shaped terraces but with a more amorphous overall plan.

At the base of Cerro Mixcuyo and immediately below the U-shaped terraces is an extensive, gently undulating area, covered with rock debris and heavy concentrations of ceramics. Unlike other Teotihuacan village sites, however, none of the undulations appear as clearly defined mounds, the remains of easily identified ruined structures, as at the TC-8 Maquixco site. On the map we refer to this area as the "Tlatel". Along with the Tlatel area, and two types of terraces, four linear features are apparent on the hillside. One is a barranca running diagonal to the slope. Two others appear as parallel lines of rock and earth forming an irregular embankment, between which is a narrow band of flat or gently sloping ground. One of these features runs up-slope the other follows the slope contour. Both of them seem to cut through the lines of U-shaped platforms, indicating that they were constructed at a later date.

At the northern end of Cerro Mixcuyo is a very distinctive linear feature which we will refer to as the "balustrated stairway". It is about five meters wide, extends from the base of the hill to the summit, is terraced and terminates at a low, three meter mound, on top of which is a hacienda boundary marker. The linear feature appears as a terraced road and is bordered by a 130 terraces, somewhat smaller in size than the U-shaped terraces on the west slope. They are either rectangular or U-shaped in plan, and are placed almost shoulder to shoulder, with little intervening space.

Surface survey, conducted in 1961, revealed the presence of a Teotihuacan period village site on the lower, west flank of Cerro Mixcuyo. Occupational remains, in the form of dense concentrations of sherds and obsidian, were found over an extensive area at the base of the hill, including the Tlatel and a gently sloping area to its southeast. The occupation extends up-slope to include the lower 10-12 tiers of U-shaped platforms. Heavy rock rubble, typical of other Teotihuacan village sites, however, was confined to the Tlatel. The distribution of sherds up-slope where no structural features, other than the U-shaped terraces, were noted, was highly suggestive that they were of Teotihuacan period construction. Furthermore, the lines of U-shaped platforms seem to merge into the more normal linear terraces, suggesting to the survey team that the latter were contemporary, and hence also of Teotihuacan age. Extensive survey and mapping, however, conducted in June and July 1962, indicated that the U-shaped terraces, above the middle contours of the west slope, had little or no evidence of occupation of any ceramic phase, immediately raising questions as to the nature of the terraces and their age.

All in all, the initial survey, and the intensive survey in 1962, suggested a very unusual Teotihuacan period site and generated much imaginative speculation. If all of the features found on the hill were prehispanic, specifically of Teotihuacan age, it was an extremely complex site, with unique and puzzling architectural features.

The U-shaped platforms, if they were sub-structures of buildings, as we imagined, were clearly too small to be even nuclear family residences. The "Tlatel" at the base of the hill seemed more like a normal Teotihuacan village site, but we could not define clearly demarcated structures like the temple platforms and residential compounds of TC-8.

We tentatively identified the site as a special function site, suggested that it might have been a garrison; that the U-shaped platforms functioned as sub-structures for buildings housing warriors; the unusually large U-shaped platform having a command function; the linear terraces probably functioning as agricultural terraces, and possibly to supply food for the garrison; and the linear features were thought of as moats and walls, the remains of a defensive system. The balustraded stairway, and the summit mound, was assumed to have ceremonial, functions with some relationship to the overall functioning of the site. In 1962 we mapped the west side of the hill (see Figure 297), including its contours. Over 400 of the U-shaped platforms were located on the map, along with the linear features. At that time we noted that the linear features post-dated the U-shaped platforms, but thought that they could still be of prehispanic age. .

The site was a very intriguing one, and we decided to conduct small scale excavations in July and August 1962, to test some of these hypotheses. The survey and excavations were directed by Jeffrey R. Parsons, then a graduate student. The results were frustrating and revealed the problems of surface survey in a post-occupational, heavily utilized landscape.

B. OPERATION 1 (see Figures 297, 298A)

Operation 1 was a relatively large scale excavation designed to reveal information on the U-shaped platforms near the base of the hill, where they were associated with heavy concentrations of Teotihuacan sherds (see Figure 298A). An area 4 m wide (N-S) and 13 m long (E-W) was laid out with a 5 x 4 meter extension to the north. The main gridded area ran up slope and included three U-shaped platforms and their peripheral spaces. The extension to the west ran along one of the parallel rows of platforms and included one additional platform. The grid units that included platforms were 4 x 3 meters in area, the intervening grid units measured 4 x 2 meters.

We began the excavations with Unit A, at the lower end of the gridded area, two workers digging in the area outside the platform, and two within it. The original plan was to excavate using a system of 20 cm. levels. During the first day of excavation, however we encountered tepetate, outside the platform, in level 1 and then decided to take the entire grid square down to tepetate, as one level. The tepetate occurred at varying depths in Unit A, ranging from 17-44 cm below the surface.

The team working inside the platform encountered a hard earth surface at a depth of 10 cm. at the rear of the platform, 15 cm. towards the front. The layer, however, seemed to extend outside and behind the platform and well into the intervening space found in Unit B. Further excavation indicated that the same soil profile seemed to cover all of Units A and B. It consisted of a thin layer of relatively soft top soil and sod, followed by a hard packed earth layer, in turn lying directly on tepetate. In Unit B, tepetate was encountered between 50-60 cm. below the surface. The tepetate surface was extremely rough and uneven in appearance (see Plate 186B).

Occupational debris was very heavy in both units, including the periphery and interior of the platform in Unit A, but no structural remains were found other than the platforms.

This basic pattern, in terms of the density and distribution of Teotihuacan occupation, and soil profile, was found to be the case throughout the Operation 1 area. The only interesting architectural features encountered were localized, heavy concentrations of rock rubble, which were found in the southern portion of Unit D, the southwestern corner of Unit E and through much of Unit F. In this last unit some of the stones in the rubble were 30 cm. long and 7-10 cm. thick, and had possible worked faces on one side. The presence of the rubble was the only evidence of possible structures, other than the U-shaped platforms, in the Operation 1 excavation.

C. OPERATION 2 (see Figures 297, 298B)

Operation 2 was conducted in a similarly-gridded area, extending 10 m. NS by 4 m. E-W, but running along a slope contour on the middle, non-sherd bearing part of the Cerro Mixcuyo west slope. The trench included two of the U-shaped platforms and their intervening spaces and was divided up into three grid units, named, J, I and H. The excavation was initiated in Unit I, the middle square. Tepetate was encountered at a depth of 30-35 cm. and the overburden was excavated as a single level. No features and virtually no artifacts were found, except a few Aztec sherds. After the excavation of Unit I the operation was suspended.

D. OPERATION 3 (see Figures 197, 298E, 299B, 300)

Operation 3 consisted of a 2 x 2 meter test pit, excavated on the large U-shaped platform, immediately below the smaller U-shaped platform on its summit. The large platform is located within the area of the site that has Teotihuacan surface ceramics. This excavation was labeled Unit K. Below the top soil-sod layer we encountered hard packed yellow-brown soil. At a depth of 27-37 cm. we found an even harder earth surface, that appeared to be a floor. The fill below the floor consisted of grey-brown loose soil. At a depth of 54 cm., a similar, floor-like surface was encountered. Below the second "floor" we encountered a layer of loose powdery soil, similar to that found between the two floors. This continued down to the underlying tepetate, which here varies from 120-150 cm. below the surface. Upon completion of the test pit, the soil profiles were drawn (see Figures 298E, 299B, 300). Scanty concentration of modern sherds were found in the fill below the first earth floor, along with a few sherds of Teotihuacan period pottery. This situation continued through the upper part of level 4, i.e. the level below the lowest floor. Ceramics are generally somewhat more abundant in the lower levels of the test pit but never were encountered in significant numbers.

E. OPERATION 4 (see Figure 297)

Operation 4 consisted of a series of five separate test pits, Units M and L measuring 2 x 2 ms.; and Units R, S and W measuring 1 x 1 meters, all excavated on the large, amorphous tlatel or mound found on the lower flank of the hill, and located below the tiers of U-shaped platforms. It was the only part of the site that resembled other Teotihuacan village sites, in the presence of substantial amounts of rock rubble, along with heavy artifact concentrations. It had an undulating uneven surface. The surface debris resembled that of the occupational remains found on residential mounds at TC-8. The five test pits were spaced at 4-10 meter intervals. They all produced similar and discouraging results. Rock rubble was found in light concentrations in the fill of the trenches, but with no apparent evidence of structure. Sherds were extremely abundant on the surface often exceeding 100 per m2. The upper 20 cm. of the units consisted of a soft grey-brown loam which was saturated with artifacts. At depths varying from 25-60 cm., was a harder, denser, darker soil layer, 5-20 cm. thick, which, in general, rested directly on the underlying tepetate. This layer generally lacked artifacts and no traces of structures were found. The "floor" generally had a rough undulating surface.

F. OPERATION 5-6 (see Figures 297, 298C, D)

To the east of the Tlatel is a large area of relatively flat, gently sloping terrain with heavy Teotihuacan sherd concentrations, but no indication of mounding, and little rock debris. Two sets of excavations were conducted in this area. Operation 5 consisted of four 2 x 4 grid units (N, O, P, Q) in an area extending 2 ms N-S by 8 ms. E-W. Two 2 x 1 meter sections (N and O) intersected Linear Feature 2 (which appears today as a wash, but originally perhaps served as a road), and were excavated. Units P and Q were not excavated. The excavation revealed no structural features. In this area a layer of soft grey-brown loam lies directly over tepetate, which occurs at a depth of 30-95 cm. In the soil layer were abundant artifacts but very little rock debris.

Operation 6 consisted of 3, 1 x 2 meter test pits (Units T, U, V) excavated in the open area below Linear Feature 2. In all the trenches the soil profile was a duplicate of that in Operation 5. Here tepetate occurred between 15-25 cm. below the surface. As in Operation 5 artifacts were abundant, rock debris scanty.

G. OPERATION 7 (see Figures 297, 299C)

The final operation at Mixcuyo consisted of four 1 x 2 or 2 x 2 meter test pits (Units X, Y, Z, AA) located at the north end of the mapped area, in the vicinity of the Linear Feature 1 (another unusually straight, erosional wash, perhaps originally a road). The soil in the northern part of the site contrasts sharply with that in the south, being darker and coarser in texture, somewhat like the soil in Pit I in Operation 2.

Unit Y was excavated immediately south of Linear Feature 1 within the area of U-shaped platforms, Unit X was to the north of the feature, and Unit Z on its south edge. Unit AA was located immediately north of Linear Feature 2. In all the excavations the soil consisted of the material noted above and lying directly above tepetate. In this area tepetate occurs at a depth varying from 50-80 cm.. The soil was heavily impregnated with sherds and a moderate amount of rock. One test pit, Unit Y, yielded the first truly structural feature found on the site. This consisted of a well defined wall which changed directions several times, the angles forming clearly visible corners. It was uncovered the final day of the excavation season. Also of significance, and confirming much indirect evidence from our excavations, the wall extended well below (45-50 cm.) one of the U-shaped platforms, demonstrating that the latter were post-Teotihuacan constructions. The wall consisted of two parallel lines of roughly worked stones separated by a fill of smaller stones and clay. It was approximately 50-60 cm. wide and several corners were defined within the excavated area (see Figure 299C, Plate 189). Near one of the corners of the wall several areas of typical Teotihuacan gravel - clay - lime stucco flooring were preserved in situ. The construction was very similar to that found in TC-46 and TC-49.

H. SUMMARY

The excavation at Mixcuyo produced unexpected and puzzling results. As a plus we obtained a very large sample of ceramics and other artifacts from another Teotihuacan period village site. The artifact assemblage is very similar to that of TC-8, indicating that this was a typical residential site and probably a village. The site was not, as we expected, a special function military site, and the hundreds of linear terraces and oval platforms are clearly of recent date. According to local informants, questioned during the last two weeks of the excavation season, the Hacienda Cadena used the terrace system in the late 19th-early 20th Century for maguey planting and presumably was responsible for their construction. Most of the Teotihuacan village site lies on the lower flank of the hill, in the area of heavy sherd and rock distribution, the area we have referred to as the Tlatel, and extending to the southeast in the area that lacked surface rock but with dense Teotihuacan occupation. It probably extended slightly up onto the flank of the hill as well. Puzzling, is both the lack of surface indications of architecture, or, presence in our rather extensive testing. Concentrations of rock rubble were found in several test pits, suggesting the use of stone for at least the bases of walls. In only one excavation, however, did we find an intact wall and portions of flooring. Even in the part of the site where surface rock was found, the density would be rated as only light to moderate, contrasting with typical Teotihuacan village sites like TC-8, TC-46 and TC-49.

One of two possibilities is suggested. The Teotihuacan village site may have been heavily mined by the Hacienda Cadena to construct the terraces and platforms - a very likely possibility. Another is that much of the architecture at Mixcuyo was constructed of adobe bricks and placed on very low stone wall bases. The relatively shallow soil depth and heavy reworking by the area with plows in recent times could have contributed to the nearly complete destruction of walls of this type. In all likelihood the explanation lies in both directions. Equally puzzling however, is the lack of evidence of fragments of stucco flooring on the surface, or in the fill of our excavations. Possibly many floors had only hard clay surfaces and the few remains encountered represent unusual circumstances on the site.

Figure 297

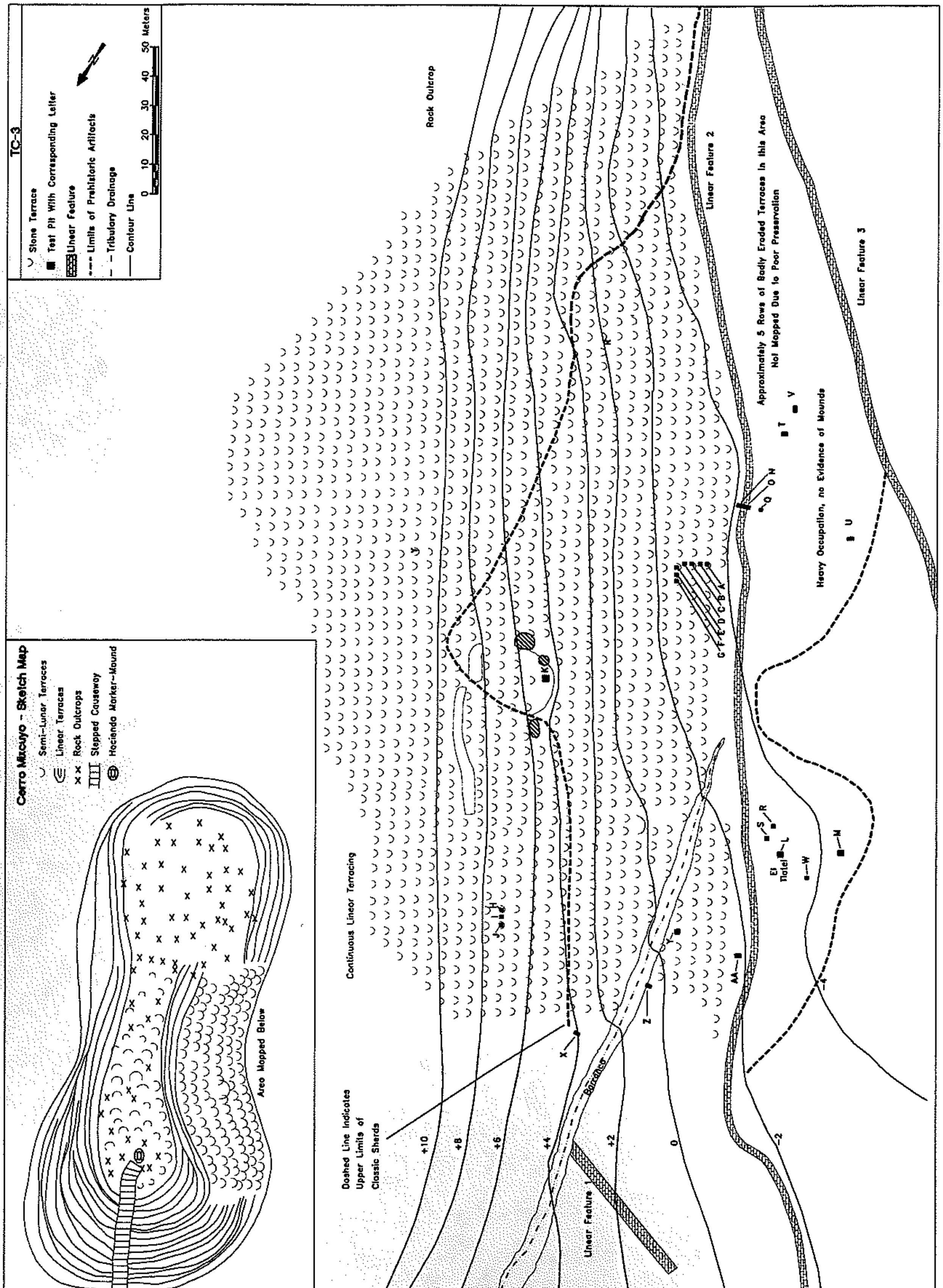

TC-3
Stone Terrace
Test Pit With Corresponding Letter
Linear Feature
Limits of Prehistoric Artifacts
Tributary Drainage
Contour Line
0 10 20 30 40 50 Meters
Rock Outcrop
Linear Feature 2
Approximately 5 Rows of Badly Eroded Terraces in this Area
Not Mapped Due to Poor Preservation
Linear Feature 3
Heavy Occupation, no Evidence of Mounds
El Tlotel
Continuous Linear Terracing
Dashed Line Indicates
Upper Limits of
Classic Sherds
Barranca
Linear Feature 1
+10
+8
+6
+4
+2
0
-2
Cerro Mixcuyo - Sketch Map
Semi-Lunar Terraces
Linear Terraces
Rock Outcrops
Stepped Causeway
Hacienda Marker-Mound
Area Mapped Below

Figure 298

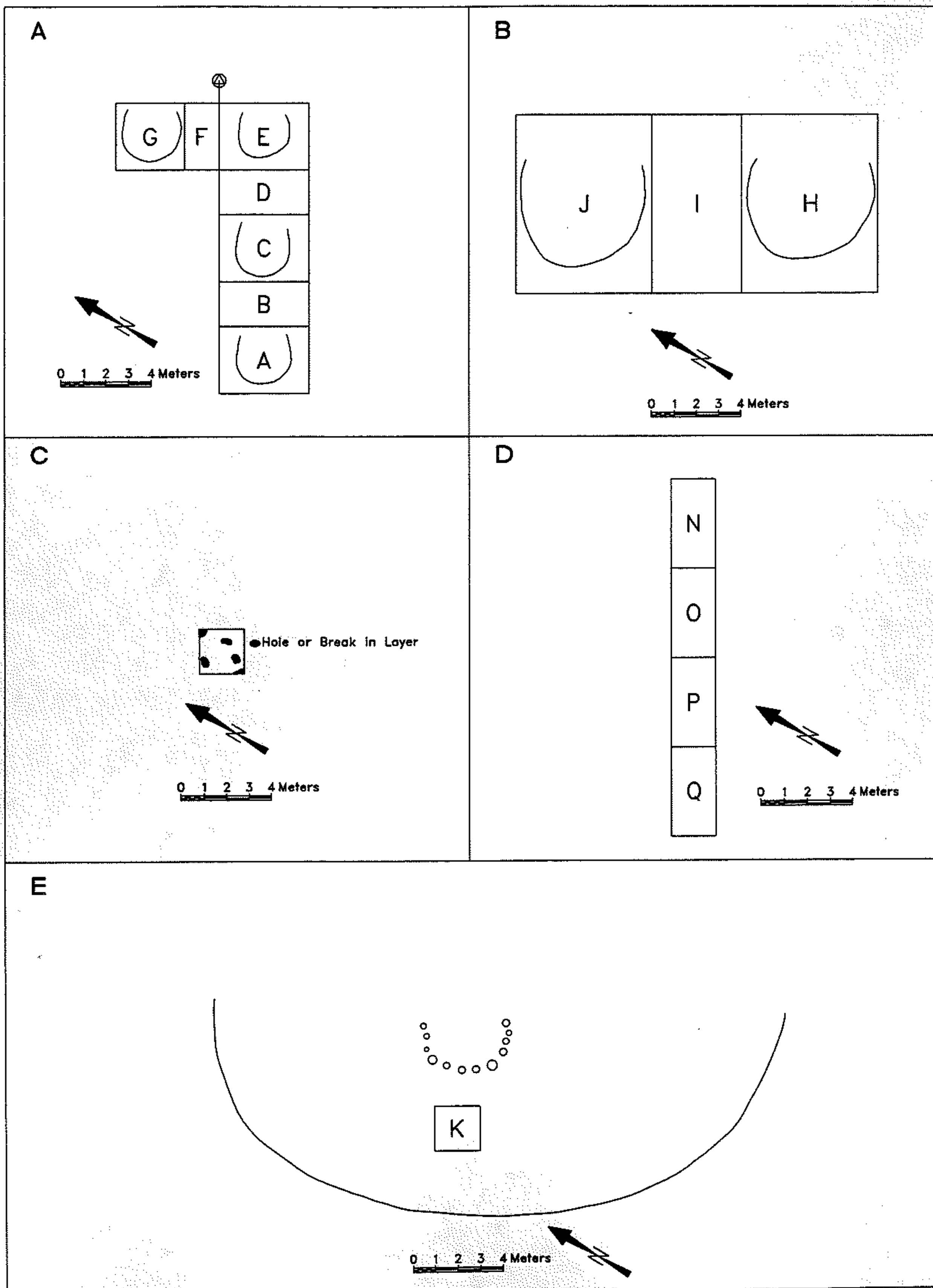

A
G
F
E
D
C
B
A
0 1 2 3 4 Meters
B
J
I
H
0 1 2 3 4 Meters
C
Hole or Break in Layer
0 1 2 3 4 Meters
D
N
O
P
Q
0 1 2 3 4 Meters
E
K
0 1 2 3 4 Meters

Figure 299

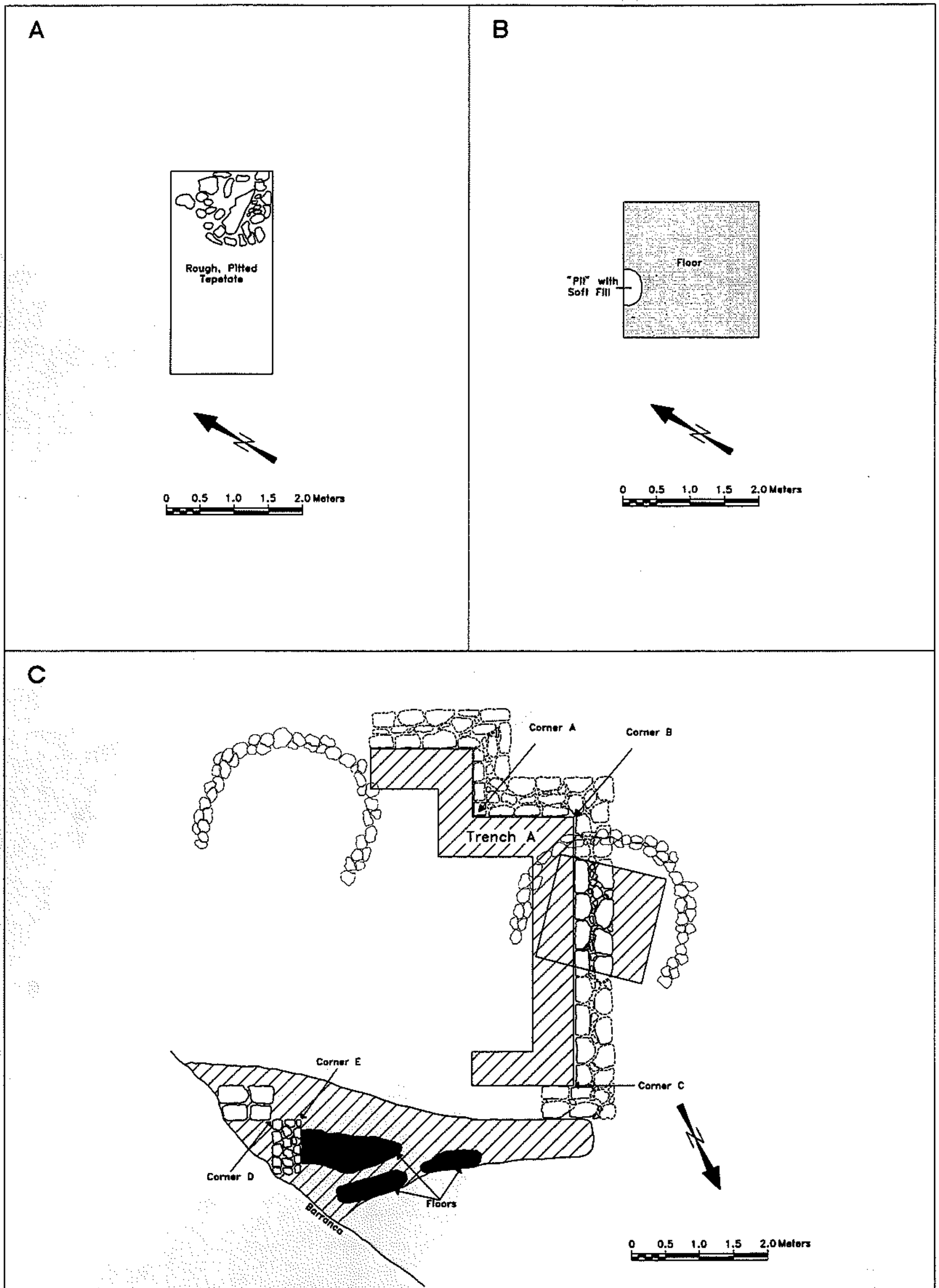
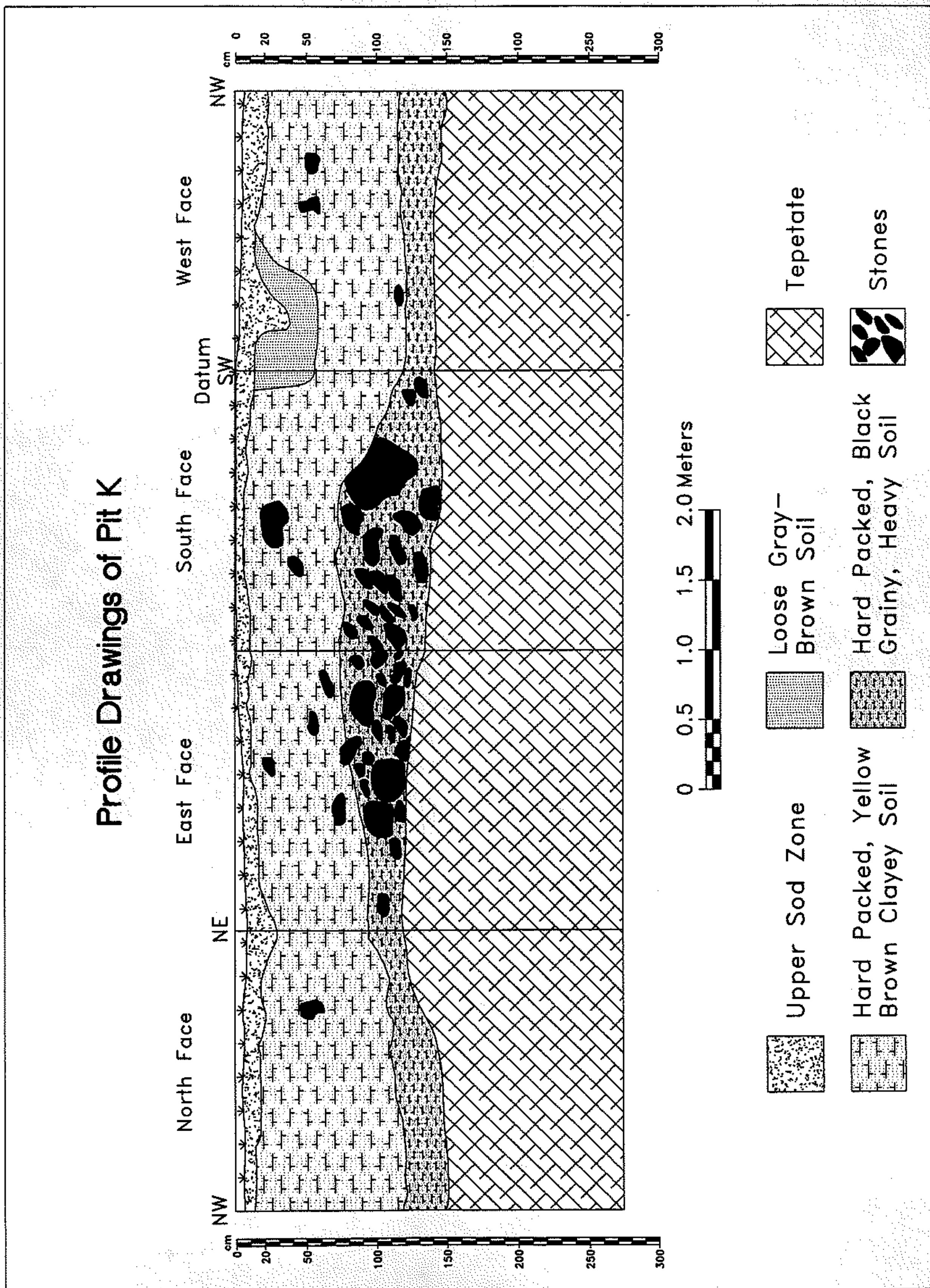
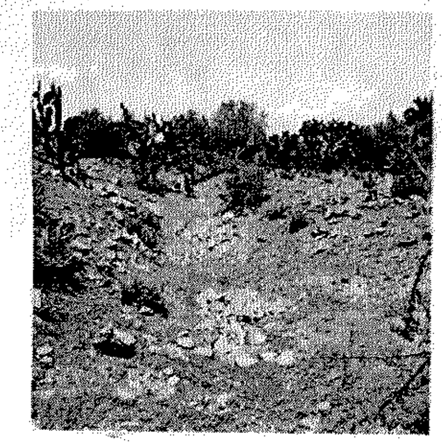

