

**Prehispanic Settlement Patterns
of the
Ixtapalapa Peninsula Region
Mexico**

BY

RICHARD EDWARD BLANTON

NUMBER 6

1972

**OCCASIONAL PAPERS IN ANTHROPOLOGY
DEPARTMENT OF ANTHROPOLOGY
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PENNSYLVANIA**

PREHISPANIC SETTLEMENT PATTERNS OF THE IXTAPALAPA
PENINSULA REGION, MEXICO

by

Richard Edward Blanton

Edited by

William T. Sanders, Carl Bebrich, Susan Bebrich and Kenneth Brown

Preface

The data for this study was collected by means of intensive surface survey. The use of this method of data collection is in line with current methodological trends in Mesoamerican archaeology, which has recently witnessed an increase in popularity of this technique. Evidence of the rise in interest in this methodology is a symposium, organized by Pedro Armillas for the December, 1969 annual meeting of the American Association for the Advancement of Science, which was entirely devoted to a discussion of recent settlement pattern work in the Basin of Mexico, the Valley of Oaxaca, Highland Guatemala, and the Petén.

The Ixtapalapa Peninsula Region project is a continuation of the studies of Prehispanic settlement patterns and demography in the Basin of Mexico initiated by William T. Sanders, René Millon, and Jeffrey R. Parsons. I am greatly indebted to Sanders, who developed the survey techniques we utilized, and to Parsons, from whom I learned those techniques.

I am further indebted to Parsons, who served as co-chairman of my doctoral committee, for his abundant advice and guidance during my years as a graduate student at the University of Michigan. Parsons obtained a National Science Foundation grant (GS-2383) which was the basic source of funds for this project.

I wish to thank the other members of my doctoral committee, co-chairman Dr. James B. Griffin, Dr. Kent V. Flannery, Dr. Eric R. Wolf, and Dr. Charles Gibson, who offered many helpful criticisms and suggestions.

I was accompanied in the field by three students from the University of Michigan, Douglas K. White, a graduate student in anthropology, and two undergraduates, Carl Spath and John Jordan. I wish to thank all three for working under conditions which were often far from desirable. Jordan and Spath were funded by National Science Foundation undergraduate traineeships administered by the Museum of Anthropology of the University of Michigan. Travel and living expenses for the author and Douglas White came from the Ford Foundation.

My wife Heather did most of the illustrations, and typed the final draft, for which I am very grateful.

In Mexico, I was greatly aided by Eduardo Matos M. and others in the offices of the Instituto Nacional de Antropología E Historia, and by Benito Hernandez, the representative of the I. N. A. H. in the Texcoco Region.*

* Editor's note - Blanton wrote this study as a doctoral thesis at the University of Michigan and this is a slightly modified version of his thesis.

Table of Contents

List of Tables	6
List of Figures.....	6
List of Plates.....	11
Chapter 1 Introduction.....	13
Chapter 2 Methodology.....	16
Chapter 3 The Natural Environment and Modern Population.....	23
Chapter 4 Early and Middle Formative Periods.....	35
Chapter 5 Late Formative Period.....	45
Chapter 6 Terminal Formative Period.....	54
Chapter 7 Classic Period.....	65
Chapter 8 Early Toltec Period.....	84
Chapter 9 Late Toltec Period.....	98
Chapter 10 Aztec Period.....	118
Chapter 11 General Conclusions.....	183
Glossary and Abbreviations.....	313
Appendix: Site Descriptions.....	315
Bibliography.....	335

List of Tables

Table 1	Chronological Chart for the Basin of Mexico.....	19
Table 2	Modern Population of the Ixtapalapa Peninsula Region.....	33