A
Rough, Pitted Tepetate
0 0.5 1.0 1.5 2.0 Meters
B
Floor
"Pit" with Soft Fill
0 0.5 1.0 1.5 2.0 Meters
C
Corner A
Corner B
Trench A
Corner C
Corner E
Corner D
Floors
Barranca
0 0.5 1.0 1.5 2.0 Meters

Figure 300



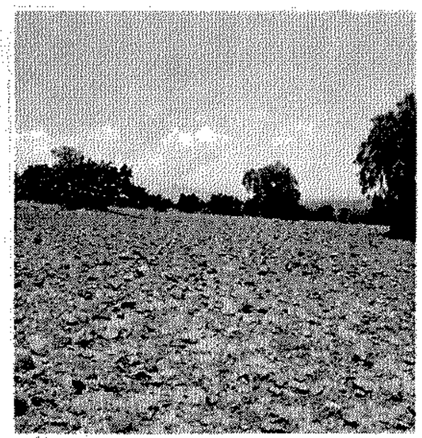
Profile Drawings of Pit K
North Face
East Face
South Face
Datum
West Face
NW
NE
SW
NW
cm
0
20
50
100
150
200
250
300
0
0.5
1.0
1.5
2.0 Meters
Upper Sod Zone
Hard Packed, Yellow Brown Clayey Soil
Loose Gray-Brown Soil
Hard Packed, Black Grainy, Heavy Soil
Tepetate
Stones

A



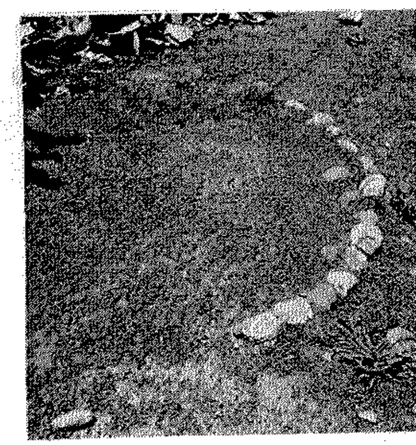
B

C



D

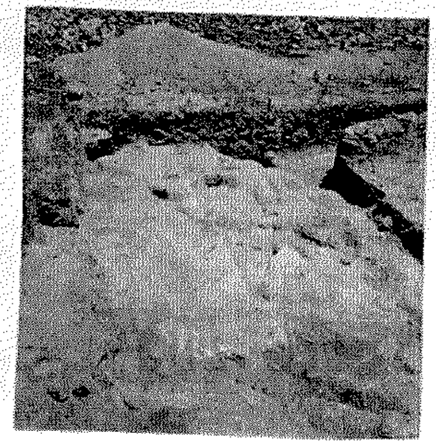
E



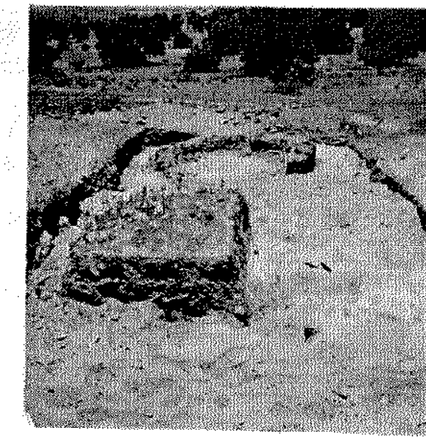
F

Plate 185

A



B



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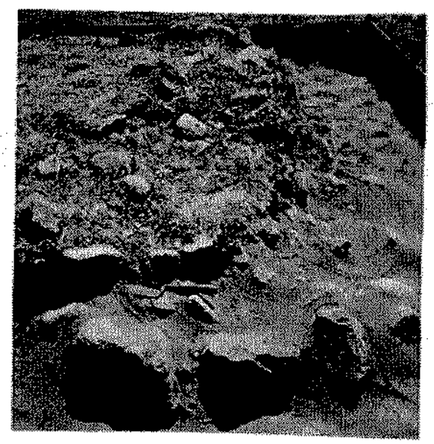
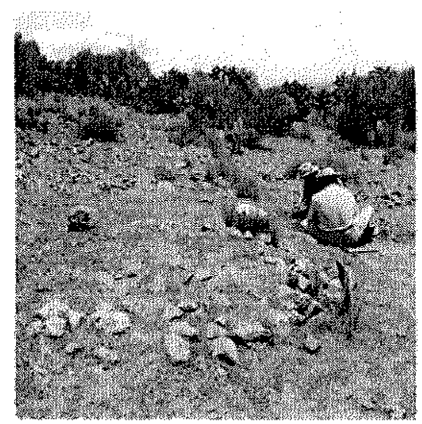


D

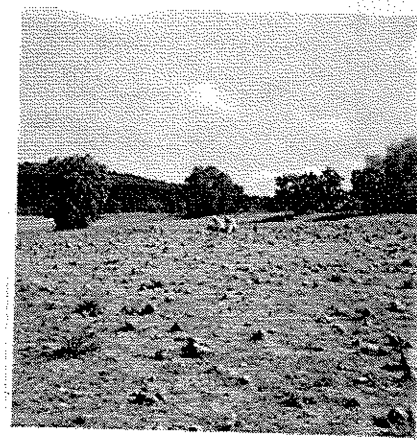
E



F

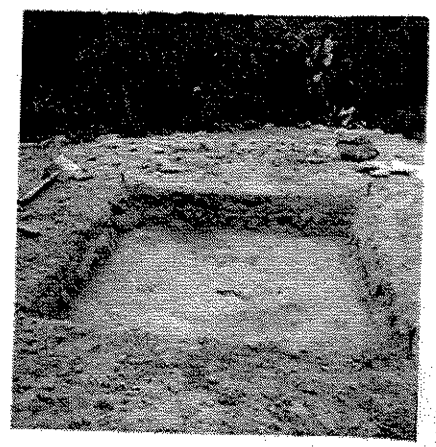
Plate 186

A



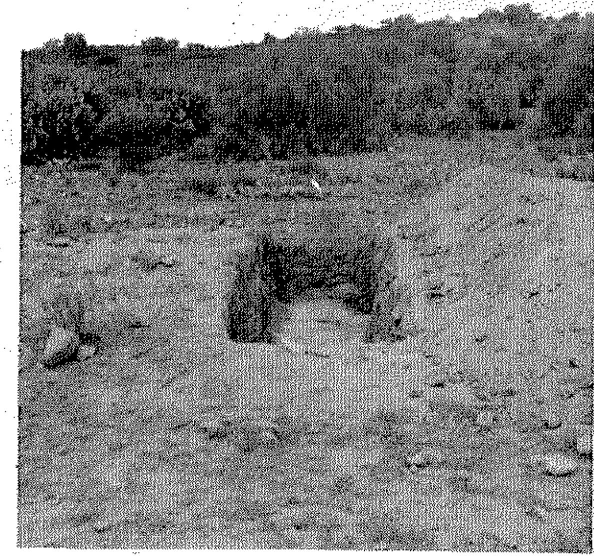
B

C



D

Plate 187



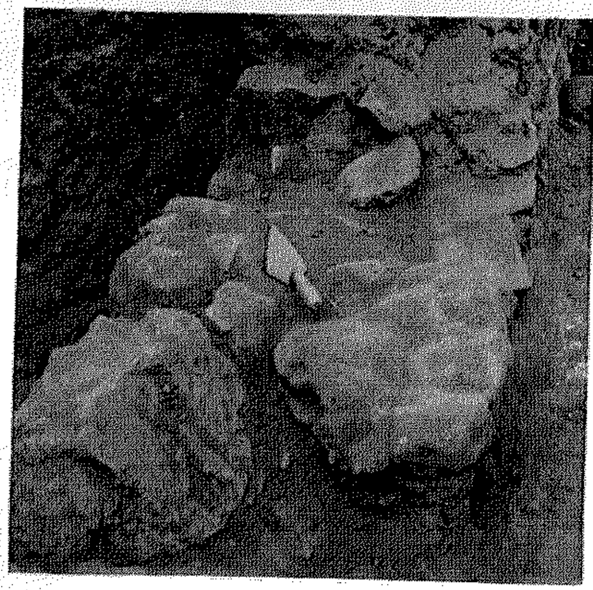
A

B

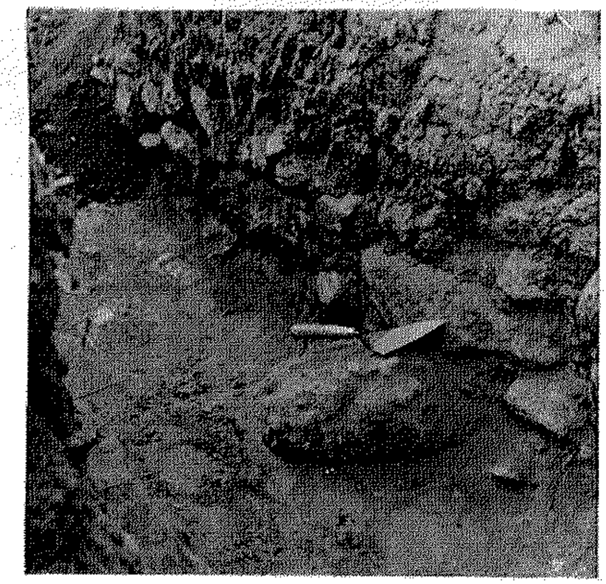
C

D

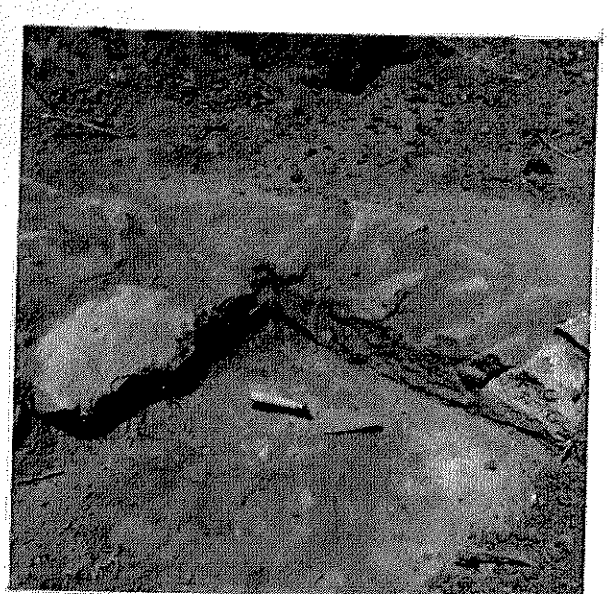
Plate 188



A



B



C

D

Plate 189

Appendix I

Village Economy - Cerro Gordo North Slope
(Republished from Charlton 1970a) (1)

San Cristobal had a population of 306 in 1960 and 320 in 1964.

Map 9 indicates the location of the ejido and private lands (pequena propriedad) of Colhuacan and Maquixco. Those of Colhuacan are confined to the slopes of Cerro Gordo and Buenavista. As I have mentioned earlier land distribution within the village appears to be rather equitable. A large percentage of the ejido lands are communal pasture. A total of 1,148 hectares are exploited by the campesinos. Maps 10-11 indicate crop distribution and land classification within the pequena propiedad of Colhuacan in 1964. I do not have similar data for the ejido lands but my impression is that only about 10% of the ejido is under cultivation, the rest being hill slope pasture or eroded terrain. The cultivated areas are located on the long ridges running from Cerro Gordo east of Cerro Jaltepec and on the flat, plain-like area to the east of Cerro Buenavista.

Within the pequena propiedad the major areas of crop production are the presas and the terrace systems. All presas are classified as tierra de humedad and are prepared as such. Only some terraces are tierra de humedad, others because of age, position or residential use, being tierra de temporal. Preparation techniques vary accordingly with careful preparation given to the humedad lands. These are planted in March and early April with six month maize. The temporal lands are planted later in April and May, usually with four month maize, although some barley occurs as well.

Including the presas, constructed in barrancas south of the pequena propiedad in the ejido of Maquixco Alto, which the residents of San Cristobal have permission to use, the total area of presa cultivation approximates 10 hectares. Virtually all are planted in six month corn regularly except those that have suffered from erosion. The most impressive system of presas is found in the Barranca La Garita which flows to the west and collects water and soil from several smaller barrancas. As a result of the sudden loss of force of the rapidly flowing water as it turns into the main barranca from the tributary barrancas and hence, the large quantity of silt, deposited, an extensive presa system could be constructed here. The barranca is completely filled in for a distance of 800 meters with smaller presas present in immediately adjoining tributary washes and gullies. Other presas occur above the village in the upper reaches of the Barranca de San Cristobal but do not reach the size of those further down slope.

There are six systems of terraces within the pequena propiedad of Colhuacan. Three appear to be quite old, possibly pre-Conquest, in date, two are more recent and were probably constructed within the last hundred years, and the sixth has been constructed since the agrarian reforms.

On the west side of the Barranca de San Cristobal there are 13 hectares of terraces owned by campesinos of Colhuacan. The terraces lie below Cerro Aguatepec and are part of a much larger complex of terraces which runs below the smaller hills that circle the base of Cerro Gordo. The other terraces are within the lands of Maquixco Alto. Those of Colhuacan are well kept, deep soil (1-2 meters deep) terraces which receive runoff from the hill. I do not have precise data on their classification but about one-third appear to be humedad. The predominant crop grown is maize, plus about two hectares of barley. These appear to be very old terraces. A colonial road, built before 1580, is integrated with the system suggesting a great antiquity for it. (Map 8, Area 6)

On the eastern edge of the barranca there are three rows of terraces which converge at a point just within the modern village. The form of the terrace system is similar to an ancient terrace system within the lands of Maquixco Alto that was directly associated with an Aztec archaeological site. It is possible that they too have a substantial antiquity although some parts have been recently rebuilt. The system contains about 13 hectares of land in moderate to poor condition with generally thin soil and crops of barley, 4 month maize, nopal or pasture. About four hectares were planted in maize, and barley, the rest being left as pasture or

1. Editor's Note: In the Text, we have kept Charlton's original map references. See list of figures for the key to the new figure numbers designated for this volume for his maps, Page xxxxv.

planted with maguey and nopal. The presence of eroded areas on both sides of the system suggests that it may present a remnant of a formerly more widely extended system. (Map 8, Area 7)

Above the convergence of the rows of terraces lies part of the village. This section below and just above the jaguey appears to have been constructed during the nineteenth century (on the basis of statements about the age of the terraces). It includes about seven hectares of land, most of which is as low in productivity as the tierra de temporal terrace sin the system below. Most of the area is occupied by houselots with maguey, nopal and some beans. (However, .5 hectares was planted in four month maize and .5 hectares in six month maize in 1964). (Map 8, Area 8)

This system forms part of the base for the fourth system, which rises above it to the south, and which has been constructed since the agrarian reforms. It too is included within the occupied area of the village but because of its recent construction and higher position, it has a much great productivity. It has effectively controlled erosion above the jaguey and gully erosion to the east. Similar terracing activities have been carried out just east of and below the jaguey but with less success, due to the prior construction of terraces (and some presas) on the slope. Since all have been constructed after the reforms, I have included them as part of a single system. For the same reason I would also include the terraces constructed to the east above the fifth terrace system (to be discussed later). In all these recently constructed terraces, with few exceptions, soil accumulation and water content are high and high crop yields occur. (Map 8, Area 9)

These recently constructed terraces contain about 13 hectares of land. Five hectares were planted in six month maize, four hectares in four month maize, and four in barley in 1963-64. The barley occurs primarily in the lower parts of the system, the six month maize on the edges and upper parts. The distribution of crops is directly related to humidity of the soil.

East of the village and separated from it by gully erosion, is the most extensive terrace system of Colhuacan. It covers 30 hectares and appears to be a remnant of an older system which has been partially destroyed by sheet and gully erosion. The soils are quite deep (2-3 meters) and well cared for. Most of the system is tierra de temporal. About four hectares were planted in six month maize in 1963-64. These are tierra de humedad and for the most part are located on either the upper edge or the sides of the system. An equal number of hectares were in barley. Three hectares are in pasture and one-half hectare is occupied by the village cemetery. The other eighteen and one-half hectares were planted in four month maize. (Map 8, Area 10)

It is possible that this system is representative of relatively well-cared for systems of terraces under aboriginal conditions. Undoubtedly the pasture area would be reduced but the proportion of humedad to temporal lands would be about the same in a functioning terrace system.

On the lower slope of Cerro Buenavista, above the Barranca La Garita, there is an old terrace system. It probably was constructed in the nineteenth century. The system includes about twenty-five hectares, all tierra de temporal. Three are planted in four month maize, six in barley and the rest are pasture with maguey (1963-64). (Map 8, Area 11)

Thus of the total 216 hectares available to Colhuacan only 78.5 were cultivated with maize or barley. Of these 23.5 hectares were planted in six month maize, 37 hectares in four month maize and 18 hectares in barley. The rest of the area consists of hillslope, barrancas and bare tepetate. In an exceptional year the area under maize cultivation could produce 126,000 kilograms of maize, using figures of 3000 kilograms per hectare of humedad lands and 1500 kilograms per hectare of temporal lands. A population of 630 could be supported with this quantity of maize estimating a consumption of 200 kilograms per person per year. In a poor year, however, the yield from the same lands could drop to 68,500 kilograms, using figures of 1200 kilograms per hectare of humedad soils and 900 kilograms per hectare of tierra de temporal. With an annual consumption of 200 kilograms of maize per person a population of 342 could be supported. If the yield from these lands were to fail completely, which has occurred occasionally, no maize would be available. Consequently, it can be seen that given a series of poor years coupled with some years of total crop failure the area of pequena propiedad under maize cultivation at the present would be inadequate to support even the modern population.

Only three (5.2%) of the residential units in Colhuacan hold neither ejido nor private lands. Only four households (7.0%) are supported by activities other than those connected with agriculture.

The focus of agricultural activity in Colhuacan is on the terraces and the presas, which together produce the bulk of the maize consumed. Maguey and barley are important cash crops grown in peripheral areas with the ejido and pequena propiedad. An examination of the barrancas and eroded zones within the pequena propiedad suggests that many are of the post-Conquest origin. It is probable that prior to depopulation the entire slope area may have been terraced. Of this terracing only a fraction remains today.

Village Economy-Santa Maria Maquixco el Alto

In 1960 Maquixco el Alto with its colonias had a population of 408. By 1964 this had declined to 387. The majority of the population live in the village area located on a flat ridge top between Cerros Aguatepec and Tiquimil. There are a few outlying residences on that ridge as well as on the ridges to the southwest of the village. The inhabited area lies between 2500 and 2600 meters although the village itself does not exceed 2550 meters in elevation.

I have indicated in Map 9 the pequena propiedad and ejido lands of both Colhuacan and Maquixco Alto. I have previously discussed the distribution of land to the households (residential units) within each community (pp.334-344). Taking my informant at Maquixco Alto as an example it would appear that there are some abuses within the system of ejido holdings. Further, fewer households of Maquixco Alto hold pequena propiedad than is the situation in Colhuacan.

The campesinos of Maquixco Alto exploit 380 hectares of pequena propiedad and 969 hectares of ejido. I have indicated in Map 10-11 the 1963-64 crop distribution and land classification for areas of both ejido and pequena propiedad for which data are available. In addition I have included the available data for the adjacent lands of Teacalco. In some cases information on the type of maize planted was not available and I have indicated all such instances as maize temporal.

Between 20% and 25% of the ejido is under cultivation. The major cultivated areas are near the ruins of the Hacienda San Cayetano and on the flat fields east of Cerro Buenavista. With the exception of a few good fields scattered through the ejido, the rest of the area tends to be hillslope, used as pasture or badly eroded.

Within the pequena propiedad of Maquixco Alto the terraces and presas are areas of major maize production. Presas are present in many barrancas but there is a concentration in the Barrancas of San Cristobal and Tecorral. All presas are classified as tierra de humedad and are regularly planted in six month maize. The total area of the presas is nine hectares. There are no large systems of presas comparable to those found at Colhuacan.

There are four major zones within which terraces occur in the pequena propiedad. The first zone is north of the Barranca Tecorral on the lower slope of Cerro Buenavista. The old terrace system previously described for Colhuacan continues into the lands of Maquixco Alto. Of the twenty-eight partially terraced hectares, only one was planted in temporal maize. Five hectares were in barley, ten in pasture and twelve hectares are bare eroded tepetate. (Map 8, Area 1)

The second zone of terrace construction lies to the west of the first but is still on the north side of the Barranca Tecorral. It is similar to the first but is not quite as badly eroded. Of sixteen hectares one was planted in four month maize, three were in barley, nine in pasture, with three of eroded tepetate. In addition small areas were planted in beans. The terraces of both the first and second zones are temporal. (Map 8, Area 2)

The third zone of terraces includes a number of separate systems in various stages of construction and preservation. The zone includes the area below Cerros Aguatepec, Tezqueme and Tlacuache Grande. It reaches below the village to the Barranca Tecorral. The terraces form part of the terrace system belonging to Colhuacan. They are located on the west side of the Barranca de San Cristobal on the same ridge as the village of Maquixco Alto and probably date from pre-Conquest times. I have indicated this area as 3A in Map 8. It contains the best maintained terraces of Maquixco Alto with deep soils and good maize yields. Data on maize and soil classification are for the most part lacking for this area. It is probable that a number of terraces should be classified as tierra de humedad. Precise data suggest that two of the total of 52 hectares were planted in six month maize, 12 hectares in barley, three hectares in pasture with maguey, two are eroded tepetate, and the remaining 33 hectares were in four month maize.

Outside of this system but still within the third zone there is a second terrace system. It is located to the southwest and appears to have been constructed much more recently than the first system. It is part of an attempt to reclaim the eroded tepetate ridge below Cerro Tezqueme. There are about twenty-five hectares of terraces within the system. I have indicated this area as 3B in Map 8. The terraces have brought the erosion on the lower part of the ridge under control although the upper part (not included here) is bare tepetate and steep hillslope. The soil in most of the terraces is not very deep. Six month maize was planted in two hectares, four month maize in two hectares and barley in eleven hectares, with seven hectares being pasture and three being eroded tepetate.

The third system of terraces within this zone lies below Cerro Tlacuache Grande, on the southwest side of the Barranca de Allacal. The system continues into the adjacent ejido lands. Within the pequena propiedad there are sixteen hectares of terraces. In the upper (southern) section some of the terraces have been destroyed by erosion but many still possess deep well-watered soil. Ten hectares were planted in barley, three hectares in maize, with one hectare of tepetate and two hectares of pasture. Data on maize type are not available. (Area 3C)

The fourth zone of terracing lies to the west of the village around the base of Cerro Tiquimil. The area is badly eroded but terracing has reclaimed some of it for agriculture. The zone contains forty-eight hectares of surface area. About twelve hectares are still bare tepetate. Many of the fields have very thin soil and most of the zone is temporal. Thirteen hectares were planted in maize, eighteen hectares in barley, with five hectares of pasture and maguey.

In the last decade the houselots of the village have become important sites for the raising of nopal. Maguey also occurs on houselots. This area includes about fifteen hectares.

On the north side of the Barranca Tecorral, between the two zones of terraces, there is a relatively flat area of thirty-nine hectares, excluding the presas. The area is badly eroded, with eighteen hectares of bare tepetate. Thirteen hectares were in pasture, six hectares in barley and two hectares in four month maize.

The other area of private property is located within the lands of Teacalco. It is on the ridge top below Cerro Tiquimil and consists of about thirty-two hectares of thin soil, with maguey bancals present. The area is referred to as the Rancho de Tenango and is owned by one family in Maquixco Alto. I have no data on the crops planted in the area (Area 4 on the map).

The other areas within the pequena propiedad of Maquixco Alto are eroded tepetate and steep or medium hillslopes used to grow maguey or to serve as pasture.

Out of the total 348 hectares of pequena propiedad of Maquixco Alto (excluding the thirty-two hectares of the Rancho de Tenango) 137 hectares were planted in maize or barley. Of these, thirteen hectares were in six month maize, fifty-six hectares in four month maize, and sixty-eight hectares are in barley. It is possible that some of the fields indicated with four month maize should be reclassified as six month maize.

Using yields of 3000 kilograms of maize per hectare of tierra de humedad and 1500 kilograms per hectare of tierra de temporal the area planted in maize would yield 123,000 kilograms of maize in a good year. This is enough to support a population of 615 persons, consuming 200 kilograms of maize per person each year. In a poor year, using yields of 1200 kilograms per hectare of tierra de humedad and 900 kilograms per hectare of tierra de temporal, the yield would drop to 65,900 kilograms, enough to support a population of only 328 individuals. Thus it appears that in Maquixco the growing of barley has made such great inroads into the pequena propiedad that the area no longer can provide maize for the population during bad years. Undoubtedly the ejido lands produce some maize, which would make up this apparent deficiency. However, it is equally clear that barley has become a very important crop, being planted in approximately 50% of the cultivated pequena propiedad. The emphasis on barley cultivation in Maquixco Alto is much greater than in Colhuacan.

Although I do not have detailed or complete data on the crop distribution and land classification within the ejido of Maquixco Alto I have indicated in Map 10-11 the pertinent available information. Barley is a major crop throughout the ejido lands with maize being grown in the deeper soil land. In the section of ejido near the Hacienda San Cayetano there is an area of seventy-three hectares which includes flat fields with deep soil and maguey bancals. The fields are planted in barley and maize and are classified as tierra de temporal. Below this area of deep soils there is a section of ejido belonging to Teacalco with bancal terracing and thin soils, also planted in maize and barley. Above the hacienda is a section with great areas of exposed tepetate, bancal terracing and fields with thin soils. The terrace system (3C) of the pequena propiedad continues into this area. There are sixteen hectares of terraces within the ejido. Soil depth in them is variable as are the crops.

Only eleven households (13.9%) in Maquixco Alto hold neither pequena propiedad nor ejido lands. Five households (6.3%) are supported by activities other than agricultural ones. The village economy is based on agriculture.

The campesinos of Maquixco Alto focus agricultural activities on the terraces and presas which are used to grow maize. Maguey and barley are grown as cash crops in peripheral agricultural lands. It is possible that both true and bancal terraces were once widely spread throughout the pequena propiedad of Maquixco Alto with only fragments remaining today.

The farmers of Maquixco and Colhuacan also use the large areas of undivided and undeveloped ejido as communal pasture lands for sheep and goats.

Agriculture Economy-Cerro Gordo-North Slope

Today, on the northern slopes of Cerro Gordo the terraces are fragmented into a number of small self-contained systems. Some are new, others appear to be quite old, probably pre-Conquest. On the basis of their significance to the modern population it is reasonable to assume that terraces were more important in the past and probably served as soil and water conservation mechanisms throughout the entire north slope area. Many remains of abandoned or nearly destroyed terraces occur in uncultivated areas associated with Aztec house remains.

In Map 9 the area of intensive archaeological survey is indicated. It included the pequena propiedad of Colhuacan, most of that of Maquixco Alto, as well as some belonging to campesinos from Teacalco. The area also includes some of the ejido lands of both Maquixco Alto and Teacalco. Of the 1160 hectares within the survey area about 160 are too steep for cultivation. It is probable that the remaining 1000 hectares were cultivated with stone and bancal type terraces before the Conquest. If the well-preserved fragment of old terraces at Colhuacan is a good example of terrace systems in the area, approximately 130 hectares within the survey area would have been tierra de humedad, the rest being tierra de temporal.

Assuming that this entire area was planted in maize which had yields comparable to those mentioned earlier, then in a good year a total of 1,695,000 kilograms of maize would be harvested. IN a poor year the harvest would drop to 939,000 kilograms of maize. Thus a maximum population of 8,475 persons consuming 200 kilograms of maize per year could be supported in good years and a maximum population of 4,695 persons in poor years. This is based on the assumption of well-kept intensive terracing throughout the survey area. Reducing the area of maize cultivation with the cultivation of other crops, the probable pre-Conquest population would be between 4500 and 5000 persons within the survey area. This estimate is subject to the same qualifications mentioned earlier in connection with the population estimates in the Lower Valley permanent irrigation agricultural system.

Although terracing is potentially able to support a relatively large population in hillslope areas it is quite apparent that the modern terrace systems within the pequena propiedad are not adequate to support the present population in poor years. Some new terraces are under construction but in general population pressure on the land in this area is taken care of in other ways. Cash income to buy necessary food is produced through the raising of barley, maguey, sheep and goats in marginal agricultural lands. In addition some of the population is being absorbed into the unskilled labor force in Mexico City. With these factors operating it is very unlikely that many new terrace systems will be constructed in the Cerro Gordo-North Slope area.

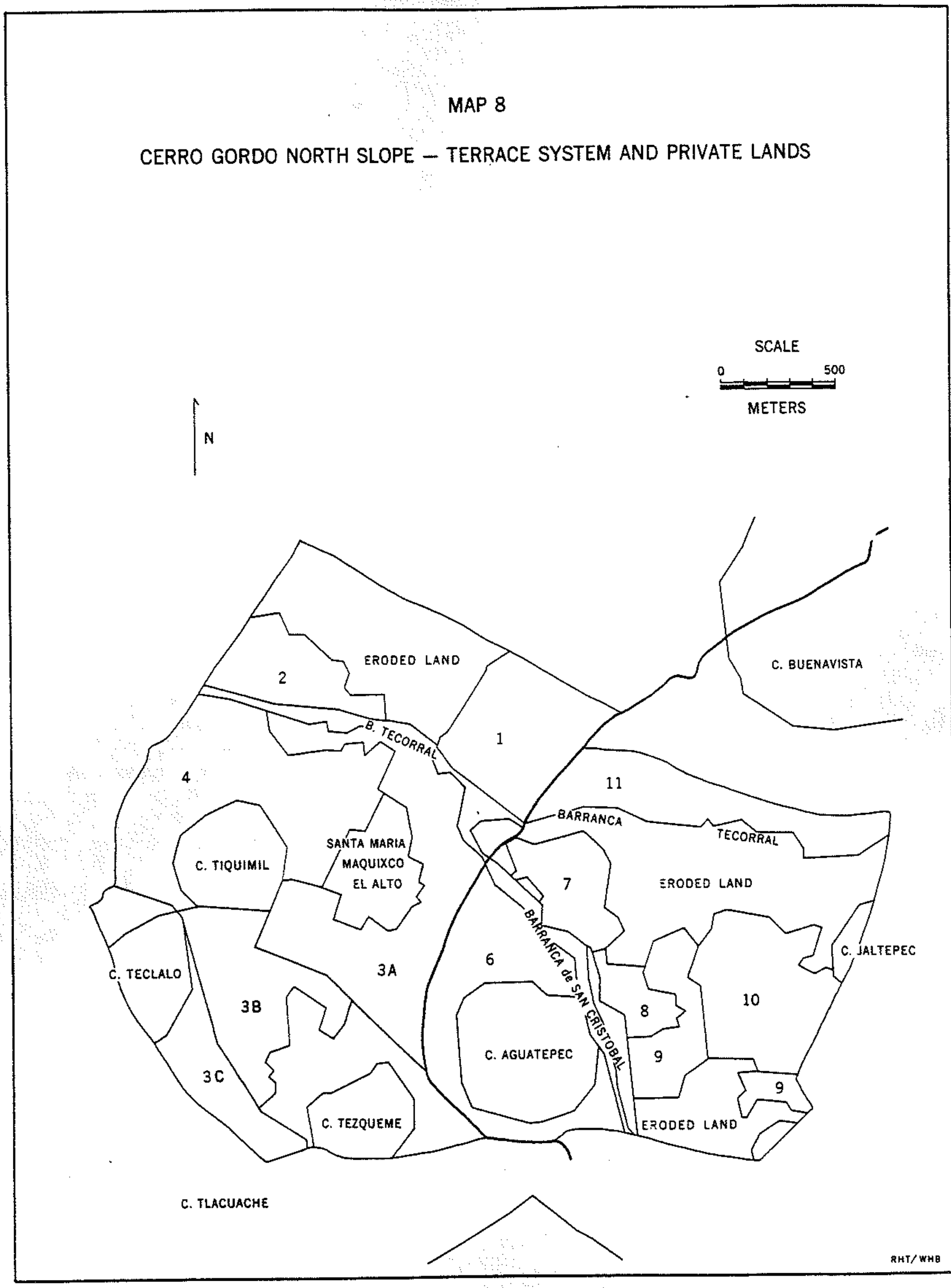


Figure 301 (from Charlton 1970)

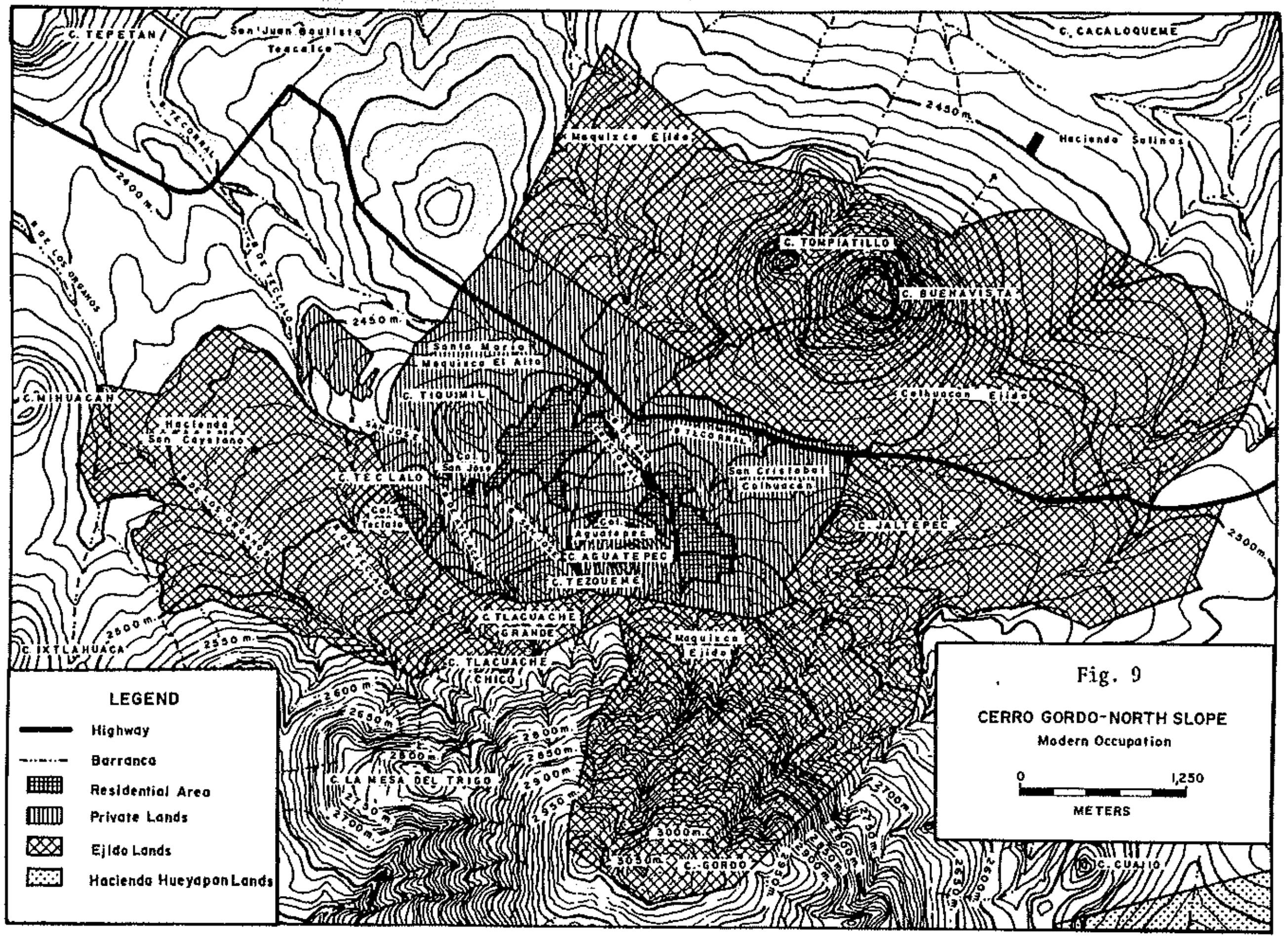


Figure 302 (from Charlton 1970)

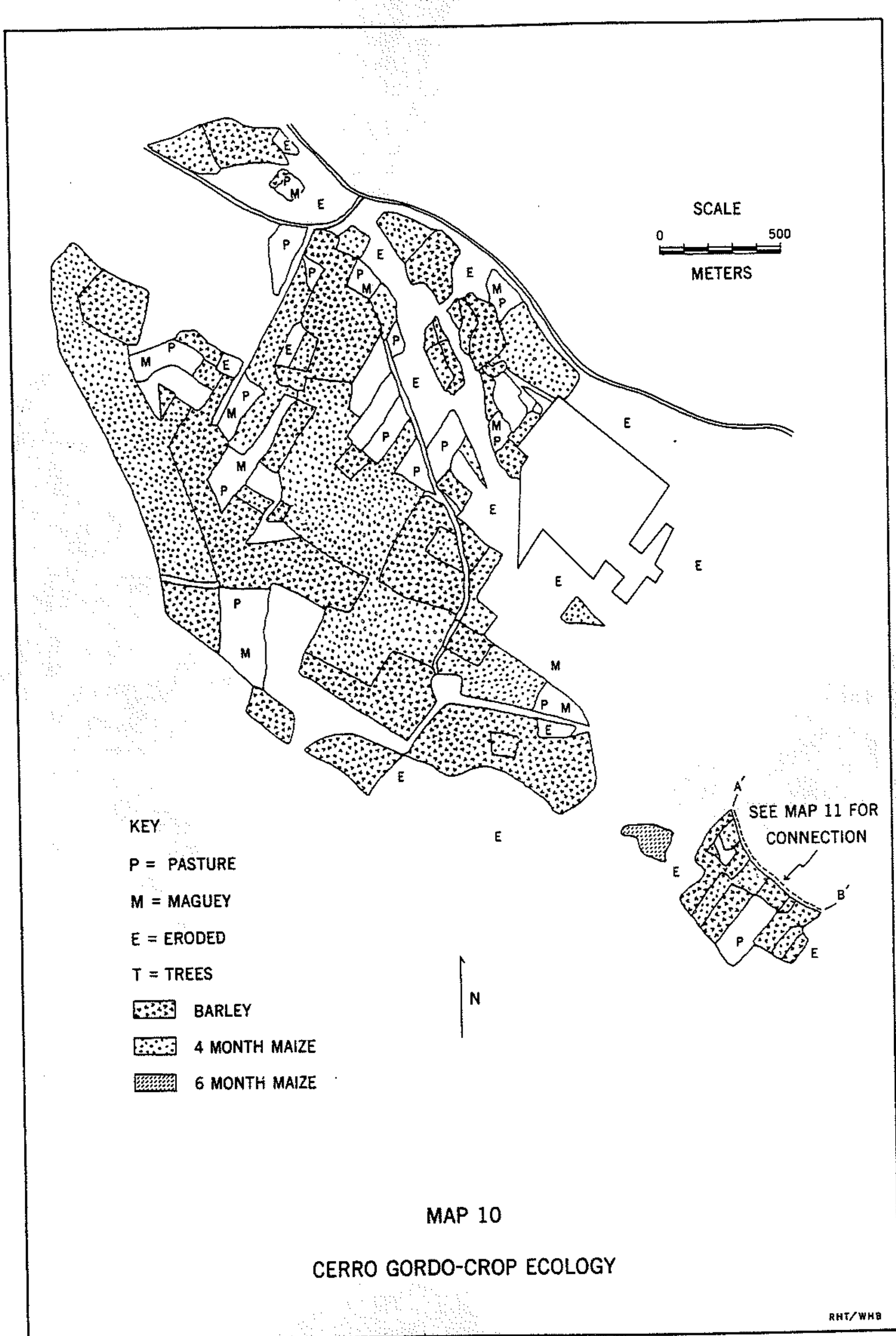
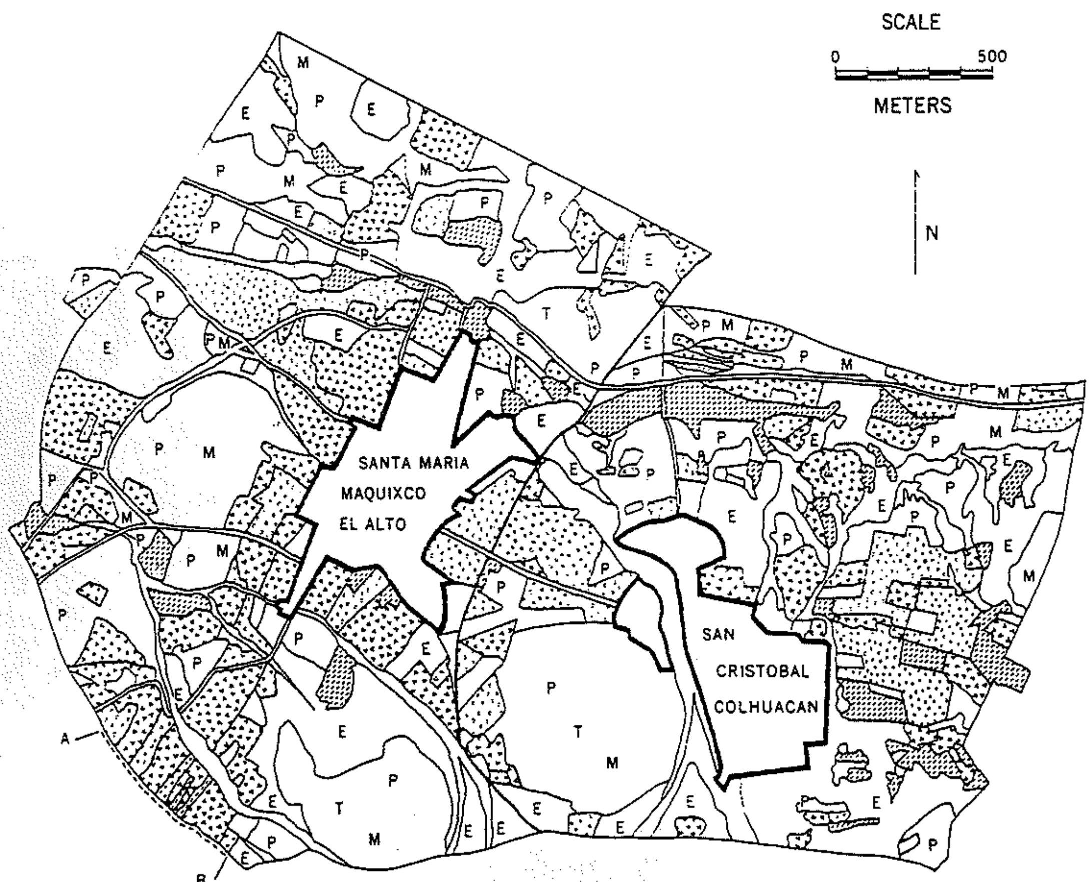


Figure 303 (from Charlton 1970)

MAP 11

CERRO GORDO-CROP ECOLOGY

KEY: SEE MAP 10



RHT/WHB

Figure 304 (from Charlton 1970)

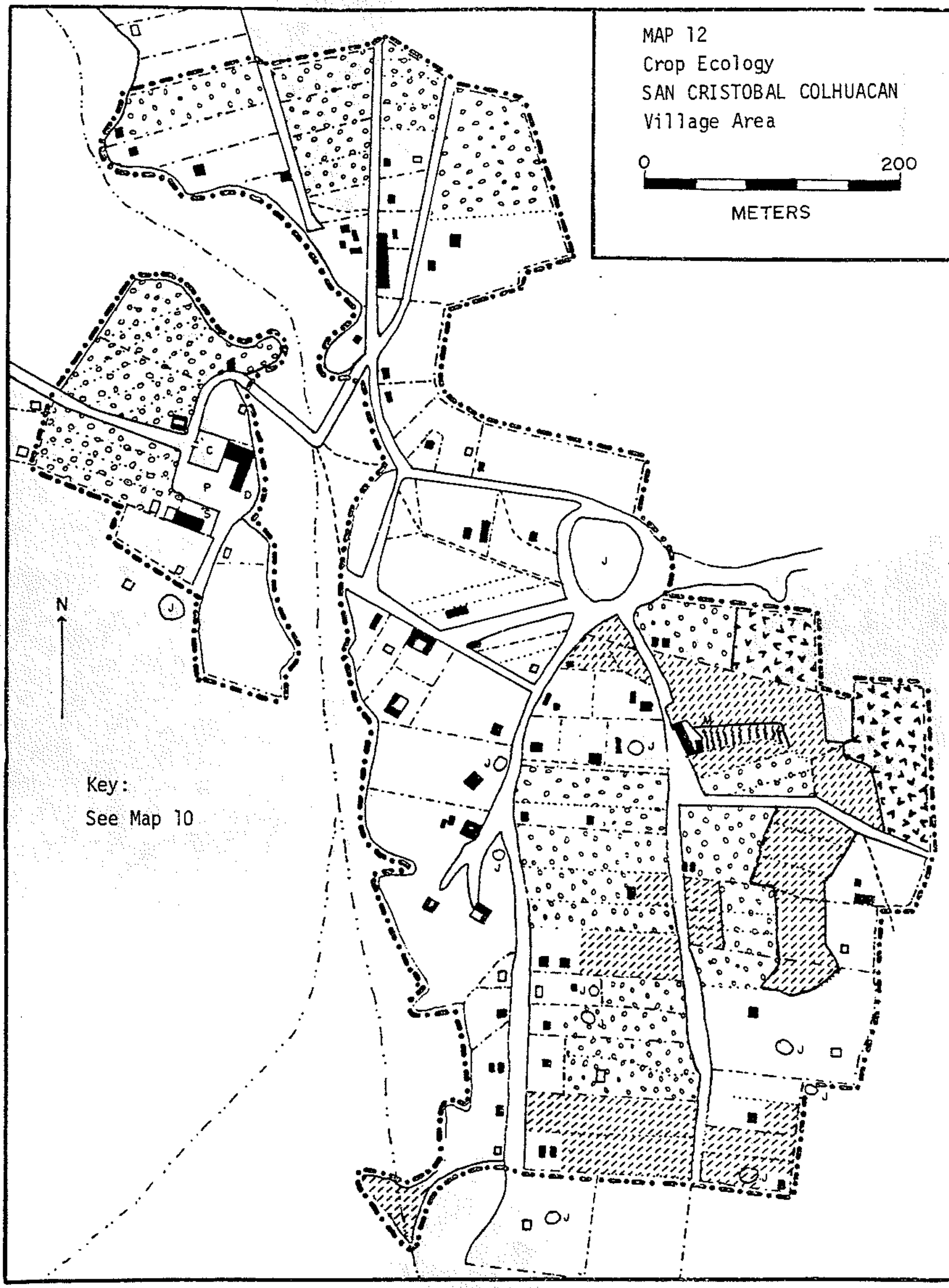


Figure 305 (from Charlton 1970)

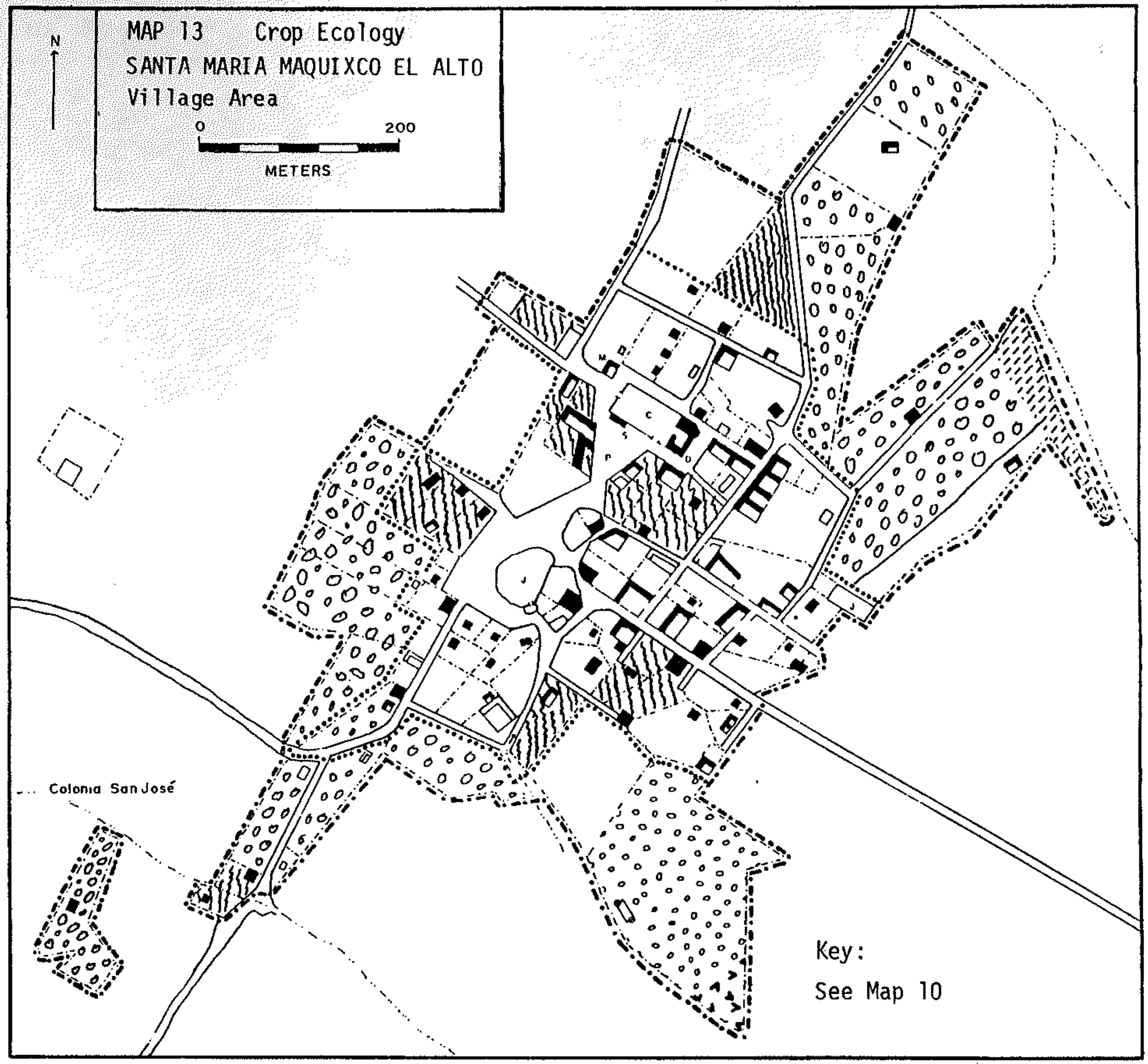


Figure 306 (from Charlton 1970)

Appendix J

Intensive Survey of Maquixco Alto-Teacalco Area
(The 1963 General Survey Report)
(William T. Sanders)

This area of 800 hectares was completely surveyed field by field. Data was collected on modern land use and archaeological occupation. Certainly no sites were missed. Since the samples have not been analyzed in detail, however, it is possible that some chronological components were missed in the following evaluation. Joseph Marino did the survey of the Classic sites, Michael West most of the Pre-Classic, and William Sanders did the general ecological survey and the Post-Classic Survey.

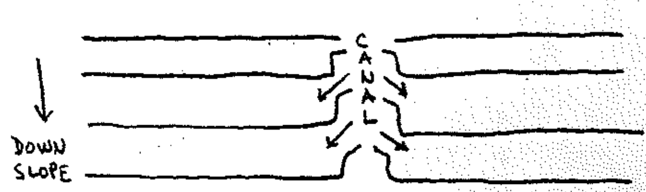
Maquixco Alto-Teacalco Survey
A. Ecological Survey
1. Maquixco Alto Section

The total area surveyed comprises 500 hectares located on the north slope of Cerro Gordo. Generally speaking, the area consists of a series of long, gentle to medium sloping ridges separated by three deep barrancas; the lower and middle section of the middle barranca is nearly absorbed by check dams and terraces.

With respect to the condition of the land, the area may be divided into four types: 1. Steep uncultivated slopes of several small isolated hills 2. Gentle to medium sloping areas completely denuded of soil and therefore today uncultivable (tepetatal) 3. marginal agricultural land in areas with considerable erosion, involving terraces with thin soil. Such lands are either disintegrating terrace systems or reclaimed tepetatal with new terraces 4. Good agricultural land, usually with well maintained terrace systems. We also break this category down into two subtypes, based on soil depth. In terms of proportions, the types of land are represented as follows:

	%	Hectares
Steep hillsides	10	50 (measured on flat aerophoto)
Tepetatal	20	100
Marginal Agricultural Land	35	175
Good agricultural land	35	175
Medium soil (50-100cm.)	25	125
Deep soil (100 + cm.)	10	50

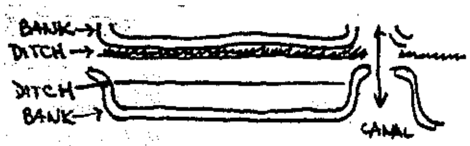
<u>Terracing</u>. This section, plus the lands around nearby Colhuacan, represents the most extensively and impressively terraced area in the Teotihuacan Valley. Terraces in all stages of growth, construction, maintenance and deterioration may be seen. There is considerable variation in soil depth, slope angle, crop use, techniques of erosion control and water conservation. Approximately eight rolls of film were taken of agricultural techniques; these are on file at Penn State. There is practically no free-flowing drainage off the slopes where terracing has been effectively maintained; terraces have sets of canals with self-flooding intakes. The terraces are arranged in roughly parallel groups running downslope, separated by main canals running between the sets of terraces. Each terrace on either side of the canal has an intake in the upper corner with low earth banks projecting into the canal to divert the water onto the terrace. The diagram below will clarify the situation:

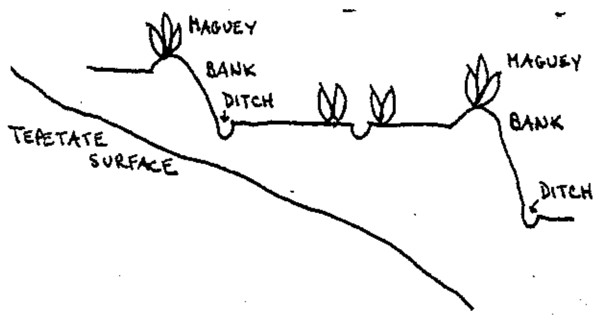


All irrigation is of the flood-water type; there are no permanent streams or springs in the area today.

The most effective terracing occurs just east, north and south of the village of Maquixco Alto, with the climax of the system represented by terraces lying along the big barranca north of the village, and a small area southwest of the village and south of Cerro Teclalo. In these areas soils frequently exceed one meter in depth. The front of the terraces possesses high earth banks planted in maguey or fruit trees; the surface of the terrace is completely level, and the lateral sides have earth banks as well to avoid lateral erosion and to retain water.

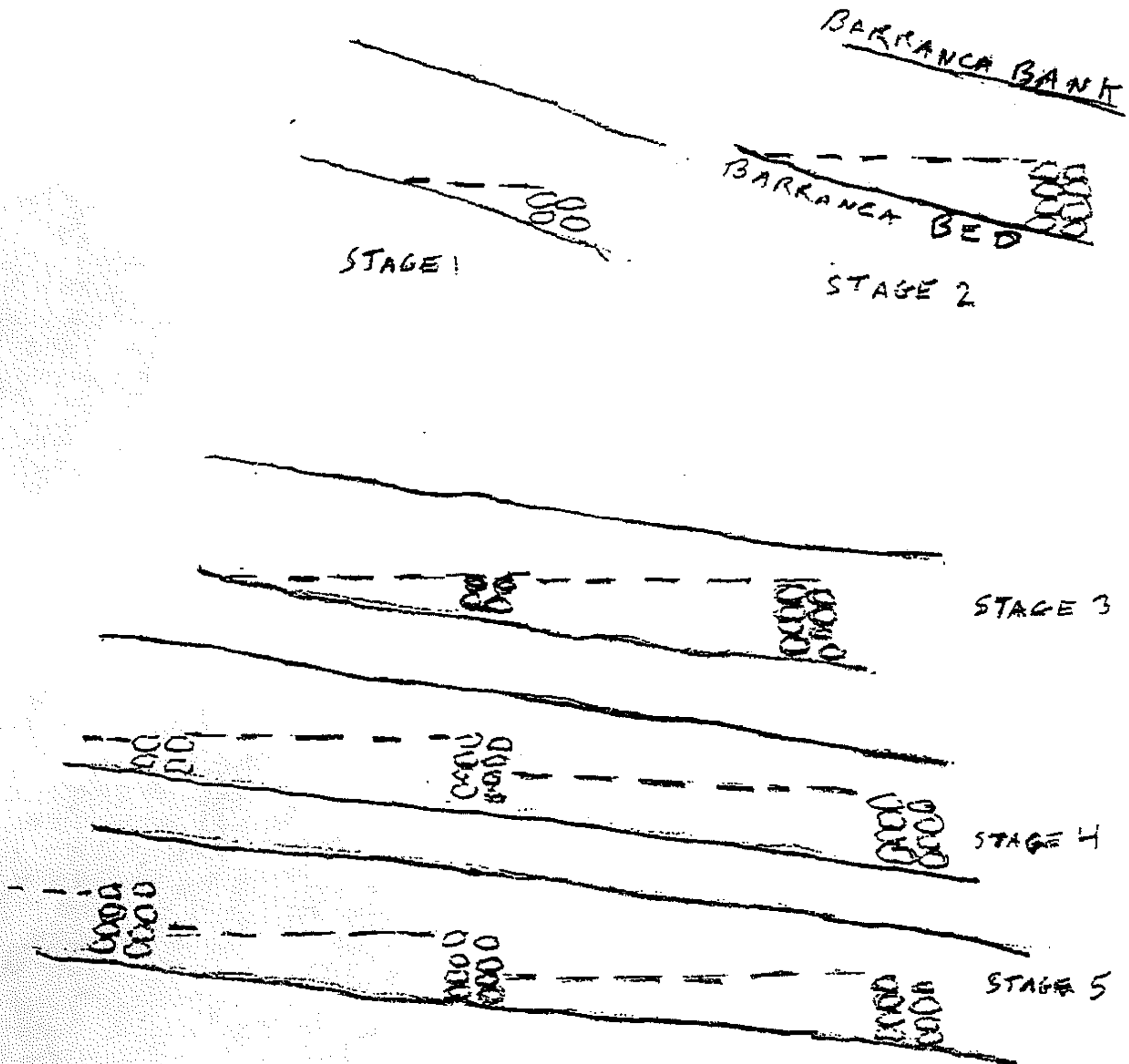
Each terrace has the canal intake noted above, and in many cases the water is diverted into a canal paralleling and occurring just, below the lower face of the terrace just above. The purpose of this is to break the force of the water and thus prevent gullying. Some terraces even possess a second ditch running along the terrace in the center, parallel to its long dimension and bordered by maguey to further control erosion. Most terraces are from 10-20 meters wide; if wider, internal lines of maguey are planted to help level the terrace and prevent erosion. Stone terracing occurs but is uncommon. The following drawings will clarify the above description:





Most of the deep soil terraces are planted in maize or maize with wheat inter-planted, plus habas and squash. Such lands are extremely productive, with maize 2-4 meters high when surveyed in September 1963. The maguey and fruit trees, along with weeds on the banks, and closely packed interplanted crops on the terrace, gave the area at that time the lush appearance of tropical jungle. There is no doubt that good terracing is an effective solution to the problems of cultivating sloping terrain in the Teotihuacan Valley. The runoff from the upper and middle slopes of Cerro Gordo above the terrace system is considerable; the water retentive capacity of terracing reduces loss of such runoff to almost zero. Complete or even partial crop loss is rare in the area of deep soils. Data from informants, plus personal observation, suggest that the productivity is not much lower than the permanently irrigated lands of the Lower Valley, and is certainly as high as the flood-water system of the Middle Valley.