List of Figures

Figure 1	The Basin of Mexico, Showing the Lake System and the Survey Regions.....	193
Figure 2	The Basin of Mexico, Showing Principal Archaeological Sites.....	194
Figure 3	Physiographic Provinces of Mesoamerica.....	195
Figure 4	Valley of Teotihuacan, Ecological Divisions.....	196
Figure 5	Texcoco Region, Modern Settlement.....	197
Figure 6	Major Topographic Features of the Ixtapalapa Peninsula Region.....	198
Figure 7	Environmental Zones of the Ixtapalapa Peninsula Region.....	199
Figure 8	Modern Settlement of the Ixtapalapa Peninsula Region.....	200
Figure 9	Archaeological Sites and Other Features at Tlapacoya Island.....	201
Figure 10	Occupation of Environmental Zones by % of Population, Early Formative Period.....	202
Figure 11	Occupation of Environmental Zones by % of Population, Middle Formative Period.....	203
Figure 12	Percent of Population Residing in Types of Communities, Early Formative Period.....	204
Figure 13	Percent of Population Residing in Types of Communities, Middle Formative Period.....	205
Figure 14	The Reconstructed Pyramid at Tlapacoya Island, (Ix-LF-2, TF-4).....	206
Figure 15	Occupation of Environmental Zones by % of Population, Late Formative Period.....	207
Figure 16	Percent of Population Residing in Types of Communities, Late Formative Period.....	208

Figure 17	The Central Concentration of Civic-Ceremonial Structures at Ix-TF-5.....	209
Figure 18	Occupation of Environmental Zones by % of Population, Terminal Formative Period.....	210
Figure 19	Percent of Population Residing in Types of Communities, Terminal Formative Period.....	211
Figure 20	Occupation of Environmental Zones by % of Population, Early Classic Period.....	212
Figure 21	Locations and Distances Between Early Classic Regional Centers in the Southern Basin of Mexico.....	213
Figure 22	Percent of Population Residing in Types of Communities, Early Classic Period.....	214
Figure 23	Percent of Population Residing in Types of Communities, Early Toltec Period.....	215
Figure 24	Occupation of Environmental Zones by % of Population, Early Toltec Period.....	216
Figure 25	Percent of Population Residing in Types of Communities, Late Toltec Period.....	217
Figure 26	Occupation of Environmental Zones by % of Population, Late Toltec Period.....	218
Figure 27	Hill-Top Structure, Ix-A-1.....	219
Figure 28	Percent of Population Residing in Types of Communities, Early Aztec Period.....	220
Figure 29	Percent of Population Residing in Types of Communities, Late Aztec Period.....	221
Figure 30	Occupation of Environmental Zones by % of Population, Early Aztec Period.....	222
Figure 31	Occupation of Environmental Zones by % of Population, Late Aztec Period.....	223
Figure 32	Texcoco Region, Middle Formative Period.....	224
Figure 33	Texcoco Region, Late Formative Period.....	225
Figure 34	Texcoco Region, Terminal Formative Period.....	226
Figure 35	Texcoco Region, Early Classic Period.....	227

Figure 36	Texcoco Region, Late Classic Period.....	228
Figure 37	Texcoco Region, Early Toltec Period.....	229
Figure 38	Texcoco Region, Late Toltec Period.....	230
Figure 39	Texcoco Region, Early Aztec Period.....	231
Figure 40	Texcoco Region, Late Aztec Period.....	232
Figure 41	Ixtapalapa Peninsula Region, Early Formative Period.....	233
Figure 42	Ixtapalapa Peninsula Region, Middle Formative Period.....	234
Figure 43	Ixtapalapa Peninsula Region, Late Formative Period.....	235
Figure 44	Ixtapalapa Peninsula Region, Terminal Formative Period.....	236
Figure 45	Ixtapalapa Peninsula Region, Early Classic Period.....	237
Figure 46	Ixtapalapa Peninsula Region, Late Classic Period.....	238
Figure 47	Ixtapalapa Peninsula Region, Early Toltec Period.....	239
Figure 48	Ixtapalapa Peninsula Region, Late Toltec Period.....	240
Figure 49	Ixtapalapa Peninsula Region, Early Aztec Period.....	241
Figure 50	Ixtapalapa Peninsula Region, Late Aztec Period.....	242
Figure 51	Locations of Types of Sites in Relation to the Environmental Zones, Early Formative Period.....	243
Figure 52	Locations of Types of Sites in Relation to the Environmental Zones, Middle Formative Period.....	244
Figure 53	Locations of Types of Sites in Relation to the Environmental Zones, Late Formative Period.....	245