Check Dams. A technique of land reclamation which, according to local informants, was initiated approximately 50 years ago, is that of constructing check dams in the barrancas. The technique is a slow, gradual process of sedimentation in the barranca. It is initiated by building a low stone and earth wall across the barranca bed. In a single season enough soil accumulates behind the wall to permit barley planting. Each year the wall is increased in height; the soil layer behind it builds up in depth and fans back to form an extensive delta until ultimately walls 30-40 feet high are constructed and the barranca has been completely or partially filled in with soil for distances of 30-50 meters behind the wall. The completed walls are impressive works, yet are the product of the labor of a single farmer and a few assistants. Such dams, if isolated, are very unstable; the erosive force of barranca water is great and even well-built "presas", as they are called, can be torn apart in a few seasons and washed downstream. Stability can only be maintained if a series is built, one below the other, as each terrace braces and supports the wall of the other. Ultimately erosion is no more a problem than in any other of the terrace systems in the area. The process is illustrated below:



There are several barrancas in the Colhuacan area that have become completely silted in by this technique and converted into land as productive as any in the Lower Valley. Not only do the check dams permit the accumulation of deep soils, but such soils have permanent stored humidity in the subsoil strata because of their location in depressed areas. This technique is rapidly absorbing most of the barrancas in the area, and should completely obliterate gully erosion when the process is complete.

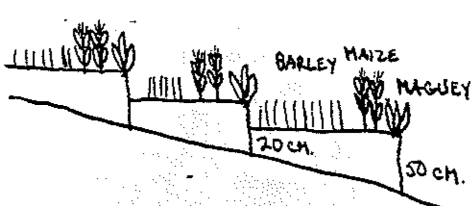
Steep hillsides are used primarily for pasture, with some maguey cultivation, and are nearly denuded of soil. When planted in maguey, the plants are placed in rows parallel to the contour of the slope, such rows being very tightly spaced (1-2 meters).

Most of the land in the survey area consists of gentle to medium sloping terrain (5-20 degrees) and has a soil cover varying from 0-50 cm. There are large areas of exposed tepetate (consolidated volcanic ash), especially south of Cerros Tiquimil, Tlaquache Grande and Tezqueme. Traces of old terraces may be seen in all of these areas, and prehistoric occupation is heavy, especially Aztec. In many of these tepetate areas attempts have been made to restore the soil cover. The techniques involve the following for each new terrace: A.

A. Excavation of a trench 30-100 cm. deep parallel to the slope into the hard tepetate.
B. Tepetate taken from ditch broken up into fragments and occasionally pulverized.
C. Excavation of a series of shallow pits 30-50 cm. apart just above and parallel to the ditch.
D. Planting of maguey in pits and partially filled with crushed tepetate.
E. Pulverized debris heaped up between and around the maguey to form a terrace front.
F. Blocks of stone, tepetate or conglomerate used to build a facing for the bank.
G. Extension of bank laterally, often by digging new trenches or just piling up tepetate.
H. Lateral walls, plus the front bank, act to trap water, and water carries soil to form an alluvial fan. The first alluvial deposits consist of flakes, chunks of tepetate, and sandy-textured soil. A further source of soil is that trapped by the trench, which is then removed and heaped behind the terrace.
I. After a few years 10-20 cm. of soil accumulates behind the terrace for a width of 2-3 up to 5-6 meters, depending on angle of slope and availability of alluvium. Barley or beans may then be planted. Meanwhile other terraces are being constructed below or above the first, and the maguey has grown, its roots acting to retain soil.
J. After 5-10 years the planting of barley and beans adds organic matter to the soil, and the depth of soil in the terrace has increased to 30-50 cm. The rapidly growing drought resistant 4 month maize may then be grown, at least in the deeper, lower end of the terrace, with barley in the shallower upper strip.
K. After 10-20 years deep soil and highly productive terraces result.

The technique described above is extremely effective; it is doubtful that there is any land unreclaimable in our survey strip.

The bulk of the agricultural land consists of terraces in various stages of maintenance, with soil depth in the lower part varying from 20-100 cm. One can observe such terraces in various stages of growth and decline. Some are obviously new, freshly claimed from tepetate and beginning to produce fair crops of barley and even maize. Others are old terraces gradually disintegrating. The process of disintegration is one that occurs both laterally and vertically. Many farmers have not maintained the lateral banks, so the terrace gradually washes away from both sides, either into an adjacent barranca, gully, or down to a lower terrace via the canal. Breaches in the lower bank are common; once such a breach occurs in the terrace just above, gullying occurs in the next terrace down until soil is washed away down to tepetate. Once the process becomes advanced, the terrace presents an undulating surface; water flows unevenly and much of it is lost laterally or through breaks in the next terrace face below. Many terraces are too wide for the angle of slope, thus permitting uneven drainage downward. A deteriorating terrace is a menace to terraces just below it. Terraces in an advanced state of decline are usually planted in barley and may be less productive than new terraces in spite of their higher content of organic soil, because of the poor drainage. Well maintained but young terraces, with relatively shallow soil, are usually planted in barley, but maize is also common, especially in the strip at the lower end, where soils are deeper and more humid. A typical well-maintained young terrace system is diagrammed below:



Terrace maintenance generally is an arduous and never-ending task. Erosion is a constant threat;

although no detailed study was made, there seems to be a very close relationship between the condition of terraces and the distance from house to land, population pressure, and degree of dependence of the landowner on agriculture for subsistence.

The settlement pattern today involves a low density compact village, Maquixco Alto roughly rectangular in shape, covering approximately 15 hectares and with a population of between 400-500 people. There are a few families that live isolated at distances up to 1 kilometer from the village. The best terraces are located near the village, along the big north barranca, and near the houses of isolated families. Apparently it is difficult to maintain terrace systems when they are located beyond a distance of 300-400 meters from the farmer's house.

The two more important crops grown today are maize and barley. Maize is the staple food; it tends to be planted year after year in fields with deep soils, and is usually the crop in medium soil terraces. However, its subsistence value results in numerous cases of attempted planting in marginal lands, lands ordinarily used for barley which requires less soil and moisture. In 1963, a good year, over half of the planted fields were in maize; because of this tendency to push maize cultivation to the limit, crop yield varied enormously. During that year the presas and deep soil terraces yielded 12-15 cargas of shelled maize per hectare (1800-2250 kilograms). Terraces with an average of 30-50 cm. of soil were yielding 500-800 kilograms, and in many of the marginal lands the crop failed completely. The average yield on the medium to deep soil terraces was probably close to 1000 kg. Nearly all of these lands were planted in maize (120 hectares) with a total production of perhaps 120 tons - enough to provide from 360-500 people with their annual maize consumption. The production in the marginal lands probably did not exceed 9 tons in all, thus providing for an additional 27-36 persons.

Several varieties of maize are grown. The heaviest producer matures in 6 months and requires abundant moisture and good soils. There is also a 4-month variety (usually multicolored ears, predominantly black) that is planted in marginal lands or during dry years on second class lands; it is more drought-resistant but yields less.

In the deep soil lands wheat or barley are frequently interplanted with maize, along with haba or squash. Fruit trees - pears, peach and capulin - are planted along the earth banks of the terraces. A very high percentage of terraces have maguey planted along the terrace banks, thus adding another dimension to crop production.

The second most important crop is barley, a cash crop. Nearly half of all planted land in 1963 was barley. In 1963 about 3/4 of the marginal agricultural land was planted; of the planted land perhaps 3/4 was planted in barley, the rest in maize and beans. About a quarter of the deep and medium soil land was in barley, or a total of 28% of the survey area; production varied enormously, especially since much of it was on marginal land. The average yield probably did not exceed 500 kgs.

Beans are a rare crop in the area; when planted they occur frequently with maize in marginal lands. Beans are a staple crop, and the local production is far below local consumption. The majority of the house lots in the village have either maguey or nopal orchards. In summary, the 1963 pattern of land use in the survey strip was as follows:

1. Steep slope (pasture)	50		
2. Tepetate waste		100	
3. Third class lands	175		
A. Planted		132	
1. Maize			30
2. Barley		90	
3. Misc.			12
B. First-second class lands		175	
4. First-second class lands	175		
A. Planted		160	
1. Maize			120 (some interplanting of other crops)
2. Barley		40	
B. Fallow		15	

5. total land planted	292 (about 60% of survey area)
A. In maize	150
B. In barley	130
C. Miscellaneous	12

The data indicates an intensive use of land, since 60% of the area was planted. This estimate includes tepetatal and uncultivated steep slopes. If the percentage is based on agricultural land alone it would increase to 6/7 or approximately 85%.

The present-day population of Maquixco Alto consume pulque, maize and beans as primary foods, with a variety of minor foods such as tuna, nopal leaves, squash, chile, tomatoes, avocadoes, chayotes, citrus fruits, bread, bananas and rice. Only maize, pulque, tuna and nopal leaves are produced in sufficient quantities to meet local needs. All the rest of the diet must be partly or entirely imported, and the production of barley provides the cash income for such purchases, plus other needs. Approximately 3/4 of the survey area is owned by Maquixco Alto, the rest by Teacalco. However, the village holds land in the Teacalco strip to be described below, so that the total holding is probably about that of the survey strip, i.e. 500 hectares; so we can use that area to discuss present-day village economics. The village also holds a large area on the main slope of Cerro Gordo and uses it for pasture land; very little of this is cropped. Most of this area is probably above the effective limits of maize cultivation (about 2600 meters in the Valley of Mexico). In Prehispanic times it would have been an area of hunting and gathering.

In terms of present-day land use, techniques of cultivation, and condition of the land, it is clear that the village is reaching its demographic saturation point. Of course such a statement is not entirely meaningful because of the possibilities of recovering the 100 hectares of tepetatal, rebuilding of the 175 hectares of marginal land, and completion of the check dam system. In those terms there is considerable room for population growth. The present ecosystem is capable of providing the village with its basic maize - pulque requirements, plus a cash crop of barley and pulque to provide for other necessities. In bad years there would be a maize shortage, although in such years the farmer has the option of replanting barley as a cash crop.

We will now attempt to assess the area from the point of view of maximum efficiency of land use within the capacity of the present-day technology. In our survey area are at least 450 hectares of land theoretically capable of being converted to first and second class land. If all the land were planted in maize, and the average yield were 1000 kg., as we have suggested for first and second class lands in 1963, then the area could provide for between 1350 and 2700 people, with, of course, no surplus production. We will refer to this figure at a later point, in the discussion of the prehispanic population.

2. Teacalco Section

This section of the general area north of Cerro Gordo was also intensively surveyed. It adjoins what we have called the Maquixco Alto section, and offers a striking contrast between extensive and intensive land use, between hacienda and village. The total area embraced is approximately 330 hectares.

The area consists of an elevated ridge running between two deeply cut barrancas, the easternmost of which forms the western border of the Maquixco Alto strip. Most of the area was owned by the Hacienda San Cayetano before the Agrarian Reform. Today perhaps 2/3 of it belongs to the village of Teacalco, the rest to Maquixco Alto.

Near the hacienda house ruin is a small area of excellent terracing. For the balance of the area a system of what we might call "extensive terracing" was applied. This involves the construction of long, high earth banks planted in maguey, but very widely spaced, and enclosing huge undulating areas of gently sloping terrain. Internal terracing, so essential to successful maize cultivation, is lacking. Some of the big contour terraces, however, are impressive works. A huge undulating field occupies the high part of the ridge near the hacienda, and is delimited by a single terrace bank with flood water canals. It is divided by sod paths into a number of long rectangular fields. The area is fairly level and the big terraces apparently work fairly effectively to retain the soil, which in this area averages from 30-70 cm. in depth.

There was another big terrace running along the edge of the high ground paralleling the west barranca that has been relatively successful in retaining the soil; but there is a heavily eroded strip below it, running between it and the barranca flood plain. Furthermore, soil cover above the terrace, because of the lack of internal terracing, is very variable, as is the quality of the crops. Terracing (of the type found near the village) generally in the survey strip is as yet not applied and erosion severe. Much of the drainage was canalized, but the more extensive approach to terracing and generally undulating surface must reduce the efficiency of water distribution considerably. The area above the hacienda to the north is extremely eroded and dissected; many of the gullies look like ancient canals, but it is practically impossible to see any consistent pattern. Further indication of ancient canals involves a long narrow depressed area running down the center of the strip below the hacienda that looks like the lower section of a canal that initiated in the above - noted gullied area. Today it is partly filled in and under cultivation.

In terms of the present condition of the land and use, the following evaluation may be made:

		Area (Hectares)	Use
A.	Flood plain of west barranca (deep soil, first class land)	20	Maize
B.	Deep soil terraces near hacienda (second class land)	10	Maize
C.	Large medium-soil plain on ridge top near hacienda (second class land)	30	Barley, some Maize
D.	Small area of medium-deep soil, archaeological zones TC-40, TA-41	20	Barley
E.	Thin soil, third class land, poor terracing	80	Mostly barley, a little maize
F.	Large tepetatal above hacienda	120	Pasture
G.	Small tepetate areas below hacienda	50	Pasture
Total		330	

Summary:

	No. of hectares	Percentage
First class land	20	6
Second class land	60	18
Third class land	80	24
Tepetatal	170	52
Total	330	100

If the area were intensively terraced, in a manner comparable to that near Maquixco Alto, it could support an additional 1320 people (Maximally 1980).

B. Archaeological Survey: Both Sections

The Maquixco Alto-Teacalco area is a prime example of the problems of relating agricultural resources to population potential. The modern ecosystem, involving a family economy in which a sizable surplus of production over family needs is considered necessary, plus the erosion of a considerable tract of land, means that with a population of 400-500 people there is some land pressure. We have noted the great variability in intensity of land use, and that there is very little marginal land that cannot be converted to productive land using known and traditional agricultural techniques. With these basic considerations in mind, we will now proceed to a discussion of prehispanic settlement patterns, land use and population.

Pre-Tzacualli phases. There is only one small settlement in the survey area for the Chiconautla (Middle Zacatenco) phase. It is located near the headwaters of a huge barranca just above the hacienda of San Cayetano, and occupies a compact area near the edge of it. The total distribution of the pottery is less than one hectare. Pottery is locally abundant but the area is intensely eroded and there is much exposed tepetate; the significance of the present distribution is therefore debatable. Occupation (pottery, obsidian) is concentrated in a series of small soil erosion remnants that have a superficial resemblance to house mounds.

Excavation revealed their true nature as indicated above. In spite of the severe erosion, however, it is doubtful that the site involved a settlement of more than a half dozen houses. The uniqueness of this one site poses some problems. Was there a series of small hamlets widely spaced on roughly the same contour around the periphery of Cerro Gordo? I found another site of this phase, of nearly identical size and ecological location on the south slope of Cerro Gordo near Tolman; while writing this report Kolb and Charlton report another one near Colhuacan just east of our Maquixco Alto survey strip. If the distance between the Maquixco Alto and Colhuacan sites may be extrapolated, there should be 8-10 such sites in the lower slopes of Cerro Gordo. The close association with barrancas also suggests that these may have been permanent streams at that time (a supposition very strongly supported by our data from the Patlachique range).

Another possibility is that the main strip of occupation was higher on the slope of the main hill, and that we are getting only a few marginal sites located below the strip of heavy occupations. The tendency of Altica and Chiconauhtla phases sites to cluster in the Patlachique range suggests this. Against the argument, however, is the lack of use of the middle slopes of Cerro Gordo for agriculture today, and the fact that the hill is 200 meters higher than the highest peak of the Patlachique range. This would indicate that most of the slope of Gordo is indeed too high for cultivation. We have noted that very little agriculture is practiced above 2600 meters (the Cerro Gordo peak is 3050, Teotihuacan Valley floor 2240-2280 meters) today in the Valley of Mexico.

At any rate it is certain that the population was small, the settlements classifiable as hamlets, and it is further doubtful that intensive agriculture was practiced.

Cuanalan phase. No Cuanalan phase (Ticoman) sites have been located as in the survey area. They do occur, however, in identical ecological locations as the Chiconauhtla phase sites on the south and west slopes of Cerro Gordo, where they are three times as numerous as sites of the earlier Chiconauhtla phase. Since this report, Kolb and Charlton report 2 Ticoman (Cuanalan) phase hamlets near Colhuacan. No detailed data is available, but they are both similar in size and location to the Chiconauhtla phase hamlet.

Patlachique phase. (Chimalhuacan). One of our major problems is the sorting of sherds of this phase from those of the succeeding Tzacualli phase in multiphase sites, since the samples have not been carefully analyzed to date. It is probable that many of our Tzacualli sites do have a Patlachique occupation[1]. On the other hand, our total survey shows that the Patlachique represents an intrusive occupation in the Teotihuacan Valley; it is possible that the serious colonization of the north slope of Cerro Gordo did not occur until after the growth of the Tzacualli town from the Patlachique village at the Zone and until the ceramics had shifted to Tzacualli. We have defined at least one certain Patlachique site, with two loci of heavy occupation separated by 240 meters of sparse occupation, but the intervening area is heavily eroded. It is conceivable that we actually have one site, a barranca-side linear settlement similar to many Aztec ones and running for 4-500 meters. One of the two loci is in the same locality as the Chiconauhtla hamlet, the other just to the north of it. The distribution of pottery and appearance of the site are identical to those of the Chiconauhtla site. The total population was certainly not over 2-3 times that of the earlier site.

Before discussing the occupation of the Tzacualli phase, it is useful at this point to consider the possible patterns of land use through the preceding three phases. No direct evidence of agricultural techniques was found, but the inferential settlement pattern and demographic data, plus data from the general survey, will enable us to make some pretty good guesses. First the population in the Teotihuacan Valley as a whole was fairly small; the majority of sites tended to concentrated in hilly areas located near barranca edges and were quite small in size. In no case do we have good evidence of contemporary terracing. This generalization applies

[1]Editors Note: In our appraisal of the surface samples from the TC Survey we recorded numerous Patlachique Phase presences - see Chapter 7, Part 3.

to all of the sites north of Cerro Gordo. The predilection for hillsides, without evidence of terracing suggests several things: 1. There was an adequate natural soil cover on such slopes 2. Security from frosts was more important than good soils capable of sustained cultivation 3. Humidity conservation techniques capable of resolving the problems of cultivation of the deep soil plain had not yet been effectively developed. The wide spacing of sites and their small size also suggest a low population, abundance of land, and extensive practices of land use. We have noted the probability that many of the deeply cut barrancas of today were small permanent streams.

Aside from the absence of archaeological proof, our argument that terracing was absent is based partly on observation of modern patterns of terrace history. Modern villages with terrace agriculture are usually located on the gently sloping piedmont of the main valley between steep slopes and alluvial plain. As the alluvial plain no longer supports the population, terrace systems start in the piedmont and, as land pressure increases, climb up the steeper slopes. Such villages are usually larger than Pre-Classic hamlets, and the growth of terraces is an attempt to extend intensive agriculture from foci of such practices in the alluvial plain and subsequently the piedmont areas. In the Patlachique range there is a series of major barrancas. Aztec sites with associated terraces tend to occur along the main barrancas where a complex pattern of small flood plains, gentle slopes, and steep slopes, obtains. The settlements clearly practiced intensive use of the flood plains, terracing of this gentler slopes, and extensive agriculture on the steep slopes, probably chiefly maguey. Pre-Classic hamlets in the same area occur on steep slopes, ridges, and heads of tributary barrancas, suggesting a very different pattern of land use.

In the more rugged parts of the Mesoamerican Highlands today, especially in areas more humid than the Teotihuacan Valley, a variant of slash-and-burn cultivation called tlacolol is practiced. It involves clearing of brush with machetes, burning off the trash, light hoeing of the soil and planting of the crop. Because of soil erosion, the generally thin soil, and lack of techniques of soil restoration, such lands are rarely planted more than 2 or 3 years, and then are rested. Periods of rest vary considerably with soil type and depth, and the regenerative cycle of the natural vegetation from 2-3 years up to 8-10 or more. Where erosion is a severe problem some terracing occurs (at Tepoztlan for example), but generally speaking very few soil conservation practices are used. Such a system is well adapted to a demographic pattern of a small population and abundant land, since production per unit of work hour is high. Settlements tend to be small because of the large area of land needed per unit of land in production.

Our data cited above from the Project very strongly suggest that tlacolol cultivation was the primary system in the Pre-Classic period of the occupation of the Teotihuacan Valley. If so, the drier climate would of necessity result in a much more rapid and severe process of erosion, as would the loamy texture of the soils. Natural vegetation recovery would be slower, and soils therefore be more exposed. The high productivity of the system, in terms of labor expended would be a strong incentive for its spread even in areas basically unsuited to it, such as the Teotihuacan Valley. As long as the population remained small, it would not be necessary to practice new techniques of agriculture.

Tzacualli phase. During this phase there was clearly a remarkable population explosion in the North Cerro Gordo area, as contrasted to earlier phase. This explosion also must be, to a great degree, linked to the even more remarkable demographic changes occurring south of the hill, i.e. the growth of the Patlachique phase village into a gigantic town site covering at least 4 km. sq.[2]

At least 30 sites are known for this phase within our test strip of 8.0 km. sq., and spot survey on both the south and west slopes indicates a parallel phenomenon. It is difficult to say just how many sites actually exist, since there are a number of instances of small areas of occupation separated by badly eroded terrain that may have been actually parts of a badly preserved settlement. Furthermore, many of the large Aztec and Teotihuacan period village sites have Tzacualli sherds mixed with the later periods, and the pattern is obscured by the more massive later occupation. Because of erosion and superimposed occupations, no house or site plans are available for this phase. In spite of the problem of erosion, however, I feel that the typical Tzacualli settlement was similar to that of the earlier phases, hamlets varying from a couple to a dozen or so houses. The

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[2]Editors Note 2: Later surveys of the city by the Teotihuacan Mapping Project, conducted by Rene Millon, have revealed a Tzacualli city several times this size.

sites occur fairly evenly dispersed over our survey area; with strings down the center of elevated ridges between barrancas, along barrancas, and along the bases of the isolated hills. The total pattern, in a demographically smaller way, parallels the later Aztec.

Adding up all the small sites,, and approximating the occupation mixed with later sites, the total residential area occupied by Tzacualli sites is probably in the neighborhood of 20-25 hectares - a respectable population, representing a striking increase over the earlier periods. The largest individual site does not exceed 2 hectares, and most of them are less than one.[3] There are no ceremonial structures known for this period and variations in site size would seem to suggest no local community stratification. Presumably all were in a socially and economically dependent relationship to the gigantic town site at Teotihuacan. The sudden population growth has all the earmarks of a directed, but not formally planned, colonization from that center.

If the area was similar in appearance to that of today, a population of that size would, of necessity, involve a similar level of intensivity of agriculture. However, in view of the small previous population, it would seem probable that extensive tepetate surfaces were not present, that the barrancas were still small permanent streams, and that a respectable soil cover was still present over much of the area. My feeling is that agricultural techniques still did not involve anything more elaborate than tlacolol. This would agree with the unchanging settlement pattern, light pre-Tzacualli land use, site locations and types over the rest of the slope area of the Teotihuacan Valley, as well as specifically within our survey area. The picture I have presented of land use during the early phases of Teotihuacan and final phase of the Pre-Classic is one of gradual development of intensive agricultural techniques in the main valley, but with a retention of more extensive and older methods in the marginal flank areas. What did happen in our survey area during Tzacualli times was the growth of population and development of what Conklin calls an "integral system" of slash and burn cultivation.

The density of ceramic remains in the Tzacualli sites proper would seem to indicate a settlement about as compact as a modern "low density compact village," i.e. 1000-2500 per km. sq. Totaling up all of the residential clusters we are calling sites, we would obtain a possible population range of 250-625 people, or just below and above the population using the strip today. This would also yield an average of 8-21 inhabitants per settlement.

<u>Teotihuacan period</u>. For the Teotihuacan period a series of extraordinary events are reflected in the local archaeology: marked community stratification, heavy population growth, shift in settlement pattern, and inferential changes in land use.

In the survey area are four large compact nucleated villages, a small town site, and 16 hamlets similar in size to the earlier hamlets. One gigantic village, TC-46, covers 25 hectares of terrain, approximately the total surface covered by all the Tzacualli sites. Other villages were TC-58, 8 hectares; TC-49, 9 hectares; and TC-42, 4-6 hectares. All four are characterized by very heavy, nearly continuous, concentrations of rock debris and pottery, and the population density was doubtfully several times as high as in the Pre-Classic hamlets, probably comparable to that at Teotihuacan itself. TC-58 and TC-49 are reworked by modern-Aztec terrace systems, as is most of TC-46, so that specific data on community planning are not available. Two small excavations made in TC-49 and 46 revealed that the areas of heavy rock debris are the remains of multiroom structures similar to those at TC-8, with central courts surrounded by room clusters. They were, however, both smaller than at Maquixco Bajo, and the construction is much poorer: the plans are more irregular, courts are unpaved, walls are constructed of roughly-shaped blocks of tezontle, gravel conglomerate and earth with mud stucco and no lime plaster. Stairways are also much cruder. Generally the construction is similar to rural Aztec houses in the same area, although the houses were considerably larger. A number of mounds are as large as those at TC-8. TC-49 has two small pyramids; such structures are either lacking or destroyed in the other sites.

TC-42 is better preserved, and the central part of the site seems to have an orderly plan composed of groups of mounds clustered around courts. There is some indication of the presence of small ceremonial structures as well.

Although TC-40 is considerably smaller than TC-46, the architectural remains indicate a higher community status. Like the villages, it was a tightly nucleated residential site with a nearly continuous distribution of rock debris and pottery. The central third of the site, possibly all of it, was regularly planned,

[3]Editors Note: But see discussion in Part 3, Chapter 8 and Appendix K

with a grid street system and open courts delimited by residential and ceremonial structures. Some ceremonial structures seem to occur at termini of streets, as at Teotihuacan, and most ceremonial mounds have small courts in front. In some cases the concentration of rock and sherds would indicate very large houses, like the urban blocks at Teotihuacan, probably similar in size to Maquixco Bajo (TC-8). There is even some indication of the presence of a main street with a pyramid at the north terminus, and the main pyramid faces the street from the east. Excavation is urgently needed to check these observations. The ceremonial structures are all small squarish or rectangular mounds varying from 60-100 cm. in height with basal measurements varying from 10-30 meters. There are eight such structures, and their small compact plan contrasts sharply with the low rambling residential mounds. Furthermore there is a large rectangular mound with traces of 3 ascending stairways that has a basal area of 48 x 14 meters and a height of 1.8 meters that looks like an elite residence. The ceremonial structures are probably similar in size and plan to the one we excavated at TC-8 in 1961.

The 16 noted hamlets are all similar in size, ecological location, and architectural remains to Tzacualli settlements. The population density may have been higher, but most of them are so severely eroded it is difficult to say. In some cases the density was certainly as high as in such village sites as TC-47-48. Even so, the bulk of the Early Classic occupation occurs in the larger sites.

The total area covered by town and village is approximately 56-58 hectares; the total area of the 16 hamlets did not exceed 9-10. The total area covered by Teotihuacan settlements is 65-68 hectares.

The ceramic samples from these sites have been cursorily examined to ascertain time range and phase bias. Unfortunately we are still wrestling with the problem of isolating Miccaotli from Tlamimilolpa in rural sites. We can, however, sort the material easily into three phases: Miccaotli-Tlamimilolpa, Xolalpan, and Metepec. The following generalizations will probably be supported by future detailed processing:

1. All of the hamlets have occupations limited to the Miccaotli-Tlamimilolpa phase.
2. The 4 big villages have Miccaotli-Tlamimilolpa occupations, and the dominant occupation is surely Tlamimilolpa.
3. The two villages TC-48 and 49 have almost no post-Tlamimilolpa occupation.
4. The big TC-46 village site has good secondary Xolalpan occupation that occurs in roughly 2/3 of the site area.
5. The town site shows a similar reduction of residential area during the Xolalpan phase. Good occupation is limited to roughly the western third to half of the site. As in the case of the villages, the maximum occupation was reached during Tlamimilolpa times, with a much lighter Miccaotli occupation.
6. TC-42, although with again a maximum occupation during Tlamimilolpa times, has a respectable Xolalpan occupation over most of the site.
7. No good Metepec occupation has been noted in the survey area!

As we have indicated, a major chronological problem is the sorting out of Miccaotli from Tlamimilolpa occupation. My impression is that all of the hamlets are predominantly Miccaotli, especially those also possessing Tzacualli components, indicating a continuity of population and of culture. The Miccaotli component on the big sites is light enough so that it too could represent a series of similar hamlets with the dominant Tlamimilolpa occupation superimposed. We very tentatively suggest that, the following pattern for the general period from Miccaotli to Metepec in the Teotihuacan, or Early Teotihuacan, period:

Miccaotli phase. There were possibly from 25-30 hamlets, similar in size to those of the Tzacualli period but probably more tightly nucleated. The population possibly doubled between the two phases. It is almost certain that some ceremonial structures were built at this time at the town site. Presumably the population was large enough to require some type of regional center. On the basis of pottery distribution there was probably a small, compact elite residential-ceremonial precinct at TC-40 with a series of well spaced house clusters scattered around the site area. The total population of the survey strip may have been between 1000-1200.

Tlamimilolpa phase. This is the period of maximum population, in which the town and large compact village were the characteristic settlement types. The total residential area was approximately 53-55 hectares, subtracting about 3 hectares of ceremonial precinct at the town site. The population density was probably as high as that of the city (at least 10,000 per km. sq., based on the Yayahuala house complex which measured 3600 square meters and house 10-12 nuclear families). If so, the population may have been as high as 5-6000 people in our survey area. The absolute minimum density would be that of modern irrigation villages in the Lower Valley (around 5,000 per km. sq.), which would yield a figure of 2500-3000 people. At any rate, between Miccaotli and Tlamimilolpa times the population not only became concentrated in large settlements, two of which, the town and one village, have formal planning), but it at least doubled and possibly increased as much as five times.

Xolalpan phase. There was a striking reduction of population during this phase. None of the hamlets was occupied, one village was completely abandoned, another suffered near-abandonment, and two villages and the town site had sharply reduced populations. If events in this area parallel those in the city, it is conceivable that the grid patterns of streets at TC-40 date from this period. The settlement pattern and type was generally similar; what happened was general shrinkage of population and village areas. It seems probable that the population was at least halved and possibly reduced to a third of its Tlamimilolpa level.

Post-Xolalpan. A major problem to be resolved is the explanation of both the shifts of settlement pattern, and the growth and subsequent decline of population. During the final phase of the general Teotihuacan period (Metepec) the population within our survey area disappears entirely. Furthermore there are no settlements of the succeeding Early Toltec phase (Xometla-Oxtotipac), so that for a period of possibly three centuries there was no permanent settlement in the area - until the Mazapan phase of the Toltec period.

The fact that the Mazapan occupation was substantial, and that the Aztec was extremely heavy suggests that the factors explaining the decline were extra-ecological. The key to the problem, I believe, lies in events occurring at the city of Teotihuacan and at the rising center of Tula to the northwest. Although Millon's survey is still in progress the following patterns of growth seem to be definite:

A. A large Tzacualli town site covering at least 4-6 km. sq. with a heavy concentration of suburban hamlets over an additional 2-3 km. sq. The town had apparently extensive religious architecture but probably a relatively low population density. The total population may have been around 10,000 inhabitants, using the upper density of modern low-density compact villages. At this time the general process of clustering rural population in the big central community had started, but had not proceeded very far, at least in the Middle and Upper Valley. There were probably several hundred small settlements in the latter areas. Our survey has revealed none below the springs in the Lower Valley.

B. A rapid process of centralization of the rural population of the Teotihuacan Middle Valley, laying out and planning of the main street, increasing compactness and nucleation of population at the town, displacement of the town towards the areas of the main street. There was, however, some survival of separate villages and hamlets within a short radius of the city (i.e. at Metepec, Techachal). The process of centralization apparently did not affect the more peripheral areas, i.e. the Upper Valley and the North Cerro Gordo area.

C. A great spurt of growth during Tlamimilolpa times, in which the city covered nearly 15 km. sq. The plan was very compact, but apparently lacked formal planning outside the main street area.

D. During Xolalpan times there seems to have been a contraction of size to perhaps 8 km. sq. but with the application of an orderly grid of streets and probably increase of population density to 10-12,000 per km. sq. The total population was probably as heavy as during the preceding period (80-100,000).

E. During the Metepec period a final spurt of growth, with the proliferation of disorganized and unplanned suburbs sprouting out around the periphery of the grid to exceed the spatial extent of the Tlamimilolpa city.

A comparison of the growth of the city and of population generally in the Teotihuacan Valley shows that two basic processes were characteristic: nucleation of small settlements into large ones, and formal planning. Our data from the Maquixco Bajo excavation and excavations at Teotihuacan itself demonstrate that the political situation was becoming increasingly unstable toward the end, and that the city, in the final centuries of its history, existed in a setting of imperialistic expansion, militarism and frontier restlessness to the north and probably south. With these considerations, let us now review our data for the survey area.

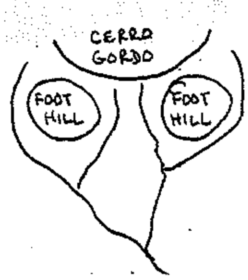
1. For the pre-Tzacualli periods the area was marginal to the agricultural exploitation of the Teotihuacan Valley, the population was small, broken up into autonomous units of hamlet size; agriculture was of the tlacolol type.

2. The expansion of population during Tzacualli times might be best considered as informal colonization from Teotihuacan. The small hamlets were surely politically and economically dependent on Teotihuacan. The population was probably as large as the modern, but probably used a more highly organized system of tlacolol cultivation in a generally favorable ecological setting. Soil erosion as the population increased must have been an increasingly severe problem.

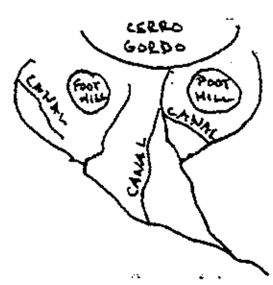
3. A doubling of population occurred during the Miccaotli phase, requiring the establishment of a local center of sociopolitical control but with a retention of the dispersed hamlet settlement pattern. If the tlacolol system was still in use, soil erosion must have become a serious problem, and with this, drought would become still another problem to contend with, given the thin soil cover. Conceivably some terracing may have been initiated at this time.

4. During Tlamimilolpa times the population apparently increased from 2-5 times the Miccaotli level and was clustered in five large, densely nucleated communities including one town. Some explanation of both population growth and nucleation is needed. We have seen that intensive agriculture on slopes works most effectively when farmers live near their lands. Therefore the nucleation process probably relates to extra-ecological processes. My feeling is that it is the product of urban-rural acculturation, possibly even planned from Teotihuacan to facilitate economic exploitation. The apparent imitation of the plan of the city in the small town site is a strong positive argument. The large increase of population, however, must relate to new approaches to agricultural exploitation, and therefore involves ecological processes. A population of the size indicated by the settlement pattern data could never have been supported by tlacolol cultivation. Something similar to the modern land use practices but more effectively applied over the entire area must have been utilized. The difficulty here is primarily methodological, compounded by the fact that people with a rural subsistence pattern were living in urban-like communities. Therefore it is difficult to relate settlement patterns to agricultural features archaeologically. Complicating the picture still further is the dense overlay of Aztec population, who completely remodeled the topography, the disastrous erosion cycle of the 16th century, and the modern reworking of the land surfaces. Most of our arguments, of necessity, therefore must be based on inferential data. There is, however, some direct archaeological data that indicates that terracing and flood water irrigation were the primary techniques by which the Tlamimilolpa phase population was achieved.

The Aztec settlement pattern may be easily related to parts of the present terrace system and to archaeological remnants of such systems in tepetate areas. There are at least two, probably more, ancient canals that drew water from one of the barrancas (see map). Such canals have no relationship to either modern or Aztec terracing - as a matter of fact, they are considered obstacles to modern agriculture, and farmers treat them as barrancas, busily constructing check dams to fill them in. The big barranca the canal drew water from has been cut down to a depth of 30-60 feet and cannot today be used for flood water irrigation. The features we are calling canals are old enough so that they look more like small barrancas; in some sections the bed is cut to 15-30 feet below the surface. The proof that they are not natural barrancas lies in their reverse flow with respect to normal patterns. The difference is diagrammed below



Normal drainage pattern



Canal patterns

In one case the "barranca" flows from one barranca to another, as do modern flood water canals. The fact that none of these canals related to archaeological Aztec terraces or to modern terracing is a strong argument in favor of a pre-Aztec dating. In terms of population growth, the obvious assignment would seem to be Tlamimilolpa -Xolalpan.

5. The reduction of population in our 8 km. sq. survey strip during Xolalpan times coincides with the growth of a big town site (TC-73) located 2-3 km. to the northeast. This site (see separate description) was settled during the general Miccaotli-Tlamimilolpa period, when it was apparently a village, comparable in size to TC-42, 49, 58. In the Xolalpan phase, it expanded into a town site with a ceremonial precinct larger than TC-40, and a dense, gridded residential area. In order words, the demographic trends are reversed. It is our contention that the growth of this town and decline of population in the 8 km. sq. survey strip is consistent with the general trend of increased nucleation characteristic of the general Teotihuacan period and that there was a population movement from the villages to the town TC-73.[4]

There is some evidence that Xolalpan may be divided into two phases - if so, detailed analysis may reveal that our Xolalpan occupation in the survey strip are primarily early and that the heaviest component at TC-73 is late. If so, it will provide us with even more positive control of the population movement. The process was probably planned from Teotihuacan, and I believe it was related to the growing militaristic atmosphere and troubles with the northern frontier.

6. During the Metepec phase the population not only disappeared from our survey area but even at TC-73 it diminished to a fraction of its former size. At the same time we noted a period of maximum population growth at Teotihuacan, with the proliferation of suburbs. It is our contention that the Metepec phase represents the end of a long trend in which the rural population of the valley gradually merged into larger communities and finally into one big center. At the end there were only a few scattered settlements in the Upper Valley. All the rest of the population resided either at the city itself or in one of the big suburbs along its fringe.

<u>Toltec occupation</u>. In the Teotihuacan Valley proper the Metepec phase is succeeded by an early Toltec phase with two closely allied but distinctive ceramic complexes. At Teotihuacan and in the Middle and Upper Valleys the Oxtotipac complex occurs, with much persistence of Teotihuacan combined with Toltec traits. In the Lower Valley occurs the Xometla complex, which includes some Teotihuacan elements.

In the Maquixco Alto survey area there are no occupations of the early Toltec period, and it appears that the area was abandoned during this phase. Even at TC-73 there is no early Toltec component. If our survey data may be trusted, and if our reconstruction of the techniques of agriculture was as we have stated characteristic of the Tlamimilolpa-Xolalpan phases, then the abandonment of the area would have initiated a new cycle of soil erosion. I suspect that at least some of the down cutting of the barrancas probably occurred at that time. Terracing in this area requires, as we have noted constant care, and, as the systems were abandoned, sheet erosion of the present type must have developed rapidly as the terrace systems disintegrated.

During the Mazapan phase there was a respectable occupation of the survey area. Our survey revealed the presence of one large village and 9-10 hamlets in the intensively surveyed area, plus five hamlets near Culhuacan. The village occupied roughly the site of modern Maquixco Alto. Because of this, the site pattern is somewhat obscured by the modern settlement; furthermore, there is an Aztec component as well. In spite of the problem of sorting out the three occupations, it is fairly certain that the houses were at least as dispersed as the modern village, and more probably approximated the "scattered villages" in the Teotihuacan Valley today. The total area of occupation is probably between 15-20 hectares, which meant a population between 100-300 (using the densities of scattered to low density compact villages).

Six of the hamlets are located along modern barrancas. All are about the size of the larger Tzacualli settlements. Pottery tends to be only light to medium in concentration indicating again fairly widely spaced houses. In the Teacalco strip is a string of 4 small hamlets spaced at 200 meter intervals running down the ridges between the two barrancas. The total area covered by the hamlets would roughly approximate the village area, or at total of 30-40 hectares of dispersed settlement. The total population would be comparable to

[4]Editors Note: But see discussion in Part 3, Chapter 8.

modern Maquixco Alto or to Tzacualli times. It is difficult to assess the agricultural system without more detailed survey and excavation, but perhaps the best picture would be one similar to the modern with areas of intensive cultivation separated by eroded slope. The hamlets would relate to local areas where the Classic terrace systems were partially preserved, and the general tendency of houses to be dispersed would relate to some kind of terrace correlation like that in modern Culhuacan. We will elaborate on this point in our discussion of Aztec settlement. Presumably the history of land use during this and Aztec times was one of gradual restoration of terrace systems and development of new patterns of flood water irrigation adapted to barranca cutting.

Toltec architecture is equally difficult to define, since so much of the occupation is overlaid and mixed with Aztec. On the north edge of the village there is a large low mound that is either a low temple platform or an elite residential structure. The debris consists of chunks of tezontle and earth. Nearby are two small mounds that are identical to Aztec house mounds. A simple local community stratification was certainly present involving two levels, village and hamlet. Presumably all were subject to the big Toltec town of Teotihuacan.

Aztec period. The Aztec occupation of the survey area is extraordinarily intensive. There are hardly any fields except deep soil terraces and presas, where some Aztec pottery may not be picked up. Nearly all Teotihuacan, Toltec and Pre-Classic sites have some Aztec occupation. Aztec house and ceremonial structures are abundant, although erosion and sedimentation tends to obscure patterns and relationship of occupation areas. The problems of interpreting Aztec survey data are so complex that before generalizing we will briefly summarize the characteristics of specific "sites."

TA-44. This is a small site, a typical barranca side linear hamlet averaging 60 meters in width. It runs for 400 meters along the barranca, with a total surface area of 2-4 hectares. The area is terraced today, with soil averaging 20-60 cm. in depth. Only one definite tlatel has survived. Pottery varies from light to heavy, and occurs in small localized areas.

TA-45. This is a big village occupying all of and extending beyond the limits of the modern village of Maquixco Alto. Where the site overlaps modern house lots only ceramics remain. Bases of adobe and stone walls may be seen in the more open lots in the southwestern corner of the village. To the north and northeast 7-8 tlatels and a small pyramid have escaped destruction. Pottery in the house lots varies from light to heavy. The occupation may run to the north all the way to the barranca, but there is a set of deep soil terraces and check dams there that would cover archaeological remains.

The area between TA-44 and TA-45 is terraced, but the soil depth is light to medium, and the scantiness of Aztec occupation there probably does have significance. The same generalization applies to the area to the west. A major problem is the relationship of TA-45 to TA-46. Between the two is an area of gentle slope and medium to deep soil terracing. There is dense Classic occupation there (TC-58) and scattered Aztec sherds may be noted through the area. The difficulty of sorting out a more dispersed Aztec settlement from a densely nucleated Classic settlement is considerable. The few Aztec sherds noted may represent only land use or dispersed settlement. If the latter, then TA-45 and 46 are one big site.

TA-46. Above or to the south of TC-58 is one of the most severely eroded sections of our survey area. Much of it is tepetate waste land. In one part there is a system of very tightly spaced maguey terraces with thin soil. The area we are designating as TA-46 has the most abundant remains of any part of the survey area, including Tzacualli, Miccaotli-Tlamimilolpa, Mazapan and Aztec occupation, of which the latter are the most extensive. Pottery occurs literally in heaps on the bare tepetate surface. Only about 5 tlatels have survived in the tepetate area, but there were obviously several times as many. On the tightly spaced maguey terraces the tlatels appear to occur in straight vertical lines associated with the terraces (at least a dozen were plotted). An ancient canal, probably of Teotihuacan age, cuts through the Aztec site. Whether the site is really an extension of TA-45 or a separate settlement is debatable. Remnants of ancient terraces and feeder canals are common in the tepetatal area, and they are lined up with those still in use just below.

The surface area covered by TA-45 excluding the possible extension south through TC-58 is approximately 30 hectares. TA-46 covers 10 hectares of settlement. If TC-58 is part of the dual site, then we have a huge village covering nearly 50 hectares and dispersed up a terrace system. I believe this is the case, and we have a fascinating parallel with the modern village of Colhuacan just outside our survey strip but in similar ecological setting.

The village of Colhuacan consists of widely spaced houses, each correlated with a terrace and running almost all the way up the vertical extension of the terrace system. Each householder owns the terrace on which the house is located, possibly several adjoining terraces. Such lands are called huertas and are intensively cultivated. The close association of field to house is ideal, since it facilitates terrace maintenance; the fields are fertilized by household rubbish and corral animals. Palerm found a similar system in northeastern Puebla called Calmil. Other terraces lying at distances up to 500 meters or so are also owned, to complete the family holdings. The village church is at the upper end of the village, and several jagueys complete the civic construction.

At TA-45-46 the pattern looks identical, with a village temple at the lower end of the community. Unlike modern Colhuacan, however, one would expect some internal clustering of houses because of the extended family and lineage structures, and our general Teotihuacan Valley survey confirms this as the case.

Even if we assume a population density comparable to modern Colhuacan (a scattered village) the Aztec site would have had a population at least as large as modern Maquixco Alto.

On the sloping ridge above TC-46 between two barrancas and just below (north of) Cerro Tezqueme is an area of very severe erosion. Nearly all the soil has been removed and the area is deeply gullied. Either two preserved segments of a large site or two small sites may be noted on the map: TA-49 and 50. TA-49 is partly mixed with a Tzacualli site. At least 11 definite tlatels, clustered in an area of 3 hectares were mapped. Like TA-44 it seems to run along a barranca. TA-50 also occurs along a barranca, covering about the same area. It possesses one pyramid, 3 definite house tlatels and a large area of rock and sherds that was probably once a mound cluster.

The fact that the intervening area is very severely gullied, and the presence of light Aztec pottery through TC-46 just below suggests the strong possibility that this was one big village running from barranca to barranca, between Cerros Tiquimil and Tezquemac, with houses dispersed along terraces. Terrace remnants may be observed in the two "site" areas.

Above (south of) Cerro Teclalo is a similar stretch of intensively terraced sloping terrain. The upper (south) section of it just below the steep slopes of Cerro Tlaquache has suffered heavily from erosion. Remnants of ancient terraces are abundant, deep gulled and large areas of tepetate cover the area. There is an Aztec site directly associated with the ancient terraces that extends laterally from barranca to barranca.

In spite of the severity of erosion, our best data on Aztec site patterns in our survey area comes from this site (TA-51). One small pyramid and at least 25 tlatels have survived. They vary in size from 15-40 meters in diameter, are all under a meter in height, and are comparable to the one we excavated in TA-40. The eastern third of the site is almost destroyed. Bearing in mind the degree of erosion, it is probable that there were at least 40 houses in the area we have defined as TA-40. The total site area is approximately 10 hectares, so that the average house density would be at least 2-5 and probably 4 per hectare. Even if we assume only one family per house the minimum population density was approximately 1000 per km. sq. As we have indicated, the density was probably at least half again as high, more probably at least double, since many Aztec houses were multifamily.

With respect to this site we have the same problem in determining its limits. Below the "site" are three rows of modern agricultural terraces (although probably Aztec in origin) with soil depth varying from 30 cm. to 3 meters. The site may well extend into this terrace system and be buried by it. However, the Teotihuacan site TC-48 occurs in an equally good terrace system, and the occupation is heavy. I suspect that the site is limited to the area defined on the map, and that villages had huerta-terraces near their houses and also held land below the village. The location for the houses was probably intentionally selected at the head of the terrace system, where the slope was more abrupt and soil thinnest.

Just below TA-51 is a small barranca side hamlet TA-52 - 1.3 hectares in area, but with no surviving tlatels.

Below Cerro Tiquimil is a large triangular shaped area lying between two barrancas that, with the exception of several narrow strips along the east barranca, is marginal to modern agriculture. The area just north of Cerro Tiquimil is heavily eroded with gullies and sheet erosion; large sections along both barrancas consist of surface tepetate. The area of the Classic site TC-49 is an exception, since it is covered by an excellent terrace system. North of TC-49 the high ground between the two barrancas has a thin soil cover, and terraces are poorly maintained. In this general area are at least 6 Aztec sites classifiable as hamlets or small villages. The area around TA-47-48 is severely eroded; it is possible that they are simply preserved segments of a larger site. Terrace remnants are common in the area.

TA-54 apparently was a typical linear village strung down the ridge between two barrancas. TA-55 was important enough to possess a pyramid.

The total area occupied by Aztec sites in the noted triangular shaped area is from 20-25 hectares.

The Teacalco section of the survey area is also rich in Aztec remains. the following sites occur in that area:

TA-41. this site, in terms of size, abundance of surface remains, and the presence of the largest pyramid in the survey area with associated plaza, is the Aztec counterpart of TC-40 and perhaps should be labeled a small town. Although smaller in area than TA-45, it has a more urban appearance. The site covers approximately 8 hectares and has a pottery concentration in the core area nearly as great as Classic villages and towns. At least 23 tlatels are definable and the large Classic tlatel we are calling TC-48 has heavy Aztec occupation as well. It is difficult to estimate what the original number may have been, but the density of pottery would seem to suggest a density comparable to modern irrigation villages in the Lower Valley. This would yield a population of approximately 300-500.

TA 40 is a big sprawling village located near a barranca and covering 9-10 hectares. AT least 20 tlatels are visible, but erosion has destroyed parts of the site. To judge from the density of better-reserved parts of the site, there were probably originally at least 30 and possibly 40 houses. Pottery tends to be heavy only in localized areas, near mounds, a more typical pattern for Aztec sites.

Running down the center of the ridge between the two barrancas is a nearly continuous band of settlement or string of small sites. Two of the localized clusters or small sites are located within the area of TC-40-42, and are slightly separated (80-100 meters) from a central, almost continuous ribbon of settlement we are calling TA-42. Pottery varies in density from light to heavy. Only a few tlatels are preserved. The area is characterized by thin to medium soil and poor terracing. TA-42 extends for a distance of 700 meters along the highest part of the ridge over a band averaging in width from 100 to 200 meters. About 20 tlatels have survived, occurring in 3 small clusters. The total area of occupation of this central ribbon is 10 hectares; the Aztec component of TC-42 an additional 6 hectares, and TC-40, 5 to 6. My impression is that the population density in this site was lower than TA-40 and was probably close to that of a modern scattered village. There is another small site just below the Chiconauhtla phase hamlet along a barranca.

Aztec sites in the Maquixco Alto section of the survey cover a surface area of from 80 to 100 hectares. Those in the Teacalco strip cover an additional 40-50, hectares, for a total of 120-150 hectares.

We have noted in the area three basic levels of population density. TA-41, a small town with a density probably comparable to that of modern high density compact villages (5000/km. sq.), the bulk of the sites with densities ranging from the upper end of scattered villages to the upper end of low density compact villages (1000-25000/km. sq.), and TA-42, with a density probably well into the range of scattered villages (500-1000). If we simply apply these figures, the total Aztec population would be approximately 1600-2000 persons. If we are cautious and assume all villages to be scattered villages, the total would be between 900-1100. If we are overly liberal and use the upper limits of low density compact villages, the figure would be between 2200-3000. If we take tlatel densities from the better-preserved sites, the following data emerge:

	House Density Preserved	Probable Original Density	Pop. Density Range Nuclear Families	Multifamily, as Excavated House (8 People Per House)
TA-51	2.5	4.0	1000-1600	2000-3200
TA-49	3.6	-	1440	2880
TA-41 (Town)	3.0	4-6.0	1200-2400	2400-4800
TA-40	2.0	3-4	800-1600	1600-3200

Excluding the town, the densities are fairly consistently between 2-3 preserved tlatels per hectare in fairly well-preserved sites, with the original number consistently estimated at from 3-4. If we applied these densities over the residential areas of all the sites and assume that each mound was a nuclear family residence of a family of 4, and that all were occupied contemporaneously, the total population range would be from 960-2400. If we assume all houses were contemporaneous and were at least 2-family residences, as was the one excavated, the total could be 1920-4800. Our field studies indicate that in modern villages the range of unused houses per village may run from 10-20%. If we apply this formula to our data, the population reduced to 760-2160 for nuclear family residences and 1500-4320 for multifamily houses. The various kinds of evaluations may be summaries in the following charts:

Calculations Based on Modern Settlement Patterns:

Formula of scattered village applied to entire residential area	900-1100
Judicial application of modern village densities	1600-2000
Formula of low density compact village (upper limit) applied to entire residential area	2200-3000

Calculations Based on Selected Sites:

	All Contemporaneous	10-20% Houses Abandoned
Nuclear family houses, all contemporary, counting only preserved houses (2-3 per hectare)	960-1800	760-1620
Nuclear family houses, all contemporary, estimate of probable original number (3-4 per hectare)	1440-2400	1150-2160
Extended family houses, all contemporary, preserved houses only	1920-3600	1635-3240
Extended family houses, all contemporary, based on probable original number	2880-4800	2304-4320

The total range of possibilities is considerable, from as low as 760 to as high as 4800. However, much of the range is easily disposed of. In examining the set of figures based on modern settlement patterns, even superficial subjective impressions can eliminate the lowest and highest levels. Over most of the site the pattern was clearly not one of scattered villages like modern Cuauhtlancingo. This would mean a range of 1600-3000 people. It is also doubtful that all the sites had densities at the upper end of the low density compact village range, so the middle figure of 1600-2000 people has considerable support.

With respect to the set of data based on calculated densities, first, the lowest figures are impossible. We know that all mounds are not preserved, and we also know that at least the larger house mounds were residences of more than one nuclear family. The upper figures in terms of land productivity would seem too high, thus presenting subsistence problems. However, if we assume that half the houses were occupied by one nuclear family, half by two, that the average house concentration was three per hectare, and that some 20% of the houses were temporarily abandoned at any one time, we derive a range of 1740-2160 people for the survey area, a density of 1440 per km. sq., which fits quite well with out subjective impression of the equivalence of modern settlement pattern data to archaeological density estimates.

Calculations based on agricultural productivity. From our survey area at least 750 hectares of land are theoretically capable of being converted to first and second class land in terms of presently known techniques of land use. As we shall argue below, archaeological evidence indicates that the entire area was intensively cultivated using terracing. If all were planted every year in maize, the average yield would probably be in the neighborhood of 1000 kilograms, and the total production 750,000 kilos. This would support a population with daily maize requirements of about 3000 people. (maximally 4680)

General survey to the west and east of our survey strip shows that there areas were an densely populated during Aztec times as our survey strip. This means that the food resources for our survey villages must have been obtained primarily from this area of 750 hectares of agricultural land. Some allowance must be made for surplus production for trade, for secondary crops, and for less than 100% efficiency of land use. This pretty well eliminates the uppermost range of our archaeological estimates, and strengthens considerably our estimate of the probable population. Today all the population of Maquixco Alto and perhaps half of that of Teacalco live off the survey strip, a total of probably 800 people. Our estimate of probable Aztec population is from 2 to 2 1/2 times the modern.

In summary then we can say that the theoretical minimum and maximum population was from 760-4800. A more reasonable minimum-maximum would be from 1200-3000, and a probable population for the Aztec period was 1600-2200.

The direct evidence from archaeological data, from the settlement pattern or the considerably higher population, all would indicate an extremely intensive use of land over the entire survey area with the exception of the small hills, which were probably covered with maguey. The Aztec land use may have been more intensive than that during Tlamimilolpa times, even though the latter population within the survey area was undoubtedly greater. I argue this because all our survey date indicate that the Aztec density reached in our survey strip was pretty typical of the lower flank of Cerro Gordo and that general survey indicates that there was a nearly continuous ribbon of settlement like that found at Maquixco Alto <u>all the way around Cerro Gordo</u>. On the other hand, there are no known Teotihuacan sites immediately east or west of our survey area, or on the east flank of Cerro Gordo. There are equally heavy clusters, but well spaced from the Maquixco Alto group, on the west side. This would imply that the big population during Tlamimilolpa times used an agricultural hinterland that extended considerably beyond our survey strip. It is probable that areas situated several kilometers from the survey strip were extensively rather than intensively cultivated.

The Aztec settlement pattern furthermore seems better adapted to terrace agriculture. We have noted that effective terrace construction and maintenance can only be carried out when houses are close to land, and that such work is best carried out by small work groups. The best adapted settlement pattern would therefore seem to be cone of dispersion in small groups over the terrace system. The Aztec pattern involved just that, with the dispersal of houses at the heads of terrace complexes and its combination of huertas and external fields at relatively short distances.

The following chart summarizes our assessment of population growth for the survey area:

Table 104

Phase	Settlement Type	Surface Area of Residence (Hectares)	Probable Population	Ag. Land: Av. Hectares/Fam. in Survey Area	Agricultural System
Chiconauhtla	1 Hamlet, 1 more outside survey area near Colhuacan	1 Hectare	20-40	80-160	Extensive roza
Cuanalan	2 Hamlets in Colhuacan, out of survey area				
Patlachique	2 Hamlets	2-3 Hectares	40-120	24-80	Ext. roza
Tzacualli	30 Hamlets	20-25 Hectares	250-625	6-12	Integral roza; severe erosion begins
Miccaotli	25-30 Hamlets	20-25 Hectares	1250	2-8	Beginning of terracing; local integral roza; peripheral extensive roza
Tlamimilolpa	1 Town 5 Villages	53-55	2500-3000 5-6000	1.2-1.0 .6-.5	Intensive ag. in survey area; extensive ag. in peripheries
Xolalpan	3 small villages: emigration to TC-73	17-27	1200-1500 1700-3000	2-2.5 1-1.7	As above. Some erosion
Metepec	Small village at TC-73 emigration to Teotihuacan				Severe erosion due to Abandonment of Area
Xometla-Oxtotipac	None				
Mazapan	1 Village 9-10 Hamlets	30-40	250-625	6-12	Intensive cult. of surviving uneroded land. Much eroded land unused
Aztec	1 Small Town 6 Villages 10 Hamlets 1 Village String	120-150	1600-2200	1.4-1.9	Intense cult. of all survey area no marginal land 16th Century severe erosion
Modern	1 1/2 Village 3 Hamlets	30	800	3-8	Intensive cult. of surviving uneroded land much eroded land being reclaimed

Appendix K

Possible Tzacualli Hydraulic Works
(Republished from Sanders 1975 et al)
(See Figure 307, Plates 190-194, this volume)

One of the major objectives of the project was to obtain archaeological data bearing on the question of the history of agricultural systems. We were particularly interested in the history of permanent and floodwater irrigation, swamp reclamation and terracing - those techniques that are usually considered essential to a truly intensive agriculture in an environment like the Teotihuacan Valley. In Volume 1 we noted evidence of the initiation of swamp cultivation or chinampas in the San Juan spring area during the Patlachique phase and expansion of this system during the succeeding periods.

The methodological problems of trying to work out the history of the large permanent irrigation system based on the springs are considerable, since the older canal systems are undoubtedly buried under meters of alluvium. Sophisticated aerial photography, combined with selected excavation, could conceivably resolve the problem. Our funds did not permit this kind of program. Instead we decided to locate peripheral hydraulic systems in the thinner-soil piedmont areas, particular in the areas where the Classic occupation was unusually heavy. The survey did in fact discover numerous abandoned hydraulic systems - canals, terraces, and dams - all over the valley, some of which are in the vicinity of Teotihuacan period village sites. Unfortunately, they were also found near Aztec village sites and, in many cases, these works are still in partial use today. This means that simple associational techniques of dating are virtually impossible. This is particularly true since many of the canals have become natural drainage tracts, have deeply incised their beds and expanded their edges laterally. This means that sediment analysis cannot yield the type of chronological control that we would like to have. Some of these canals have so deeply penetrated the tepetate that they appear as miniature barrancas.