Figure 54	Locations of Types of Sites in Relation to the Environmental Zones, Terminal Formative Period.....	246
Figure 55	Locations of Types of Sites in Relation to the Environmental Zones, Early Classic Period.....	247
Figure 56	Locations of Types of Sites in Relation to the Environmental Zones, Late Classic Period.....	248
Figure 57	Locations of Types of Sites in Relation to the Environmental Zones, Early Toltec Period.....	249
Figure 58	Locations of Types of Sites in Relation to the Environmental Zones, Late Toltec Period.....	250
Figure 59	Locations of Types of Sites in Relation to the Environmental Zones, Early Aztec Period.....	251
Figure 60	Locations of Types of Sites in Relation to the Environmental Zones, Late Aztec Period.....	252
Figure 61	Estimated Population, Early Formative Through Aztec, Ixtapalapa Peninsula Region.....	253
Figure 62	Political Boundaries of the Late Aztec Period in and Near the Ixtapalapa Peninsula Region.....	254
Figure 63	Apenes' Map of the Southern Basin of Mexico in 1942.....	255
Figure 64	Ixtapaluca Viejo (Ix-A-26).....	256
Figure 65	Distribution of Numbers of Residences by Size Categories, Ix-A-26.....	257
Figure 66	Floor-Plan of a Residence, Ix-A-26.....	258
Figure 67	Floor-Plan of a Residence, Ix-A-26.....	259
Figure 68	Floor-Plan of a Residence, Ix-A-26.....	260
Figure 69	Floor-Plan of a Residence, Ix-A-26.....	261
Figure 70	Floor-Plan of a Residence, Ix-A-26.....	262
Figure 71	Floor-Plan of a Residence, Ix-A-26.....	263
Figure 72	Floor-Plan of a Residence, Ix-A-26.....	264
Figure 73	Distribution of Numbers of Residences by Size Categories, Ix-A-26 (section A2).....	265

Figure 74	Distribution of Numbers of Residences by Size Categories, Ix-A-26 (section A1).....	266
Figure 75	Distribution of Numbers of Residences by Size Categories, Ix-A-26 (section B).....	267
Figure 76	Estimated Population, Middle Formative through Aztec, Texcoco Region.....	268
Figure 77	Population History of the Teotihuacán Valley.....	269
Figure 78	The Main Cluster of Civic-Ceremonial Structures at Ixtapalapa, Ix-A-69.....	270

List of Plates

Plate 1	The Slopes of the Upper Piedmont East of San Francisco Acuautla.....	271
Plate 2	The Lower Piedmont Zone East of San Francisco Acuautla.....	273
Plate 3	The Cerro Pino Massif, Looking West Across the Acuautla Plain.....	271
Plate 4	Cerro de la Estrella, Looking Southeast.....	275
Plate 5	Looking Northwest From the Summit of Cerro de la Estrella.....	275
Plate 6	The Upper Slopes of Tlapacoya Island.....	277
Plate 7	Tlapacoya Island, Looking South From Cerro Pino.....	277
Plate 8	The Cerro Pino Upper Slopes.....	279
Plate 9	The Cerro Pino Lower Slopes.....	279
Plate 10	The Cerro Sta. Catarina Massif.....	281
Plate 11	Example of the Rugged Terrain of the Lomas and Hoyas.....	283
Plate 12	A Large Rock-Pile in the Lomas and Hoyas.....	281
Plate 13	Ancient Terraces in the Lomas and Hoyas.....	285
Plate 14	A Rock Shelter in the Lomas and Hoyas.....	285
Plate 15	The 18th Century Dam Southwest of San Francisco Acuautla.....	287
Plate 16	The Sierra Zone.....	287
Plate 17	Barba's " <u>Pozo 1</u> ", at Tlapacoya.....	289
Plate 18	The Reconstructed Pyramid at Tlapacoya.....	289
Plate 19	The Reconstructed Pyramid at Tlapacoya.....	291
Plate 20	Terraces in the Lomas and Hoyas Pertaining to Ix-LF-7 and/or Ix-TF-10.....	291
Plate 21	Terraces in the Lomas and Hoyas Pertaining to Ix-LF-7 and/or Ix-TF-10.....	293
Plate 22	Earth Terraces in the Cerro Pino Lower Slopes.....	293