North of Cerro Gordo there is an ancient canal system that can with some assurance be dated as Pre-Aztec, probably pre-Toltec. Between Cerros Ahuatepec and Tezqueme flows a major tributary barranca. Below the hills it flows north to a distance of approximately 1 kilometer and then swings to the west. After an additional 1 kilometer it joins another major barranca that initiates between Cerro Tezqueme and Cerro Tlacuache Grande. All drainage in this area ultimately ends up in a main stream called the Barranca de Tecorral, which flows below the village of Maquixco Alto. At a point where the barranca flows between Cerros Ahuatepec and Tezqueme, it has a depth of nearly 20 meters and is 40-60 meters across. A canal intake departs from the barranca at this point and runs parallel to it. This can be traced for a distance of 500 meters before it vanishes in an extensive area of tepetate wash. On the aerial photographs, but not on the ground, it can be traced across the wash until it joins another barranca east of Cerro Teclalo. The depth of the canal, for a distance of 100 meters from the intake, is 2-4 meters; it could only have functioned as a canal when the barranca was a shallow stream. There must have been a dam across the stream at the time of the functioning canal, but the lateral erosion that occurred when the stream widened has destroyed any traces of it. Following the down-cutting of the barranca the canal apparently continued to function as a natural drainage tract; today it is 10-20 meters wide and has an undulating plan. It appears, therefore, more like a barranca than a canal and in fact is considered and treated as such by the contemporary peasants who have constructed a series of check dams within it. The lower portions of the canal, i.e., that portion where it shifts direction, run along the southern or upper edge of the big Classic village site TC-46. Below the last check dam and before it enters the tepetate area, it widens and decreases in depth.

A second canal departs from the same barranca on the opposite side at a point 100 meters upstream and flows northeast. It is easily traced for a distance of 800 meters to the upper edge of the village of Maquixco Alto. For the first 500 meters it appears as a narrow, shallow trench that could still function today if the barranca had not incised its bed so deeply. It then enters a wide, deeply scarred wash between two functional modern-Aztec terrace systems. At the point where it enters the village it has deeply incised its bed.

Two large contemporary check dams have been constructed within the canal bed and, as in the case of the other canal, it appears more like a small barranca than a canal. Below the check dam it enters a great tepetate wash area near the village jaguey. Some of the drainage is diverted from it to the jaguey. Below the jaguey the drainage diverges to follow two tracts: each serves as a contemporary village street road. We are convinced that they are old canal beds that became floodwater drainage tracts after they ceased to function as permanent canals. They are utilized today as floodwater canals for the terraces in the west and northwest edge of the village, as well as streets. The lower one is of particular interest. It flows 150 meters northeast, then makes a sharp turn to the northwest where it flows for 300 meters. It then angles across several modern fields. In passing across one field it has incised its bed deeply; two contemporary check dams have been constructed over the ancient canal. The canal, cut down into the tepetate, can be distinctly seen running under the check dam wall. This portion of the course (i.e., through the fields) is 280 meters long. The canal then appears as a shallow barranca running between a set of contemporary terraces on one side (the west) and a large unterraced field on the east; it finally enters the Barranca de Tecorral. This last stretch is 240 meters or a grand total for the canal of a little over 2 kilometers.

The upper canal parallels the lower at varying distances of 100-150 meters after departing from the jaguey area. After a total distance of perhaps 800 meters, it too enters the same barranca but downstream. Sections of it, as in the case of the upper canal, serve as contemporary village roads and floodwater drainage tracts; the lower portion is still used to supply the set of terraces noted above in our description of the upper canal. The terraces border both sides of the two ancient canals.

The entire drainage pattern is easily traced on the aerial photos, particularly on the large scale photos. With respect to its morphology, the canals over most of their length are clearly nonfunctional in terms of the present-day terrace floodwater systems; in fact, as we pointed out these are treated as barrancas. It is equally obvious that they are not natural since they flow diagonally across and connect parts of the natural stream systems.

The present system of cultivation in the Maquixco Alto area is described in detail by Charlton in Volume 1. Basically it involves the construction of sets of terraces that occur in vertical series separated by shallow floodwater canals. Water is diverted from the latter into each terrace by small earth embankments that enter into the canal. The system is a self-flooding one.

The older portions of the contemporary system are, in part, a remnant of the Aztec system which functioned in much the same way. Much of the old Aztec system has been obliterated by erosion but remnants are visible everywhere. In some cases the contemporary villages are recolonizing these eroded areas and building new systems that are morphologically identical to the old ones.

The ancient canal system we have described is quite different in character since the canals lead water directly from major streams and where presumably provided with water from them by means of a dam built across the barranca. In this respect the system is more like the floodwater irrigation system of the alluvial plain in the middle valley or the permanent system in the lower valley. It could only have worked at a time when the barrancas were shallow, narrow, semi-permanent or permanent streams. The system is not only morphologically different from the Aztec and contemporary systems but many of the deep barrancas were already formed in Aztec times, to judge from Colonial documents pertaining to the area. The canals, therefore, must be pre-Aztec. Assuming that to be the case, the precise dating remains the major problem.

Mazapan occupation is respectable in the area. In fact, the upper part of the east canal flows through the center of TT-36 and the lower part through the largest Mazapan site in the area, TT-35. There are no Mazapan sites associated with the west canal.

The Teotihuacan occupation of the area served by the two canals is by far the most massive. The east canal runs along the southwest edge of TC-58 (a densely settled village measuring 8 hectares), the lower part flows along the northeast edge of TC-46 (a huge village 25 hectares), and each of its lower branches flow by two Teotihuacan hamlets - TC-64 and 45. Immediately before they exit into the Barranca de Tecorral, the upper branch flows by the cluster of Teotihuacan period hamlets - TC-63, 60, 62, and 61. The lower portion of the west canal flows along the entire south edge of the large village site TC-46.

In view of the very heavy Teotihuacan occupation of the area and the close association of the canal system to it, the most probable date for the canals would seem to be that period. There is, however, a good possibility that they date as early as Tzacualli times since at least five Tzacualli hamlets are found within a short distance of the canal system (TF-3, 72, 144, 127, 202).

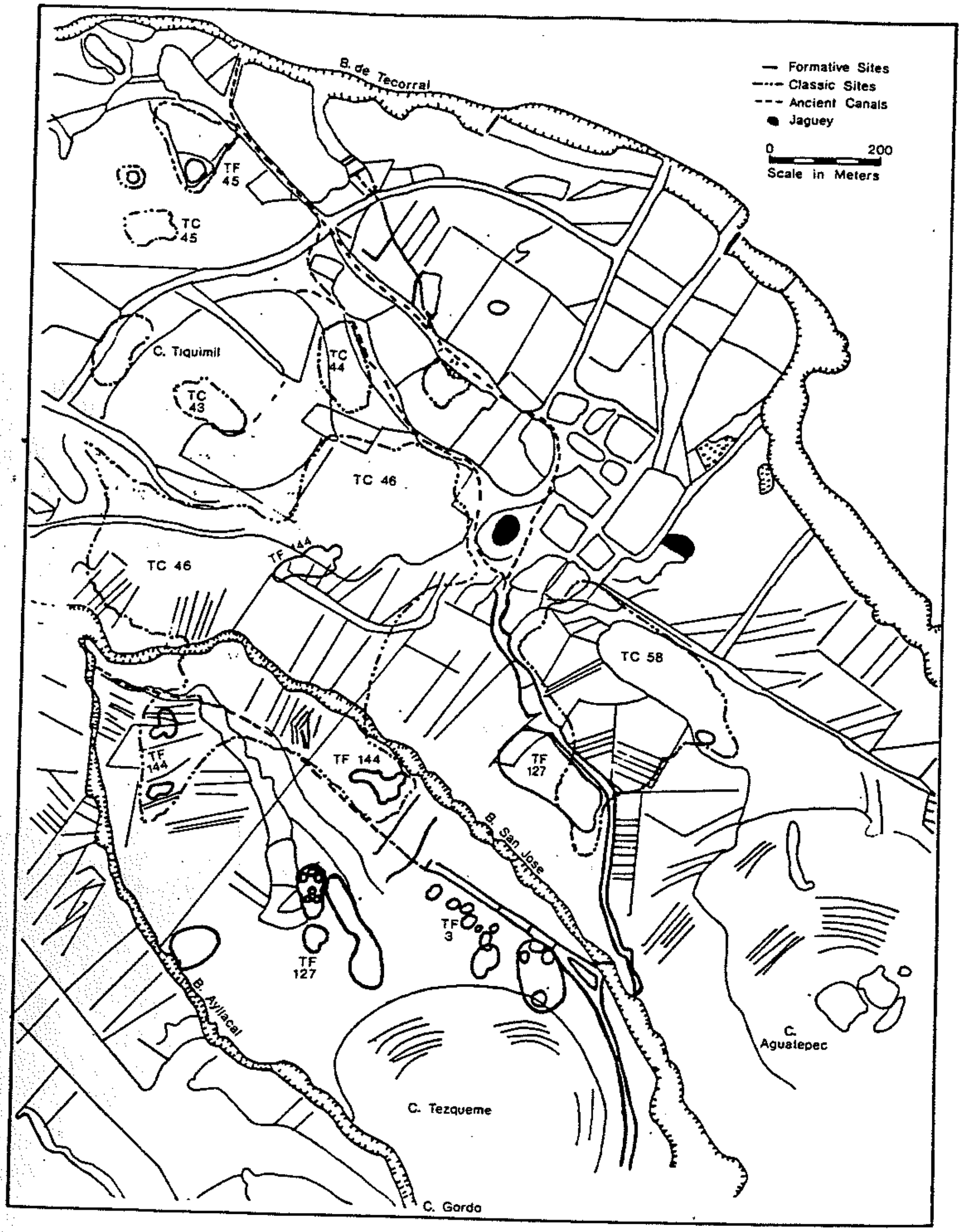


Figure 307 (from Sanders et al 1975)

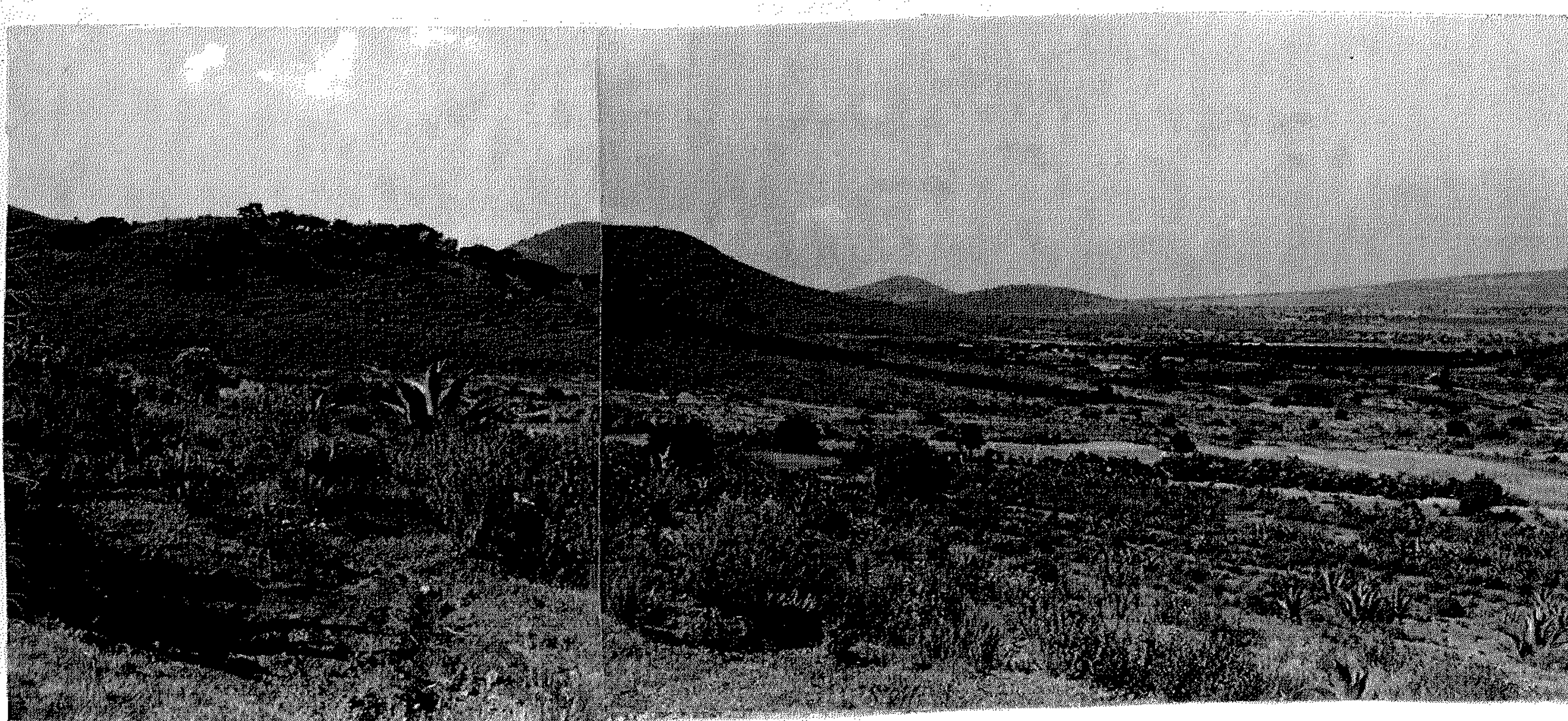


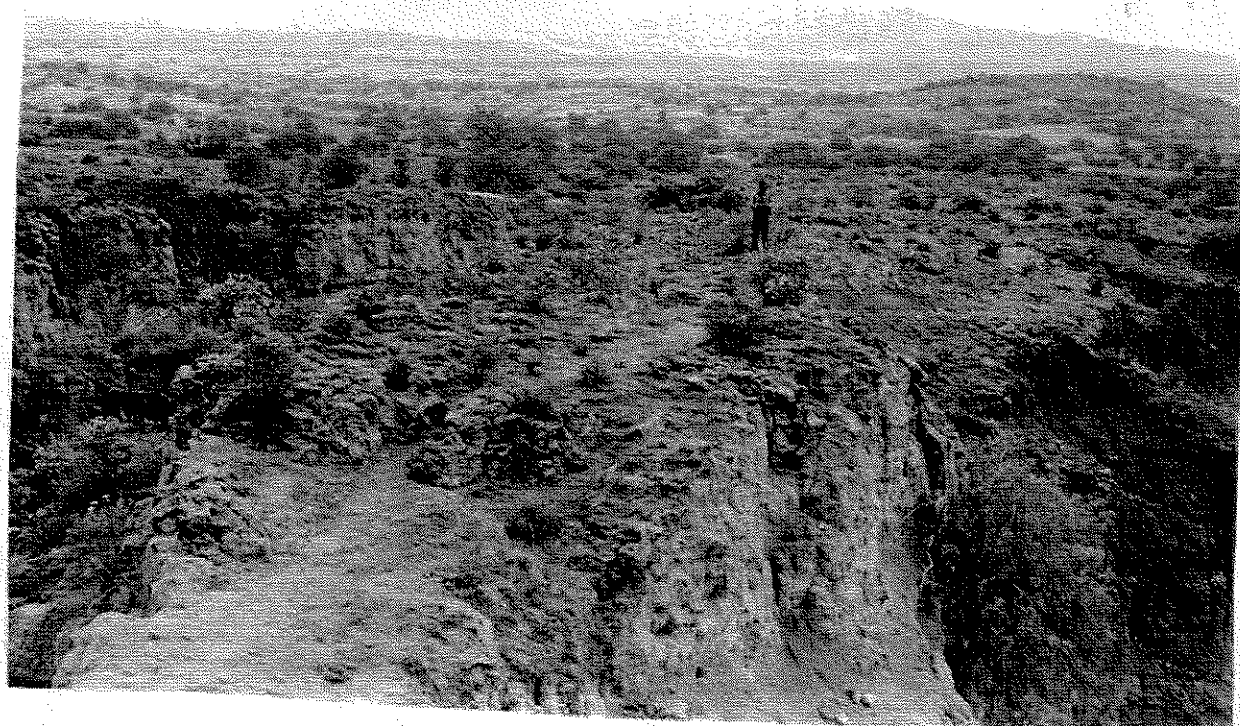
Plate 190

A

B

Plate 191

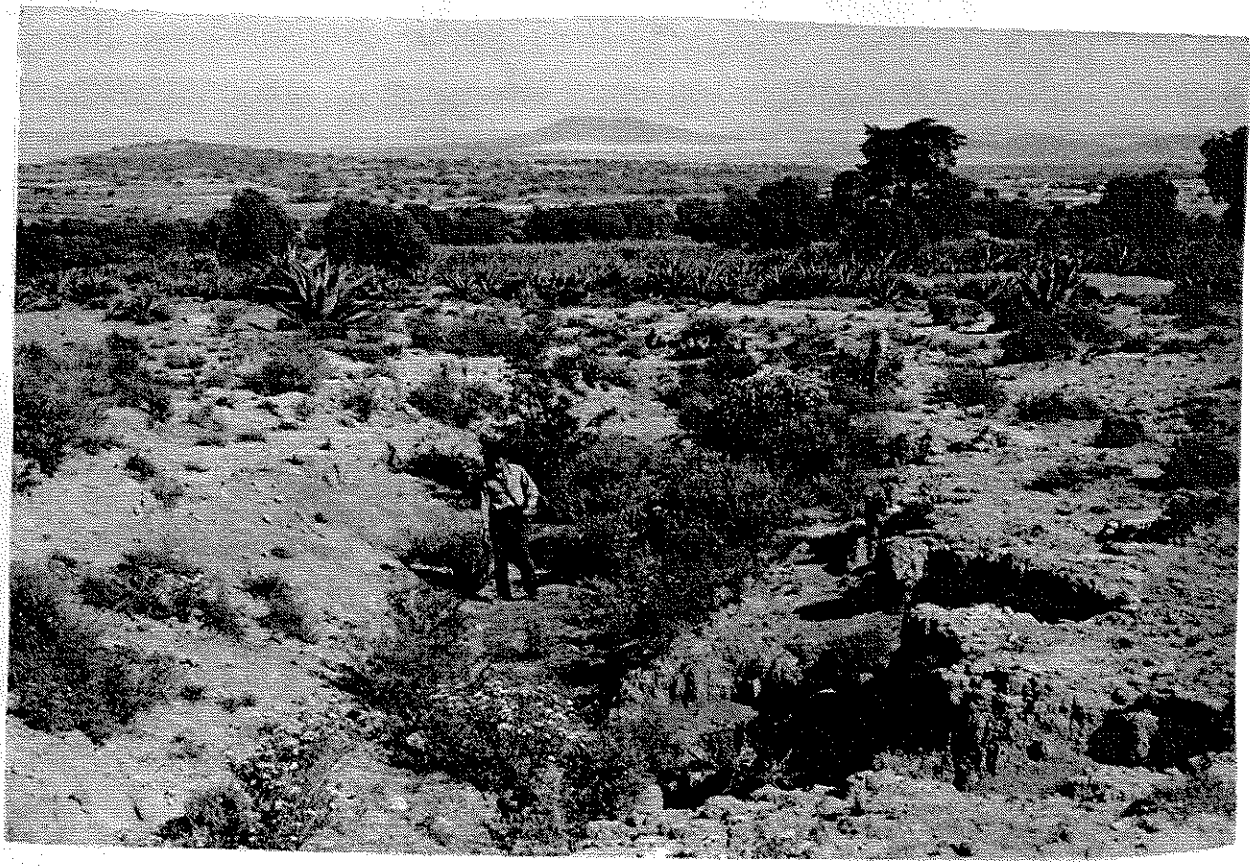
A



B

Plate 192

A



B

Plate 193

A

B

Plate 194

Appendix L
(Portions from Chapter III, Charlton's Dissertation)
(Within the Text We have Retained Charlton's Original Figure and Table Numbers.
For the Equivalences with Our Numbers see Page XXXV)

Tzacualli Phase

Tzacualli Phase sites in the Teotihuacan Valley outnumber sites of the earlier phases. The large site near the later Classic city increased in size during this phase.

> During the succeeding three (Tzacualli) terminal pre-classic phases a real population explosion occurred in the Teotihuacan Valley and the Patlachique village grew into a gigantic town covering some 700 hectares with a boundary partly coincident with a later Classic city but extending to the northwest well beyond its borders. Nearly all of the other sites are small hamlets scattered over the piedmont and slopes on the north side of the valley and along the piedmont of the south side but with a tendency to cluster around the central town in the middle of the valley. In other words the distribution of sites tends to reflect the later Classic settlement (Sanders 1964a: 18).

A similar expansion occurred within the survey area. No site comparable to the town site was found.

External Patterns

Seventy-five Tzacualli Phase sites are located within the area of intensive survey. Twenty-two are in the Teacalco sub-area, forty-nine in the Maquixco Alto - sub-area, and six in the Colhuacan sub-area (see Fig. 4) (1). Seventy-one sites are located in previously unoccupied sections of the survey area. All sites in earlier phases were situated above 2500 meters; forty-two Tzacualli sites are below that contour.

In the Teacalco sub-area the sites are strung out along the barranca edges, usually on the high ground above the slope. Nine sites within Ridge Four of the Maquixco-Alto sub-area are also along the barranca edges. Four are on or near the slopes of Cerro Tiquimil, and nine are strung out down the center of the ridge. Of the seven sites in Ridge One, two are on the slopes of Cerro Tiquimil, one is in the center of the ridge, one is on a barranca, and three are on the slopes of Cerro Aguatepec. One site in Ridge Two is situated on the slope of Cerro Tezqueme. The other eleven are between the two barrancas, on the slopes of Cerro Tezqueme or Cerro Teclalo. All six sites in Ridge Three are on the slope of Cerro Teclalo; two are also on a barranca edge. Five of the Colhuacan sub-area sites are on the center of the ridge proceeding from Cerro Gordo; the sixth is on the summit of Cerro Jaltepec.

Of some interest is the possible orientation of TF-46 and TF-48 to an ancient canal system which once diverted water from the Barranca San Jose to the Barranca Tecorral. Due to barranca bed erosion the inlet is now much above the water level. Today the canal conducts water from Cerro Aguatepec to the Maquixco Alto jaguey. A second canal inlet is visible on the other side of the barranca. This possibly diverted water through Ridge Two and back into the same barranca. In his discussion of these canals Sanders (1964b: 14) has suggested that they were constructed in the Tlamimilolpa Phase of the Teotihuacan Period, citing as evidence the large sites of that phase. It is also possible that they were built during the Tzacualli Phase, initiating a system of floodwater irrigation analogous to the system of permanent irrigation begun at Teotihuacan during the same phase (2).

Internal Patterns

All Tzacualli sites consist of sherds and rock concentrations, often with later occupations and in severely eroded areas. In the survey area there are no plans or structural remains available, but some information has been reported from the Teotihuacan Valley.

Structures - Millon and Bennyhoff (1961) excavated a number of Tzacualli Phase floors in the northwest portion of the city. Millon's survey (1964) has also yielded information on structures and plans.

1. Editors Note: Republished in Part 3, Volume 3 as Figure 237. For Place Names mentioned in the Text see Figures 22 and 32
2. Editors Note: Also Republished here from Sanders Et Al 1975 as Appendix K

In much of the area of the northwest extension of Tzacualli phase Teotihuacan, low mounds of varying size predominate. These give the impression of the former presence of structures of pole and thatch and wattle and daub rather than of stone, concrete and lime plaster, suggesting structures like those associated with earth floors in the Tzacualli phase deposits at Plaza 1 in Oztoyahualco . . . . (1964: 349).

On the basis of the Cuanalan house and the succeeding Miccaotli house plans, it is probable that the Tzacualli structures were also relatively small units. There are no ceremonial structures of this phase in the survey area.

Intra-Site Patterns - Sherd densities suggest settlements of a few widely spaced, small residential structures.

Inter-Site Patterns - The criteria of site size and site numbers in Table 2 present subtle patterns suggesting later Teotihuacan period developments.

Table 2 (Renumbered 104)
Tzacualli Phase Site Areas (Hectares)

Sub-area	0-1.0	1.01-2.0	2.01-3.0	8.01-9.0
Teacalco	18	3	1	
Maquixco Alto 1	4	1	1	1
Maquixco Alto 2	10	2		
Maquixco Alto 3	6			
Maquixco Alto 4	2	1		
Colhuacan	5		1	
Total	64	7	3	1

The Maquixco Alto sub-area has the most sites. Occupation fades off drastically to the east in the Colhuacan sub-area, and gradually to the northwest in the Teacalco sub-area. Except in Ridge One, the Maquixco Alto sites tend to be small and scattered. TF-46, an eight hectare site, dominates Ridge One, with TF-47 and TF-48. The total area occupied by the seven sites of Ridge One (14.22 hects.) is greater than that covered by twenty-two sites either in the Teacalco sub-area (12.79 hects.) or in Ridge Four (7.32 hects.).

Although most Tzacualli sites are similar to those of the preceding phases, the Maquixco Alto sites suggest the start of population centralization in Ridge One. This continues through the Teotihuacan Period.

The concentration of sites in the Maquixco Alto sub-area foreshows the heavy Teotihuacan occupation there. Teacalco sub-area sites are followed by a moderate Teotihuacan population, and the Colhuacan sub-area is abandoned at the end of Tzacualli.

<u>Summary</u>

External Patterns

All Pre-Tzacualli sites are situated above 2500 meters. Tzacualli sites occur through the entire survey area, at most elevations. In every phase, hill slopes, hill tops, barranca edges, and ridges, are foci of site location.

Internal Patterns

Structures - On the basis of limited evidence from the Teotihuacan Valley residences appear to have been small, single rooms, with associated out structures.

Intra-Site Patterns - Inferences from sherd densities and Teotihuacan Valley patterns suggest that sites of all phases were composed of several widely spaced, one room residences, each with associated structures.

Inter-Site Patterns - In the Pre-Tzacualli Phases, sites were too few to suggest any overall patterning. There is no evidence of community stratification. The Tzacualli sites show an increase in size and number. Ridge One of the Maquixco Alto sub-area was a focal point for the organization of larger sites. The other sub-areas were peripheral to this. The overall patterns in Tzacualli foreshadow the later patterns in the Teotihuacan Period.

Teotihuacan Period Settlement Patterns

Although final ceramic analyses have not been completed, a preliminary sorting of surface and excavation samples indicates that the following description is essentially correct. No doubt some changes will occur when Sanders has processed all the materials for the final report.

Miccaotli Phase

All Teotihuacan occupation in the survey area is restricted to the Teacalco and Maquixco Alto sub-areas. The Colhuacan sub-area remained abandoned until the Mazapan Phase of the Toltec Period. Outside of the survey area the eastern piedmont of Cerro Buenavista was also a focus of Teotihuacan occupation (see Fig. 5).

External Patterns

Twenty-two Miccaotli sites are in the Maquixco Alto sub-area, and six are in the Teacalco sub-area. The six Teacalco sub-area sites are all below 2480 meters. The upper slope of the ridge is completely abandoned. Five sites are on high ground above the barranca edges, the sixth being in the center of the ridge. Three of the eleven sites on Ridge Four of the Maquixco Alto sub-area are also on the center of the ridge. Two are along the barranca edge, and six are on or near the slopes of Cerro Tiquimil. In Ridge One, one site is on the lower slopes of Cerro Aguatepec, and three with part of a fourth are on the slopes of Cerro Tiquimil. Part of TC-46 is located within Ridge Two, between the barrancas. The six sites of Ridge Three are on the slopes of Cerro Teclalo, two also being on a barranca edge.

Except for the lower slope of Cerro Aguatepec, the hills in the upper section of the Maquixco Alto sub-area are not occupied. Miccaotli site locations remain virtually unchanged to the end of Late Tlamimilolpa. No new sites are established during the Teotihuacan Period, the only changes occurring through site expansion and abandonment. Such expansion takes place within the above site locations.

Internal Patterns

Structures - three types of structures have been reported for Miccaotli sites; residential structures, elite residential structures, and pyramid mounds. Anthony Senulis excavated a small Miccaotli residence in TC-49 during July 1963. No reports have been prepared on this excavation but my own notes indicate that it was a small, stone based structure, about two by two and one-half meters in size. Construction techniques were crude (3).

No elite residential structures were excavated, but they are known or indicated from surface ceramics and mounding in TC-40. The low, compact house mounds associated with Mounds 1, 2, and 3 probably began in Miccaotli (see Fig. 7a-b). Their exact nature is not known but they possibly were similar to the "palaces" excavated at Teotihuacan.

Pyramids 1, 2 and 3 must have had their beginning in Miccaotli times. The final forms date from Late Tlamimilolpa and I shall describe them later. Similar pyramidal mounds, though smaller and in poor conditions, are located in TC-42 and TC-49. These too possibly began during the Miccaotli Phase.

Intra-Site Patterns - Due to later occupations and natural destruction it is difficult to provide detailed descriptions of Miccaotli Phase sites. The following observations on intra-site patterns are based on ceramics and fragmentary structural remains. The majority of the population continued to live in single roomed structures similar to those of the Pre-Classic. Instead of being widely spaced within each site, however, these were tightly grouped within both large and small sites.

In TC-40 there is evidence suggesting the establishment of a ceremonial precinct of pyramids and elite residences surrounded by smaller residences. TC-42 and TC-49 may have had similar precincts.

3. Editors Note: A Final Report has been Published in this Volume, Part 1

Inter-Site Patterns - Using the criteria of site size and presence or absence of ceremonial structures there emerge two types of site; small under 2.25 hectares and residential in nature; large over 2.25 hectares, at times with ceremonial structures. TC-40, TC-42, TC-49, TC-46, and TC-58 are large sites. The first three have indications of ceremonial structures. The remaining twenty-three sites are small.

The pattern of relations between these types began in Tzacualli, emerges in Miccaotli, and crystallizes in Early and Late Tlamimilolpa. Around four of the large sites have located around them a number of smaller sites. TC-47, TC-48, and TC-66 are near TC-40, and TC-41 and TC-74 are neighbors of TC-42. TC-46 is centrally located with reference to TC-49 and TC-58. In addition there are nine small sites around it and nine around TC-49.

The pattern of a large central site with several smaller sites arranged near or around it persists to the end of Late Tlamimilolpa. The total occupied area of Miccaotli sites is 42.22 hectares, slightly less than the 45.18 hectares covered by Tzacualli sites. Both density and site size are greater while total site number is reduced.

Early and Late Tlamimilolpa Phases

External Patterns

At the end of the Miccaotli Phase one site on Cerro Teclalo was abandoned. This was followed by three more at the end of Early Tlamimilolpa. Except for this partial abandonment of Cerro Teclalo site locations remained stable (see Figs. 8 and 9).

Internal Patterns

Structures - Residential structures, elite residences, and pyramids continue through the two phases. Excavations in TC-46 revealed two residential structures with Late Tlamimilolpa and Early Xolalpan occupation. Although only portions of each structure were preserved and excavated, they suggested the presence of multi-roomed houses with patios. Both excavated structures were similar in form to the residences at TC-8, but the techniques of construction were poorer, as were the materials used.

No elite residences were excavated, but both surface traces of finer materials and pitting by local peasants attest to the presence of such structures. TC-40 and TC-49 have good indications of such residences, and traces have been found in TC-42 and TC-46. Mural fragments were recovered in TC-73, out of the survey area. These residences were probably similar in ground plan to the excavated residences, but were constructed with greater care and finer materials.

Rectangular or square platform mounds, higher and smaller than residential mounds, are found in TC-40, TC-42 (Figs. 7a-b, 10a-b), and TC-49. Those on the first two sites are best preserved. Although it is not absolutely certain, these mounds probably served as bases for temples and other structures which were foci of religious activities. Pitting in Mound 1, TC-40, revealed a lime plastered tezontle (volcanic ash) floor over earth and rubble fill. The mound originally was stone faced. On Mounds 2 and 3, stairs are still evident. Similarly constructed mounds are present in TC-42, and possibly TC-49. This site has few remaining surface structures due to extreme destruction. Both TC-58 and TC-46 have been eroded and cultivated to such a degree that all surface structures have been destroyed. None of the smaller sites had any traces of surviving structures.

Intra-Site Patterns - The large multi-room residence became standard in both large and small sites. The evidence for the small site is not conclusive, due to the fragmentary remains, and it is conceivable that the small, single room residence persisted there. Mounding and excavations in the large sites confirm the existence of the multi-room residence.

In three large sites that is evidence suggesting the presence of a ceremonial precinct, with platform mounds and elite residences, larger than in the Miccaotli Phase. Of TC-40, TC-42, and TC-49, only the first two have adequate surviving structures to suggest any overall plan for the phases. In TC-40 the nine platform mounds and the residential mounds are aligned in a grid plan, established over at least the central two thirds of the site area (see Figs. 7a and 7b). Incorporated into the grid plan is a series of plazas or forecourt before six of the mounds. A similar, though much smaller, plan is present at TC-42 (see Figs. 10a and 10b). This covers only the eastern third of the site area. It is probable that the grid plan was first used during Early and Late Tlamimilolpa. It could have coincided with the introduction of the multi-room residence to the majority of the population.

Inter-Site Patterns - Although these remain essentially the same as in Miccaotli, the large sites increase in area occupied, and the small sites remain static, some being abandoned. At the end of Early Tlamimilolpa the large sites covered an area of 60 hectares of a total 73.82 hectares occupied, and 61.92 hectares of 72.73 occupied at the end of Late Tlamimilolpa. These phases mark the greatest extent of Teotihuacan occupation in the area of intensive survey. Outside the area TC-73 also underwent a similar growth, and became a small version of the city of Teotihuacan.

Early Xolalpan Phase

External Patterns

At the end of Late Tlamimilolpa three of the Teacalco sub-area sites and fifteen of those in the Maquixco Alto sub-area ceased to be occupied (see Figs. 9 and 11). Ridge Three of the Maquixco Alto sub-area was entirely abandoned. The ridge center and the Tecorral-Teclalo barranca edge were similarly deserted in the Teacalco sub-area.

Internal Patterns

Structures - Site size and numbers were reduced at the end of Late Tlamimilolpa. In TC-46 residential structures continued to be occupied into Early Xolalpan. It is probable that little construction was undertaken during both Xolalpan Phases. Pyramids and elite residences continued to be used in the occupied areas of sites with little change. No purely Xolalpan structure is known from any site.

Intra-Site Patterns - Although the total occupied area within all sites decreased, the pattern of occupation remained the same as in the preceding phases.

Inter-Site Patterns - Except for TC-41 all small sites were abandoned at the end of Late Tlamimilolpa. The five large sites remained occupied, though much reduced in area. The total area occupied by Early Xolalpan sites was 27.12 hectares. The inter-site patterns of the preceding phases were dramatically altered with the sudden loss of sites and occupied area.

Late Xolalpan Phase

External Patterns

Site reduction and abandonment continued through Early Xolalpan resulting in the continued occupation of only two sites in Late Xolalpan, TC-40 and TC-49. Both are on ridge tops, near barrancas; one is in the Teacalco sub-area, the other in Ridge Four of the Maquixco Alto sub-area (see Fig. 12).

Internal Patterns

Structures - No excavations were conducted within the survey area. It is probable that in this phase all structural types of the Tlamimilolpa Phases continued in use. Surface survey at TC-73, which has a heavy Xolalpan occupation, suggests that no new structures were added.

Intra-Site Patterns - Only the central areas of the two sites, near the ceremonial structures, were occupied. Density of occupation remained constant, although each site covered only 2.25 hectares. No unaligned structures obscured the grid pattern in TC-40.

Inter-Site Patterns - Two large sites, one with a definite ceremonial precinct, the other with a possible ceremonial precinct, survived into Late Xolalpan. The reduction, beginning at the end of Late Tlamimilolpa, continued into Late Xolalpan. The earlier patterns were almost eliminated. The site reduction within the survey area corresponds with developments at TC-73.

> The reduction of the population in our 8 km. sq. survey strip during Xolalpan times coincides with the growth of a big town site (TC-73) located 2.3 km. to the northeast. This site . . . was settled during the general Miccaotli-Tlamimilolpa period, when it was apparently a village comparable in size to TC-42, 49, 58. In the Xolalpan phase, it expanded into a town site with a ceremonial precinct larger than TC-40, and a dense gridded residential area. In other words, the demographic trends are reversed. It is our contention that the growth of this town and the decline in population in the 8 km. sq. survey strip is consistent with the general trend of increased nucleation characteristic of the general Teotihuacan period and that there was a population movement from the villages to the town TC-73 (Sanders 1964b: 14-15).

Metepec Phase

No Metepec occupation have been encountered in the survey area. A small Metepec occupation occurs at TC-73.

<u>Summary</u>

External Patterns

Site locations remained stable from Miccaotli through Late Xolalpan. Although no new sites were established, some sites increased or decreased in size, and some were entirely abandoned. Concentrations of sites occurred in the central section of the Maquixco Alto sub-area, and in the lower portions of the Teacalco sub-area. Many locations selected for occupation in the Tzacualli Phase were abandoned in the Teotihuacan Period. The external foci for site locations remained the same; hill slopes, barranca edges, and ridge tops.

Internal Patterns

Structures - The Pre-Classic house type, a small, one room structure, persisted into Miccaotli. At this time pyramids and elite residences were added to the inventory of structures. These persisted to the end of Late Xolalpan in the survey area. The house type, however changed. By Late Tlamimilolpa the single room structure had been replaced by a multi-room residence with interior patios. This type probably persisted to the end of Late Xolalpan.

Intra-Site Patterns - Although the residence type persisted into Miccaotli, internal arrangements did not. The residences became closely spaced, in both small and large sites. Density increased, and persisted with the multi-room house to the end of Late Xolalpan.

The pyramids and elite residences, when present, were centrally located, surrounded by residential structures. In two sites a grid plan appeared during the Tlamimilolpa Phases.

Inter-Site Patterns - On the bases of size and presence or absence of ceremonial structures, sites sorted into two types, large and small. Four of the five large sites had from two to nine small sites around them. By Late Tlamimilolpa some of the smaller sites had been abandoned. In Early Xolalpan only one was still occupied, along with a partial occupation of the five large sites. In Late Xolalpan only two of the latter were occupied. Both were abandoned before the Metepec Phase. The growth of TC-73 during Xolalpan was probably at the expense of the survey area sites.

The settlement pattern trends on the north slope of Cerro Gordo match the patterns in the Teotihuacan Valley. The city was the largest site in the valley, surrounded by a number of smaller sites. A similar pattern, comparable to that in the survey area, was found in the east of the valley, with smaller centers surrounded by still smaller sites. From Tzacualli through Late Tlamimilolpa the trend in the city and in the survey area was the same; an increase in site size and density. A grid plan was centrally applied to the city. In Xolalpan there was a reduction in area covered and the extension of the grid plan to most of the site area. This is paralleled by the growth of TC-73 with the population of the survey area. In the Metepec Phase there was a final period of growth, and the appearance of large numbers of sprawling settlements on the periphery of the city. TC-73 apparently contributed to this growth, as did the remaining settlements in the Teotihuacan Valley (4).

4. Editors Note: Some of Charlton's conclusions as to the history of the area as with Sanders's field report (here published as Appendix J) are now altered with respect to the Cerro Gordo North Slope Area (see this volume Chapter 8) and with respect to Teotihuacan itself (see Millon's and, Millon et. al's various publications listed in this volume Bibliography

DETAILED SITE MAP SYMBOLS

- Barranca
- Residential Structure
- Ceremonial Mound
- Plaza
- Street

OCCUPATION BOUNDARIES

- Miccaotli
- Early Tlamimilolpa
- Late Tlamimilolpa
- Early Xolalpan
- xxxxxxxxxx Late Xolalpan
- Mazapan
- Aztec

DETAILED TOWN MAP SYMBOLS

- Barranca
- Residential Area
- Maquixco- Core Area
- Lot Boundary
- Terrace
- Path
- Simpie Residence
- Walled Residence
- Occupied
- Unoccupied
- C Church
- D Delegación
- J Jaguey
- M Mill
- P Plaza
- S School
- W Well

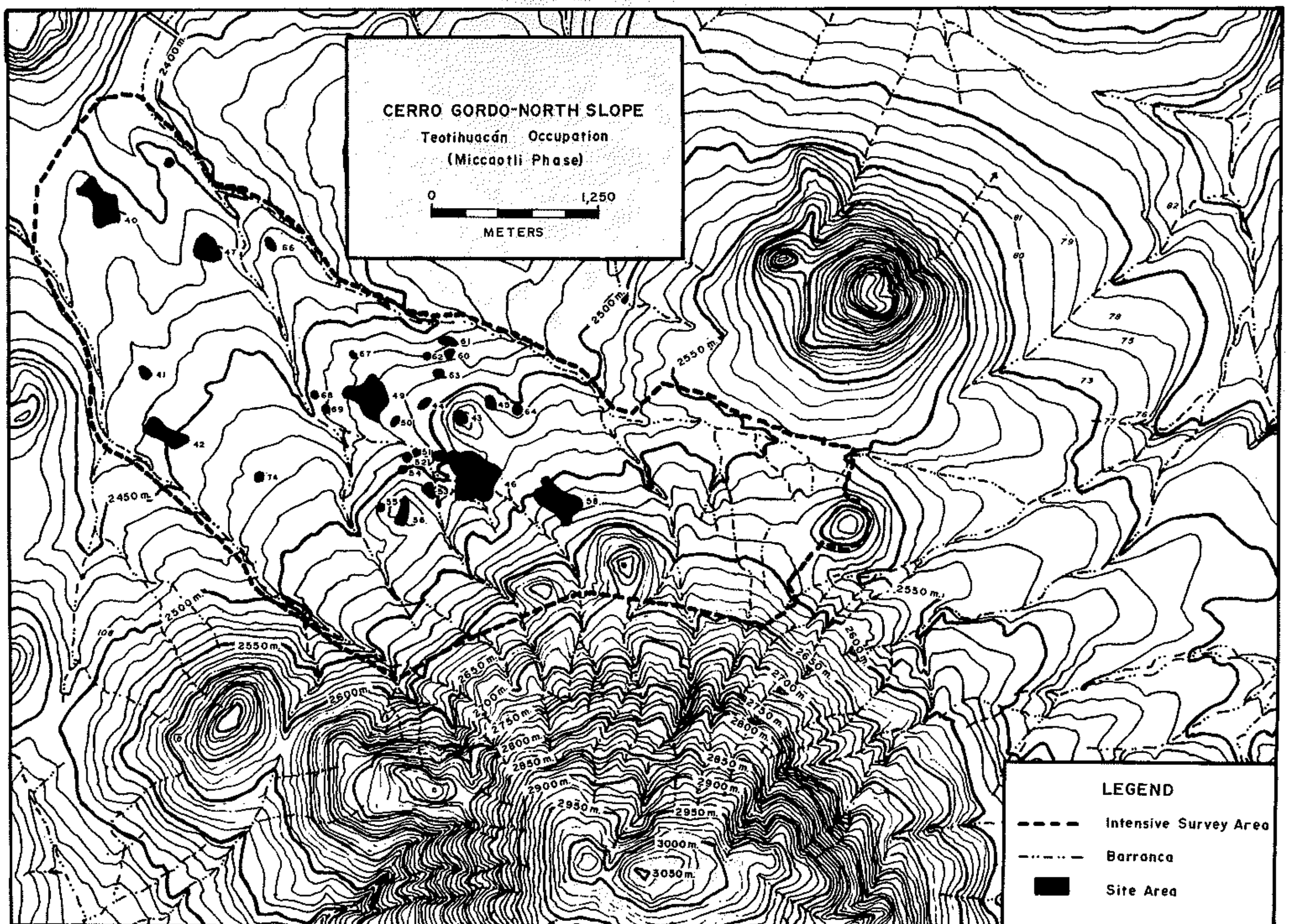


Figure 308 (from Charlton 1966)

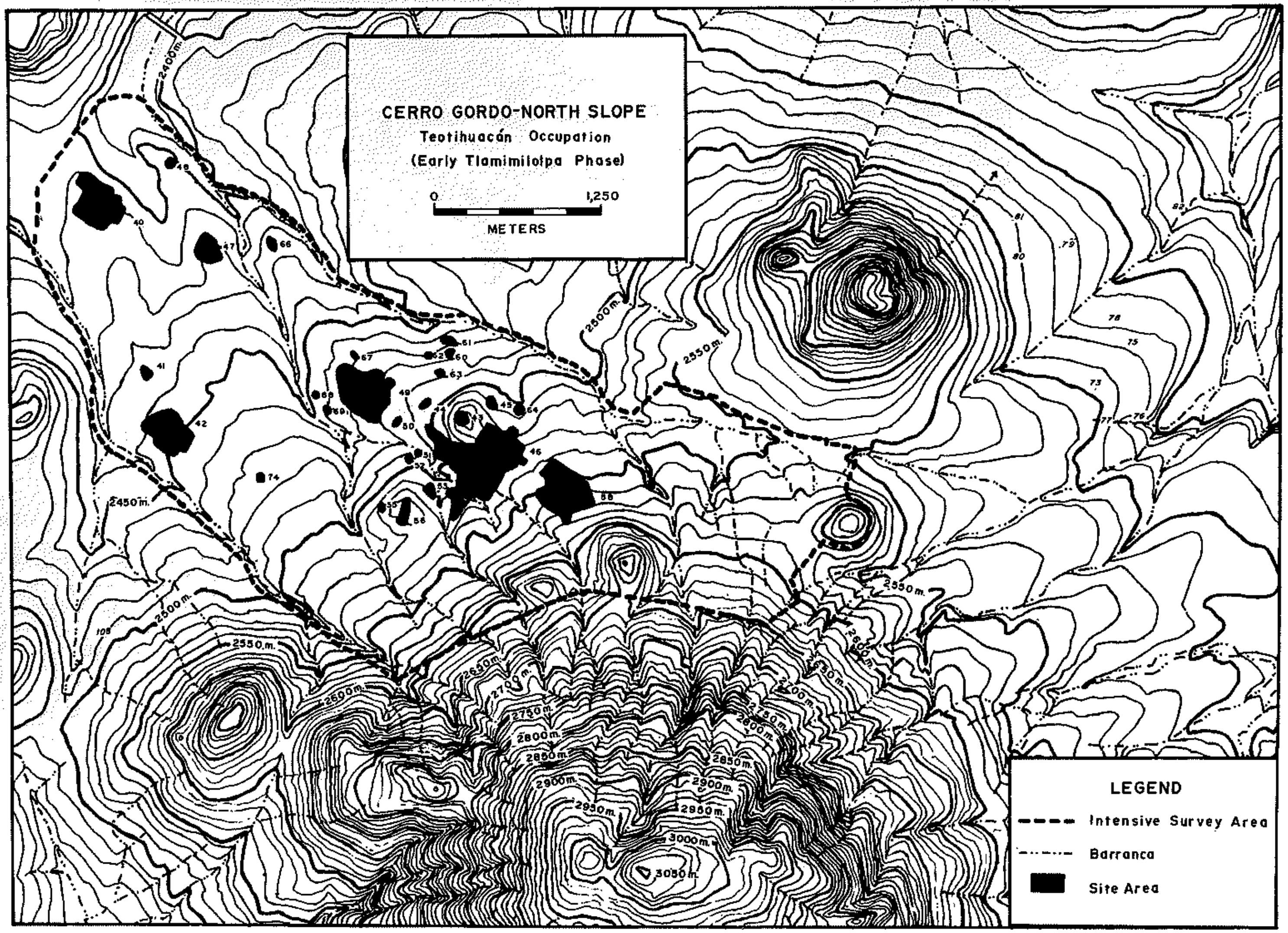


Figure 309 (from Charlton 1966)

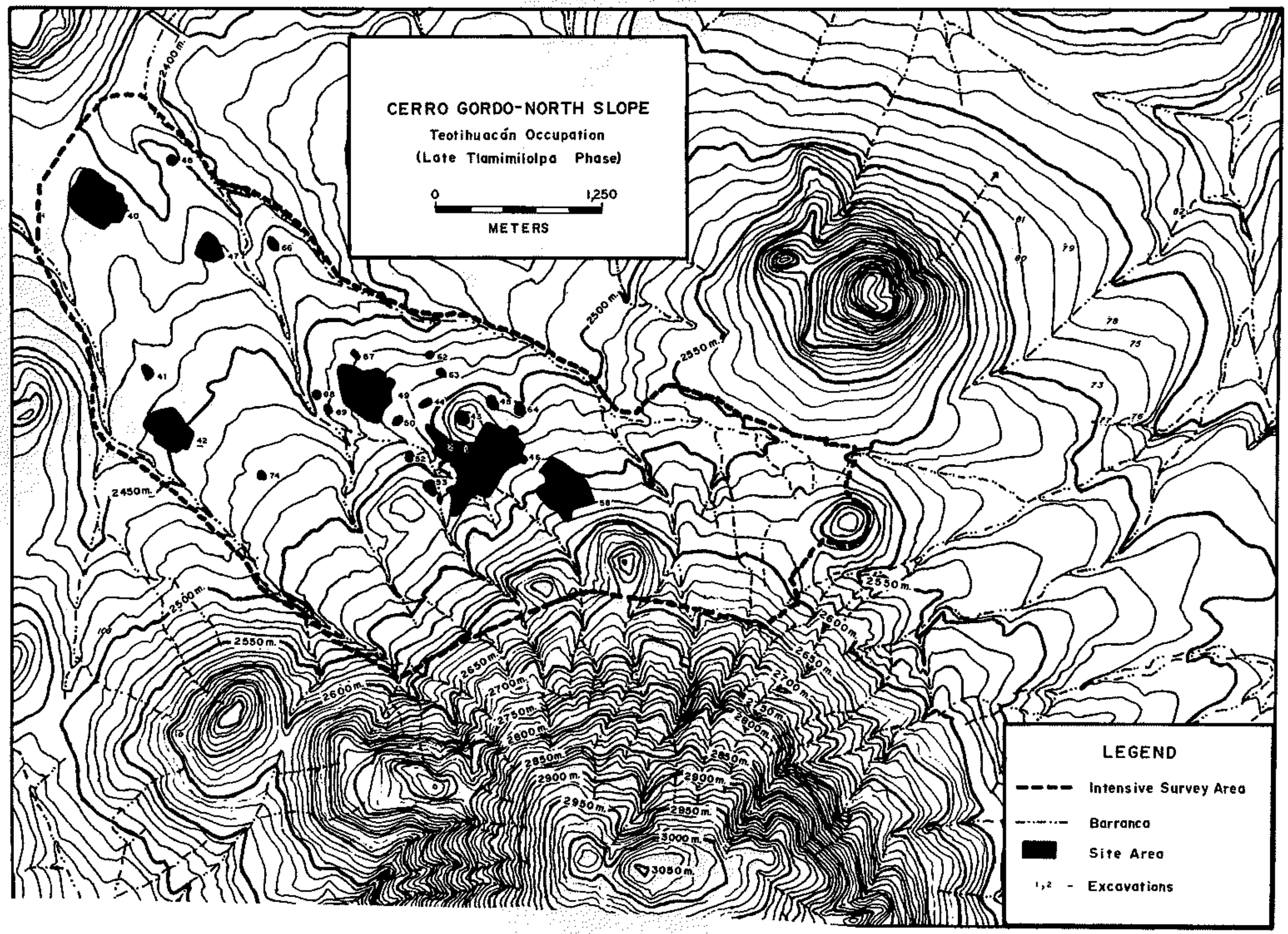


Figure 310 (from Charlton 1966)

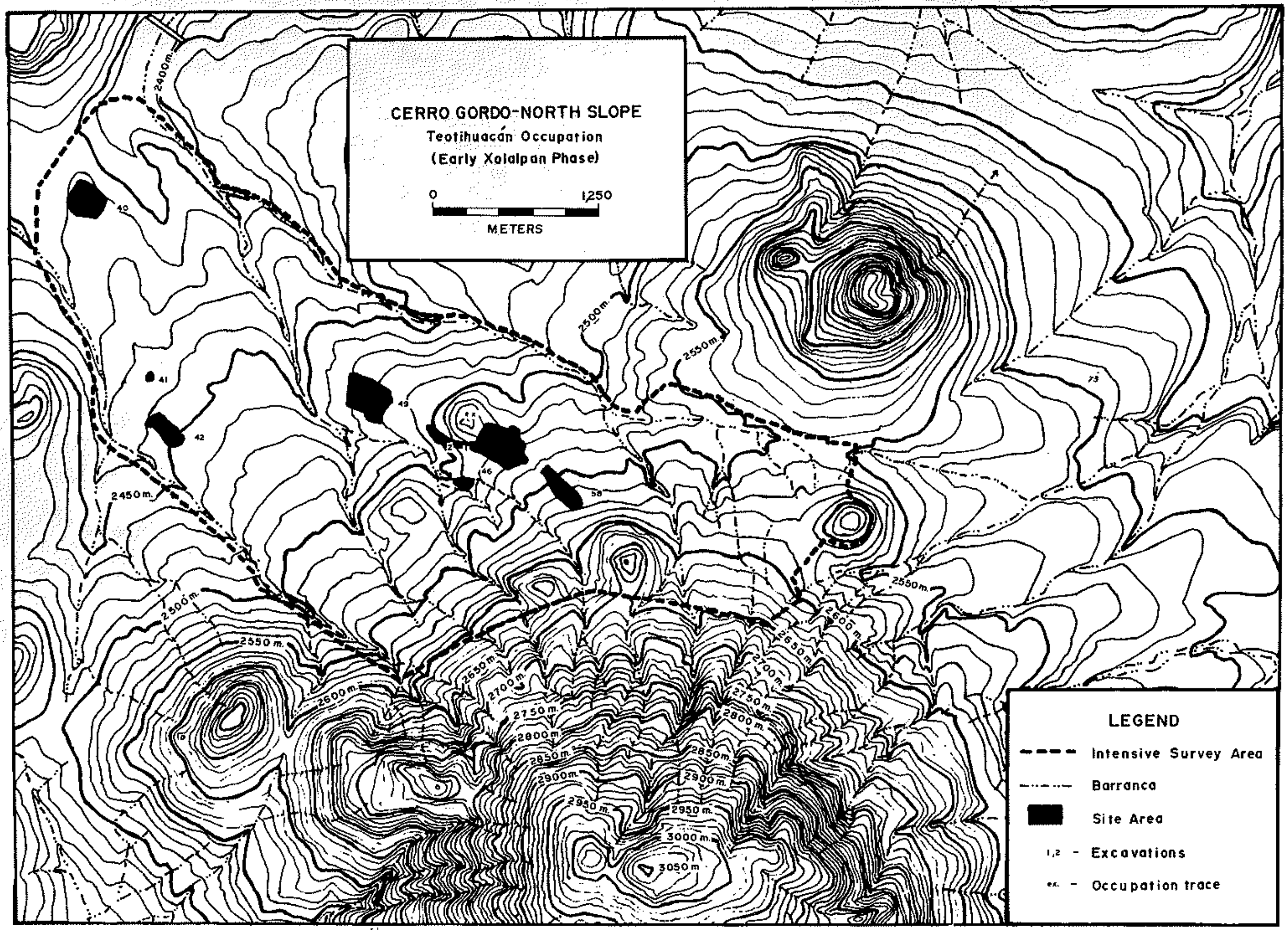


Figure 311 (from Charlton 1966)

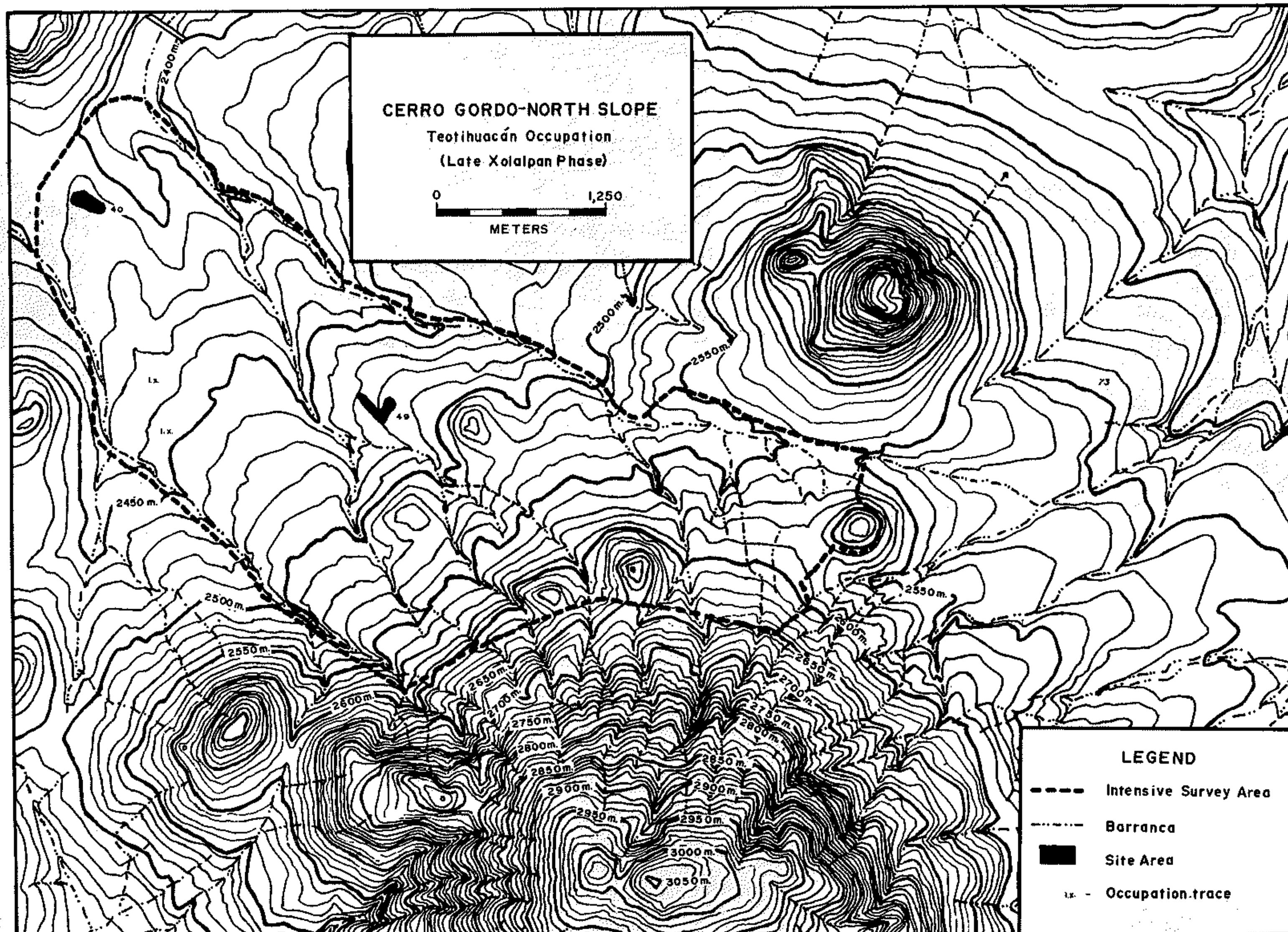


Figure 312 (from Charlton 1966)