Plate 23	Ix-TF-2 and Ix-LT-16.....	295
Plate 24	Ix-TF-5, Showing Two of the Pyramid Mounds.....	295
Plate 25	Ix-EC-18, Ix-LC-3, Ix-ET-5, and Ix-LT-22.....	297
Plate 26	Ix-EC-37, Ix-LC-8, Ix-ET-13, Showing Terrace Remnants.....	297
Plate 27	The <u>Templo Mayor</u> at Ixtapaluca Viejo (Ix-A-26).....	299
Plate 28	The <u>Templo Mayor</u> and Other Civic-Ceremonial Structures at Ixtapaluca Viejo (Ix-A-26).....	299
Plate 29	Aerial Photograph of Ixtapalapa.....	301
Plate 30	A Small Church Built Over an Aztec Pyramid-Mound at Culhuacan (Ix-A-72).....	303
Plate 31	Aztec Wall at San Marcos Mexicaltzingo.....	303
Plate 32	<u>Plancha I</u> From the Codex Xolotl (Dibble, 1951).....	305
Plate 33	Aztec Wall Exposed at Ix-A-74.....	307
Plate 34	Map From the <u>Relacion de Coatepec y Su Partido</u> , (Paso y Troncoso, 1905-48, vol.6:39-65).....	309
Plate 35	A Portion of the Upsalla Map (Linne, 1948).....	311

Chapter 1

Introduction

General Background: This paper is a preliminary study of the Prehispanic settlement patterns of the Ixtapalapa Peninsula Region, in the Basin or Valley of Mexico. This is the fourth of a series of projects entitled "Coordinated Anthropological Research in the Valley of Mexico". This long-range project was initiated at a conference at the University of Chicago in June, 1960, organized by Dr. Eric Wolf. The objectives of the project, as outlined by Wolf, are to study the following:

1. Changes in the natural and man-made environment of the Valley of Mexico over time and the possible correlation of these changes with cultural changes.
2. The antiquity, development and relative importance of major and minor patterns of land use over time.
3. The characteristics of settlement in the Valley and changes in settlement patterns over time and related population problems.
4. The nature of the relationships between hamlets, villages, towns, cities, and similar units at various periods including a discussion of relations between specific sites.
5. Problems of urbanization.
6. The characteristics of symbiotic regions in the Valley in various periods of time and their social consequences.
7. The relevance of environment to agriculture and settlement patterns to problems of social controls at various levels.
8. Patterns of ceremonial control at various time levels.
9. Patterns of political control at various time levels.
10. Patterns of warfare in the Prehispanic period.
11. Effects of the Spanish conquests and colonization on social and cultural groups in the Valley of Mexico.
12. Cultural persistence or change in major patterns throughout all known time periods within the Valley.
13. Causal or functional relationships between various cultural patterns at different time levels (in Sanders, 1965: 8).

The general objective of this proposed research program was to better understand the influence of cultural development in the Basin of Mexico on cultural development in Mesoamerica as a whole. With the exception of the early part of the Formative stage, the Basin of Mexico was for many years a key area in Mesoamerica. During the Classic period the Basin was the location of Mesoamerica's first and largest city, which was at the same time possibly the focus of the first pan-Mesoamerican empire. By the time of the Spanish conquest the Basin of Mexico was again a key area, the seat of an empire which exerted a strong influence over a large portion of northern Mesoamerica. The large cities and dense population which the Conquistadors encountered in the Basin were the object of their admiration. The Basin of Mexico retained its position as a key area during the Colonial period, and to this day it is the heart-land of Mexico.

The first field program undertaken as part of the proposed Basin of Mexico research, initiated in 1960, was a study of the cultural ecology of the Teotihuacán

Valley (Fig.1), directed by William T. Sanders. The results of this project have been published in preliminary form (Sanders, 1965; Sanders, et.al., 1970). The specific objectives of the Teotihuacán Valley Project, in line with the more generalized objectives of the proposed long-range study of the Basin of Mexico, were the following:

1. To trace the history of development of agriculture in the Valley with special focus on irrigation, terracing, and other patterns of land use.
2. To define and trace the history of rural and urban community types.
3. To construct, on the basis of data on settlements, at least a relative profile of population history.
4. Finally, and on a higher level of abstraction, to explore the functional relationships among such phenomena as settlement patterns, agricultural techniques and demography, and by an analysis of the interaction between these patterns to throw light on the urban development of the area (Sanders, Ibid.: 9).