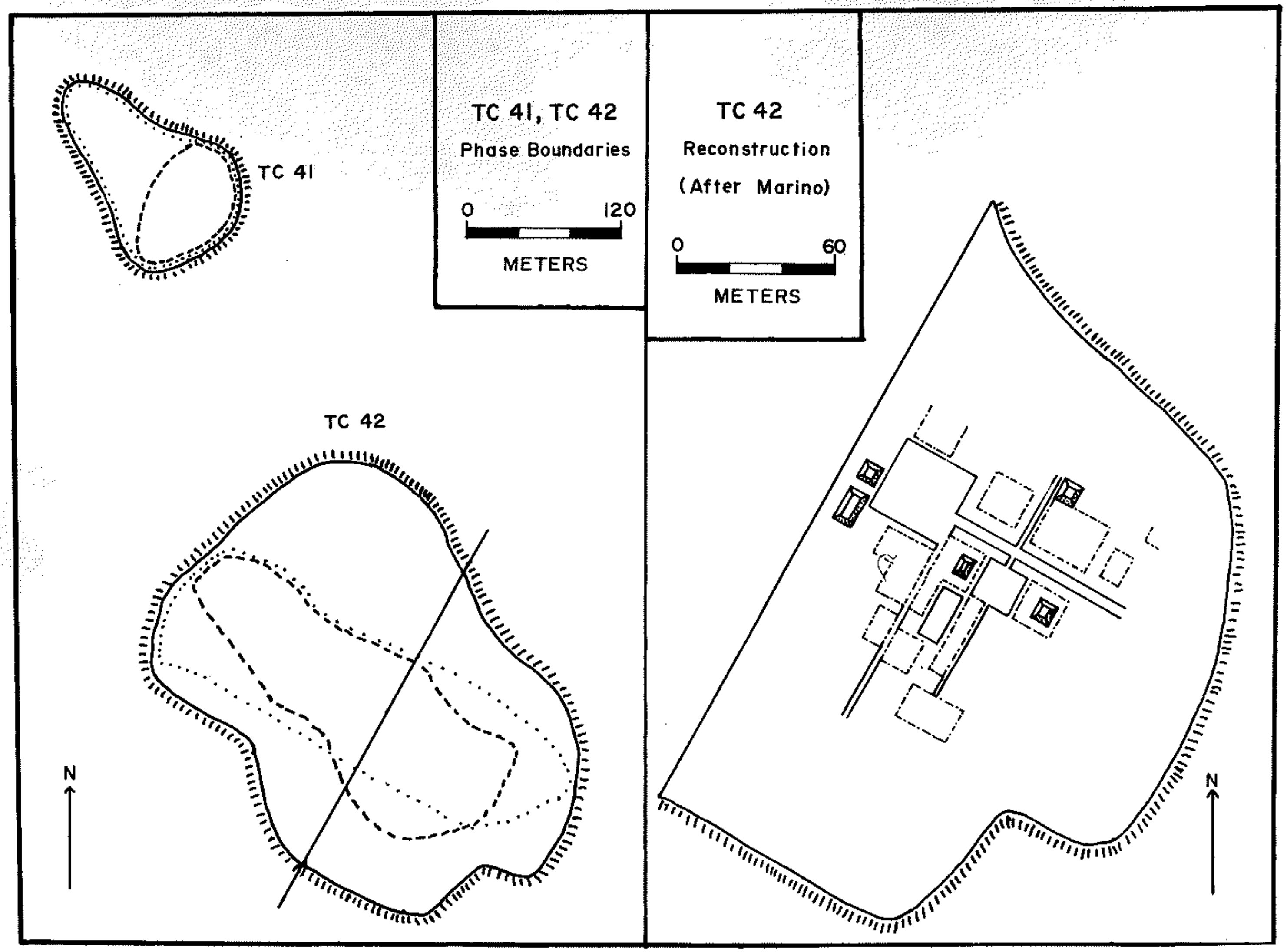


Figure 313 (from Charlton 1966)

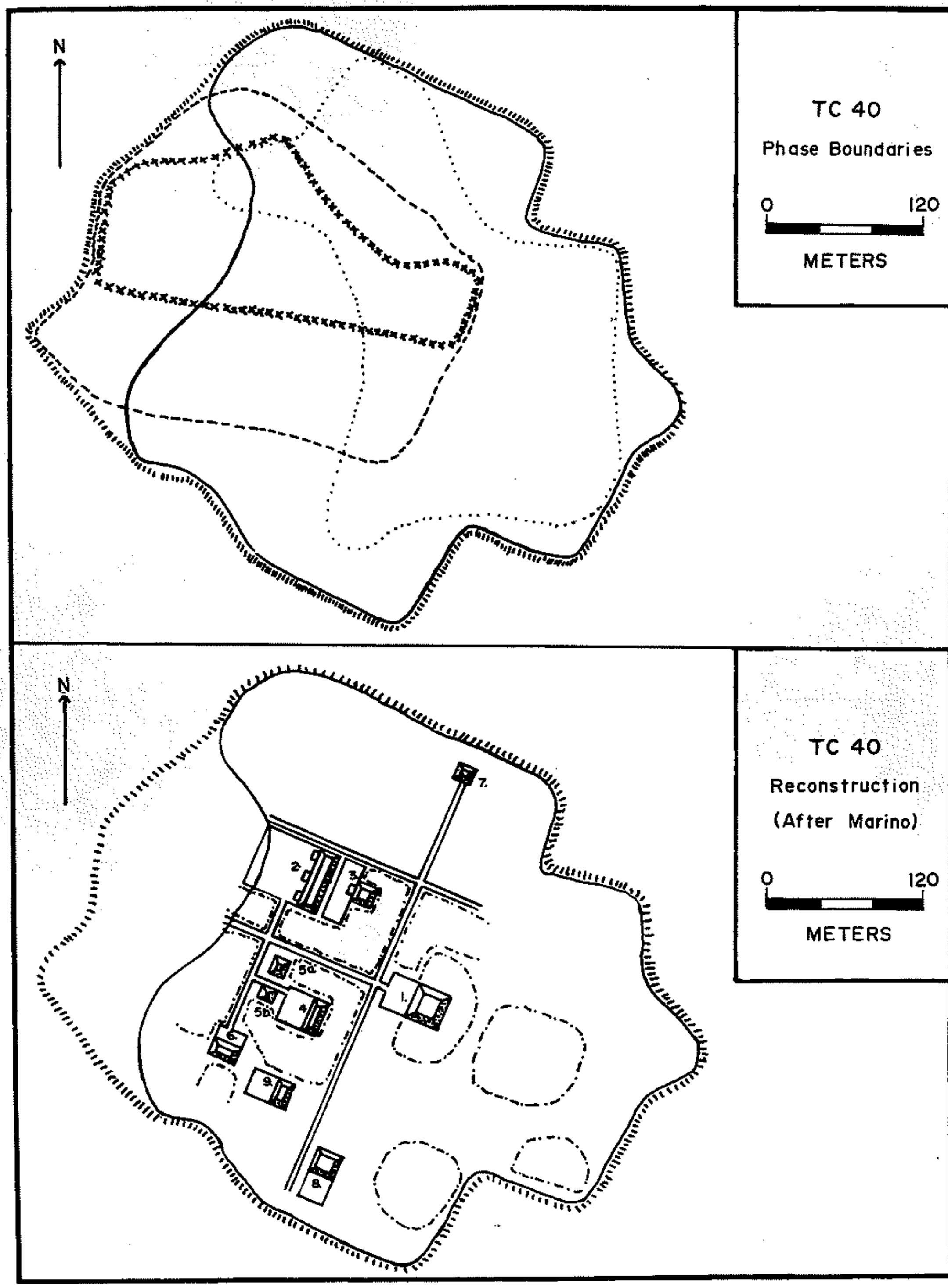


Figure 314 (from Charlton 1966)

Appendix M

Marine and Fresh Water Molluscs From Rural Teotihuacan Sites
(By Charles C. Kolb)

Seventeen genera and/or species of marine and riverine (fresh water) molluscs have been identified from excavations and surface reconnaissance in the Teotihuacan Period sites in the rural areas of the Teotihuacan Valley during the investigations by Sanders and others from 1960-1965 (Sanders 1965, Sanders et al. 1970). These specimens included ten Gastropoda (four species from the Panamanian Marine Faunal Province [Pacific Coast], four species from the Caribbean Marine Faunal Province [Gulf Coast], and two genera from either/or the Panamanian or Caribbean Provinces), and seven Pelecypoda (four species from the Panamanian Marine Faunal Province [Pacific Coast] and three species which have riverine habitats). Molluscs were recovered from eight of 133 Teotihuacan Period sites (TC-2, 8, 10, 13, 40, 49, 73, 91), including three excavated or tested sites (TC-8, 10, 49). Specimens were recovered from Teotihuacan Period Sites in the following ecological zones of the Teotihuacan Valley (Sanders 1965): Delta (TC-10), Lower Valley (TC-2, 8, 13), Upper Valley (TC-91), and North Slope of Cerro Gordo (TC_40, 49, 73). These data are summarized in Table 105.

A total of 4200 worked and unworked mollusc shells and fragments composed the analytical sample. The identifications of the marine and riverine specimens were initially undertaken by myself in 1962, and were continued by Lawrence H. Feldman (1965, n.d.), when a graduate student in anthropology at the Pennsylvania State University, who analyzed approximately fifteen per cent of the sample. The unstudied materials and those previously classified were examined by Dr. Harold S. Feinberg, Assistant Curator, Department of Living Invertebrates, American Museum of Natural History, New York (1971, 1972, 1973). Frinberg freely gave valuable assistance on identification procedures, data reliability, and problems of classification taxonomy. His assistance is gratefully acknowledged, especially for his clarification of the Spondylus calcifer Carpenter, 1857, Spondylus princeps Broderip, 1833 (both Panamanian Marine Faunal Province species), and Spondylus americanus Gmelin, 1791 (the Caribbean Marine Faunal Province species).

Of the 4200 specimens from Teotihuacan Period sites, only eight had been obtained from surface reconnaissance collections, while the remaining 4192 specimens came from the four excavated sites and had the following distributions: Site TC-8 (Santa Maria Maquixco el Bajo), mounds TC-8:1-2, 3 and 4, a total of 4188 specimens (Classes: Gastropoda 11, Pelecypoda 4148, indeterminate 29; Ranges: Caribbean M. F. P. 5, Panamanian M. F. P. 4138, Caribbean or Panamanian M. F. P. 30, Fresh Water [Riverine] 15). Site TC-10:B (Venta de Carpio), a total of three specimens (Classes: Gastropoda two, indeterminate one; Ranges: Caribbean M. F. P. one, Caribbean or Panamanian M. F. P. two). Site TC-49 (Tenango 1-3), a single specimen (Class Pelecypoda, Range Fresh Water [Riverine]).

The bulk of the sample was from the TC-8 site excavations. Of the 4188 shells recovered from the TC-8 site excavation, the vast majority came from one mound, and specifically two rooms of that mound. The TC-8:1-2 excavation produced 215 specimens (Class: Gastropoda 6, Pelecypoda 202, indeterminate 7; Range: Caribbean or Panamanian M. F. P. 8, Panamanian M. F. P. 199, Fresh Water [Riverine] 8). Mound TC-8:3 yielded 3927 specimens (Class: Gastropoda 4, Pelecypoda 3902, indeterminate 7; Range: Caribbean M. F. P. 4, Panamanian M. F. P. 3895, Caribbean or Panamanian M. F. P. 21, Fresh Water [Riverine] 7). Mound TC-8:4 produced 29 specimens (Class: Gastropoda 1, Pelecypoda 28; Range: Caribbean M. F. P. 1, Panamanian M. F. P. 28). No specimens were recovered from the pyramid excavations, but Spondylus calcifer Carpenter, 1857 shells were observed there in a resurvey during the summer of 1972 because of the clandestine digging of pits by looters between 1970-1972. Seventeen additional shell specimens had been excavated in 1961-1962, but had lost provenience designations (Class: Pelecypoda 16, indeterminate 1; Range: Panamanian M. F. P. 16, Caribbean or Panamanian M. F. P. 1)

Therefore, of the 4188 specimens excavated at the site, one genus and species, Spondylus calcifer Carpenter, 1857, dominated the excavated sample, comprising 4084 specimens (97.52%). Spondylus calcifer Carpenter, 1857, was represented as follows: TC-8:1-2, 194 of 215 specimens; TC-8:3, 3862 of 3927 specimens; and TC-8:4, 28 of 29 specimens. Of the 3862 shells, whole or fragmented, from TC-8:3, 3817 were found in or immediately adjacent to Room 2-3, while the remaining 45 were scattered throughout the Central Court or other architectural units.

Four Spondylus calcifer were found in an offering (Feature 10) sealed beneath the plaster floor of the Central Court at the northeast corner of the altar platform. These shells, with three "jadeite" (green stone) beads, disintegrated bird or rodent (?) bone, and sand were contained in a complete burnished tan cooking pot which had a similar but smaller vessel inverted as a cover. These vessels dated to the Early Tlamimilolpa Phase, and the offering was probably connected with the commemoration of the altar or the house itself. The ceramics from the dwelling indicated an occupation from Miccaotli and Early Tlamimilolpa through Metepec Phases, with a later occupation in Aztec III-IV and into early Hispanic colonization (i.e. 150-750 A.D. and ca. 1400-1560). No other features or offerings at TC-8 contained marine shell, nor did any of the 21 burials, representing 40 individuals (31 unsexed, 3 males, 6 females; 20 adults, 20 children, who were both Teotihuacan (13 individuals) and Aztec (27 individuals) (Kolb and Bilharz 1972).

Room II of TC-8:3 spatially comprises 22.08 m2, and of the 3817 Spondylus calcifer Carpenter, 1857, were found in the room near or on the floor, or within two meters surrounding this architectural unit. Literally there was more shell than earth in many of the excavated squares. Approximately 4100 potsherds (no complete vessels) were recovered in levels in or adjacent to the room, and only about eight per cent were Aztec. The levels immediately above and on the floor overwhelmingly contained Teotihuacan ceramics of the Early and Late Xolalpan Phases (ca. 450-700 A.D.). The few Aztec sherds may be accounted for by rodent activity and the planting of maguey (Agave americana) during the early years of this century (ca. 1905-1910). The Santa Maria Maquixco el Bajo site, TC-8, is the ceramic type site for the Late Xolalpan Phase in the Teotihuacan Valley (Kolb 1965a, 1967a; Bennyhoff 1966; Muller 1966c). Ceramic figurine and architectural associations with the Spondylus calcifer suggest an Early and/or Late Xolalpan chronology (ca. 450-700 A.D.). In the midden deposit immediately south of Room II; two sherds attributed to the Classic Maya were found. These have been examined by the late James Gifford (1971, 1972), R. E. W. Adams (1972), T. Patrick Culbert (1972), Robert Rands (1972) and Robert Sonin (1972). They unanimously agreed to an Early Classic Lowland Maya origin (Kolb 1972b), and Culbert suggested specifically Mojara Orange Polychrome,, Mojara Variety, reported from Altar de Sacrificios (R. E. W. Adams 1971:36, 126-127). Gifford (1972: personal communication) saw "direct comparison counterparts at Barton Ramie." These sherds were associated with a Teotihuacan Period carved tepetate brasier in the form of the deity Huehueteotl, which was in fragments. Also nearby was a frontal cranial fragment which evidenced frontal (or fronoto-occipital) cranial flattening or deformation, a characteristic of the Lowland Classic Maya (Bilharz 1972, Kolb and Bilharz 1972). Millon (1964:351, 1967a:45) has reported Maya Tzakol sherds near the eastern and northwestern edges of the urban center, while Linne (1934:96, 153; 1942:98, 186) noted "Maya style" sherds at Xolalpan, and recovered "Peten Maya" ceramics in a sealed deposit at the Tlamimilolpa site.

Just to the north of Room II at the edge of the Alley I and Patio I a rim sherd identified by Phil Weigand (1972: personal communication) was recovered. He stated that it ". . . appears to be from the Chalchihuites area, during the Classic." Five other sherds from western Mexico (Jalisco, Nayarit, Zacatecas) dating to the Teotihuacan Period, and one other Lowland Maya sherd dating to the Teotihuacan Period were recovered from the TC-8 site excavations. Chronologically the time period from 400-800 A.D. is suggested for these "foreign" intrusions. Monte Alban III-A and III-B and some Huastec III (Tajin) and other Gulf Coast ceramics of the Classic and Late Post Classic also were recovered at Tc-8 (Kolb 1972). The "foreign" Classic period ceramics suggested a strong orientation to western Mexico and the Valley of Oaxaca, but the Monte Alban ceramics probably were local Teotihuacan productions (Harbottle 1973). A ceramic marine bivalve, possibly a Pecten, was also recovered from TC-8:3, and is considered in another section of this report.

The chronology and "foreign" associations suggest that the Late Teotihuacan occupations of TC-8, or specifically those of Mound 3 (TC-8:3) functioned as trade "middlemen" in the importation of Pacific Coast marine shell, especially Spondylus calcifer Carpenter 1857, to Teotihuacan and were possibly involved in the subsequent market distribution to artisans at the urban center. The Mound 3 inhabitants may have been pochteca long-distance merchants charged with the importation of this shell in its raw form to be distributed to artisans who worked the shell into ornaments (beads, pectorals, bracelets, etc.). A distinct alternative would be that the Maquixco TC-8:3 inhabitants were collecting shells as tribute from west Mexican polities, and may have been "tax collectors." Only one Spondylus tubular bead was recovered at Maquixco in TC-8:1-2, and was in a Teotihuacan Period deposit. It would appear that the shell was not being worked by artisans at the TC-8 site. I have observed fragmentary specimens of Spondylus calcifer Carpenter 1857 in areas of the Great

Compound, which Millon identifies as the market for the urban center (1966b, 1967b). Lithic sculptures of Spondylus are well-known from the Templo de Quetzalcoatl in the Ciudadela (Rubin de la Borbolla 1947:64-65). It is important to recall that the Maquixco site is five kilometers due west of the Ciudadela and Great Compound, immediately north of a prolongation of the Western Avenue of Teotihuacan, and would be on the route to the Pacific Coast.

Spondylus calcifer Carpenter, 1857 is commonly known as the Pacific Thorny Oyster, and found in warm seas at depths of from ten to one hundred meters attached to rocky substrata from the Gulf of California to Ecuador (Morris 1966:129; Abbott 1968; Keen 1960:76, 1971:96). "Large specimens may be 150 mm. across and weigh three pounds or more" (Keen 1971:96). Morris reported that "the valves are thick and sturdy, well inflated, joined at the hinge by interlocking teeth, and are so well secured that in most cases it is impossible to separate the valves without breaking the teeth" (Morris 1966:1929). The species is coarser and less spinose than Spondylus princeps Broderip, 1833, or Spondylus princeps princeps Broderi, 1833 (Keen 1971:96), and older individuals exhibit less spinous sculpture than younger specimens. Young shells are difficult to distinguish from those of Spondylus princeps (Keen 1971:96). The color is pinkish red on its exterior but is white on the inside with a distinctive wide border of reddish purple on most specimens (Morris 1966:129, Keen 1971:96). The species attaches itself to rocks and is often a "home" for Vermetidae (family), Vermetus (genus) or Petaloconchus (genus), the "Black Worm Shell." This marine "worm" (actually a snail) often occurs in colonies attached to rock or shells, and was notable on specimens of Spondylus calcifer Carpenter, 1857 (Abbott 1962:38, 1968:84). The Spondylus in its adult stage is often riddled by the burrows of sponges, "worms", and small boring clams (Keen 1971:96).

Keen (1971:96) has noted that: "The name calcifer (lime bearer) refers to the extensive use that was made by the Spanish settlers of Central America, who used the lime of these shells as a source of cement." The burning of Pacific Coast or Gulf Coast Spondylus to obtain lime for architectural purposes was also practiced in Precolumbian times on the coast of Guatemala (Shook 1965:186), the Maya Lowlands and Tabasco (Pollock 1965:396, 404).

Adult specimens of Spondylus calcifer Carpenter, 1857, cannot be confused with Spondylus princeps Broderip, 1833 (Synonyms: S. dubius and leucacantha Broderip, 1833) and the latter has been incorrectly called S. crassiscuama Lamarck, 1819 or S. pictorum Chemnitz 1784, neither of which are West American (Keen 1971:96). Spondylus princeps princeps Broderip, 1833 is restricted to Ecuador (Morris 1966:129, Keen 1971:96). There is a Caribbean Marine Faunal Province (Gulf Coast) species of Spondylus, particularly Spondylus americanus Lamarck or Hermann, 1781, the "Atlantic Thorny Oyster" (Morris 1951:22-23, Warmke and abbott 1962:170-171). It also attaches to rocky substrata, but differs in size and coloration from its Pacific Coast cousin S. calcifer Carpenter, 1857.

The TC-8 site specimens were definitely Spondylus calcifer, and were nearly exclusively adult specimens. It is not likely that divers ventured to depths of ten meters or more to obtain the live molluscs, since they are firmly attached to the rocky substrata, requiring major effort to dislodge even with metal tools let along with a neolithic tool kit. Shells broken from their rocky substrata by storms would be deposited on beaches, and were probably collected from this locale. Dead Spondylus would also be cast ashore, but would have lost their prized feathery fronds. However, in Aztec time skilled divers were employed in the Kingdom of Colima, where an annual tribute of 1600 Spondylus valves was paid to Moctezuma, as recorded in the Libro de Tributos (Penafiel 1890:83, Plate 16; Boekelman 1935:262-264). Feldman (1973:personal communication) has examined the Libro de Tributos and holds the opinion that the "Colima" referred to was the town of Colima, Michoacan, rather than the kingdom of the same name. These shells were retained and probably redistributed from Tenochtitlan. Adult shells cast ashore would have been a major and valuable resource of raw material for processing into artifacts, especially jewelry. Something along the lines of dentalia shell "fishing" from open boats with elaborate gear, which was practiced by Nootkan groups on the Northwest Coast of North America, as described by Drucker (1965:151-152), may be suggested. Spondylus princeps were an important barter item on the west coast of Mesoamerica, as reported by Gonzalo Fernandez de Oviedo y Valdes in Historia general y natural de los Indios, volume four (1855:122). These were the conchas coloradas known in Post Classic times to the period of Hispanic contact (Linne 1942a:151).

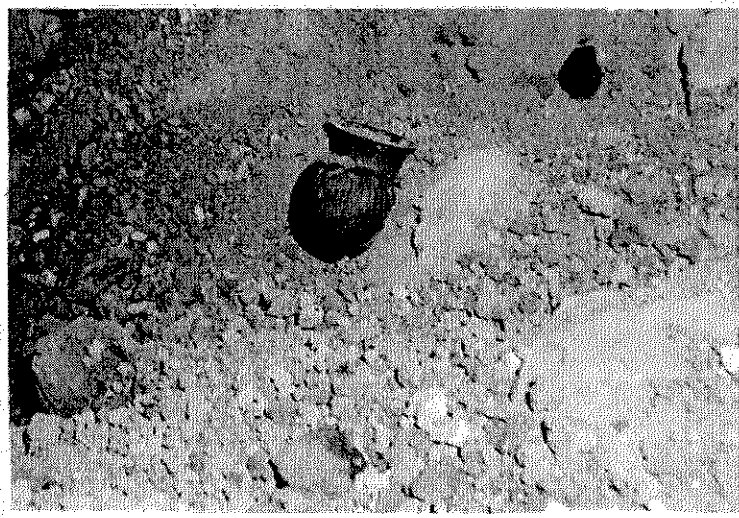
Table 105

Teotihuacan Valley Marine Shell (Rural Sites): Teotihuacan Period

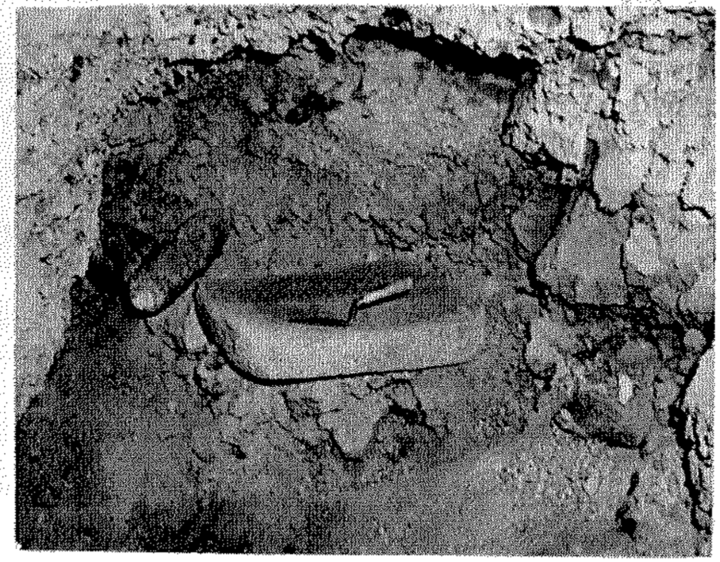
Total Specimens (whole and Fragments)	420
Classic excavations and survey (TC-2, 8, 10, 13, 40, 49, 73, 91)	
Classic survey (TC-2, 8, 13, 40, 73, 91)	8
Classic excavations (Tc-8, 10, 49	4192
Classic site TC-8. Total excavated specimens	4188
Non S. calcifer, total excavated specimens	104
Panamanian M. F. P.	54
Caribbean M. F. P.	5
Panamanian/Caribbean M. F. Ps.	30
Fresh Water (Riverine)	15
S. calcifer, total excavated specimens	4084
Classic mounds (total shell. total S. calcifer	
TC-8:1-2 (215)	194
TC-8:3 (3927)	3862
TC-8:4 (29)	28
Classic Mound TC-8:3	
Ofrenda (Feature 10)	4
Room II area (22.08m2)	3817
All other areas	41
Total specimens Classic site TC-8 from Pan. M. F. P.	4138
Total specimens Classic site (excavated + survey):	
Panamanian M. F. P.	4142
Caribbean M. F. P.	6
Panamanian or Caribbean M. F. P.	36
Fresh Water (Riverine)	16

Appendix N

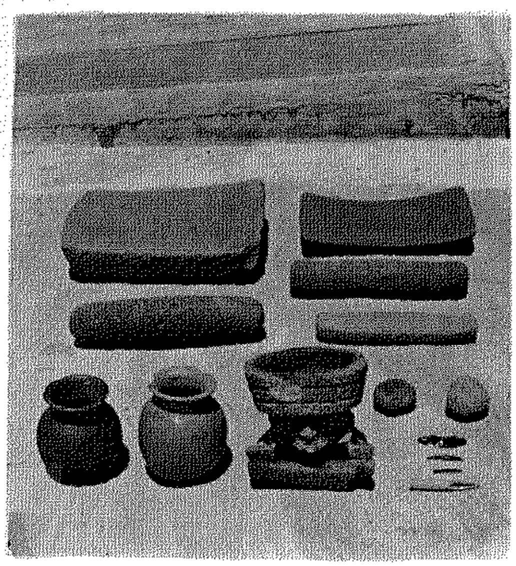
Republished Plate (Originally Plate 4, Page 255)
From the Teotihuacan Valley Project Final Report. Volume 4
The Toltec Occupation Of The Valley



A



B



C

D

E

Plate 195

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ERRATA AND ADDENDA FOR VOLUME 3

Part 1

1. In the production of part one we had problems in lining up table headings with the respective columns. In Tables 3-4; 8-9; 16-24, all headings should go approximately two to three spaces to the left.

2. Additionally the following specific errors should be corrected.
Page 33 - In the Feature 12, Room Numbers 2 and 3 are reversed in the description
Page 40-41 - (Table 1-2) "area" should be "area (m2)",
Page 44 - "Area 2" should be "area (m2)"
Page 53 - "Kovar 1971" should be "Kovar 1970"
Page 58 - "Millon 1972" should be "Millon 1967a"
Page 82,83,85 - In Table 10 "compsilhouette" should be "comp silhouette",
Page 84 - "Hemishperical bowl" should be "Hemispherical bowl"
Page 92 - "cencer" should be "censer"
Page 93 - In the description of Room 5; "7 per unit" should be "8.5 per unit"
Page 95 - San Francisco Monochrome total should be "12", not "6"; (overall total for Porch 2 then should be "17" not "12)
Page 100 - insert number "3" after "San Francisco Monochrome Deep Flat Bottom Bowl"
Page 102 - For Room 15 the number should be "4 per unit" not "3 per unit"
Page 103 - For Room 16 the number should be "12 per unit" not "22 per unit"
Page 115 - Change "Porch 1 units" to "Porch 1-2 units"
Page 118 - Room 1 San Franscisco Monochrome total should be "19" not "18"
Page 124 - Room 6, insert "Total Rims 15" in the heading
Page 128 - Table 17, 18 "irregular plates" should be "irregular flakes"
Page 131 - Table 21 heading "Spongy" should be "Spondy" (for Spondylus)
Page 133 - Table 22 "Mixed Ants" should be "Mixed Apts 8,9"
Page 134 - Table 23 should be "plasterers" not "plastering"

Part 2

Page 143 - Line 32 (including headings) delete "the" between "into" and "at"
Page 147 - Line 43 (5th paragraph) "early Toltec" should be "Early Toltec"
Page 274 - Delete "lot number" after "Columns 10-13", place it at the bottom, of the second column under "56 drilled holes"
Plate 58 B - A note of explanation, the base of this vessel is propped up with a rim sherd from another vessel

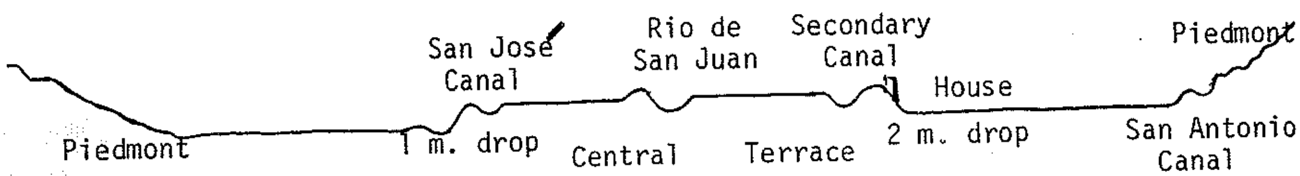
Part 3

Page 488 - Line 37, "lithic" should be "lithics"
Page 492 - Line 1 "Sanders et al" should be "Sanders et al 1970"
Page 528 - Line 3, "dependent" should be "depended on"
Page 554 - Line 35 "Marino 91965)" should be "Marino (1965)"
Page 634 - Table 53, 7th column, "classic" should be "classif."
Page 655 - Line 13, delete "on" between "affect" and "land"
Page 659 - Line 7, "hamlets with elite residents" not "from elite residents"
Page 674 - Line 28, "similar" should be "similarly"; line 41 "Storey 1999" should be "Storey 1992"

Finally, in our original plan for Part 2, we expected to have different plate numbers for each of the illustrations of obsidian artifacts in Chapter 6, one per page. We decided to combine them, four on a page, but when we developed the enumeration for the plates in Part 3, we had forgot that we had made this change and hence we jumped the plate numbers from 105 to 115. What this means is that there are no Plates 106-114 in Volume 3.

Addenda
Part 3

Page 667 - We neglected to include a sketch drawing that was suppose to be between paragraphs six and seven. We have reproduced it here below.



114