As an independent but closely allied project René Millon initiated a study of the history and development of the city of Teotihuacán, a project which is still in progress (Millon, 1960, 1964, 1967a, 1967b, 1970; Millon and Bennyhoff, 1961).

The third project undertaken as a continuation of the proposed Basin of Mexico research was the Texcoco Region Project, directed by Dr. Jeffrey R. Parsons. Parsons applied the methodology which had been developed by Sanders in the Teotihuacán Valley. The first phase of the Texcoco Project, completed in 1967, was an intensive surface survey of a large portion of the Texcoco Region (Fig.1). The object of Parsons' pilot study of the Texcoco Region was to delineate the settlement patterns of all of the major Prehispanic periods from the Formative through Postclassic times. The work has been reported upon in preliminary form (Parsons, 1968, 1969), and a final report is in press (which will be referred to from now on as Parsons, MS).*

The Ixtapalapa Peninsula Region Project is a continuation of the work initiated by Sanders and Parsons. The Ixtapalapa Peninsula Region (Fig.1, page 193) was chosen as the next region for intensive study for several reasons. Most importantly, it is the next easily definable region south of, and adjacent to, the Texcoco Region. We felt that many of the hypotheses generated by Sanders and Parsons could be best tested by expanding our knowledge of the settlement patterns of the eastern Basin of Mexico, rather than initiation of research in the western half. In addition, we felt there would be fewer problems of divergences in the ceramic sequence in an area adjacent to those already done compared to regions further away. Also, the Ixtapalapa Peninsula Region has considerable intrinsic importance in the Basin of Mexico as a whole because it forms the dividing line between the northern and southern Basin, and it forms a dividing line between the fresh water Lake Chalco and the saline Lake Texcoco. Therefore, it would serve as the first step in the study of contrasting patterns of adaptation in the northern as compared to the southern Basin, and of adaptation to the saline versus the freshwater lakes. A final, and very important reason for choosing the Ixtapalapa Peninsula Region as an object of study is that Mexico City, now the largest city in Latin America, is rapidly growing over a large part of the peninsula, destroying the remains of Prehispanic occupants of the area.

* Editor's note: Parson's report was published in 1971 and we have appended it to Blanton's bibliography.

We felt that it would be imperative to survey the region while it is still possible to recover a considerable amount of information. It is my impression that in five to ten years most of the sites on the Ixtapalapa Peninsula, except those on high ridges, will be completely covered by modern occupation. Even now a large number of sites have been completely or partially destroyed, or were in the process of being destroyed while we were there. The portion of the region that has been most severely damaged is the western tip of the peninsula; here there were two large Aztec communities, Ixtapalapa and Mexicaltzingo (Fig.2) which are now largely under pavement and concrete.

Purpose and Scope: The purpose of this preliminary study of the Ixtapalapa Peninsula Region is to outline the configurations of settlement of all the major time periods from the Early Formative through the Aztec, and to estimate the total population of the region during each of those periods. This project, like the Texcoco Region Project, has been limited to intensive surface survey as a means of data collection. Interpretation of the settlement pattern and demographic data will be pushed to a reasonable limit, mostly in line with the prior kinds of interpretations made by Sanders and Parsons. The various hypotheses which will be generated in this paper can be tested by further settlement pattern work in the Basin of Mexico and adjacent regions, and by carrying the Ixtapalapa Peninsula Region Project further, utilizing the methods of geomorphology, palynology, ethnography, archival research, and most importantly, further archaeological research, including systematic surface collection of artifacts and excavation.

Chapter 2

Methodology

From the time of our arrival in the Basin of Mexico early in January, 1969, until approximately the end of April of the same year, our work consisted of systematically walking over the entire Ixtapalapa Peninsula Region, recording the location and nature of all Prehispanic sites and features as they appear on the ground, and noting and describing as much as possible regarding the modern occupation of the region and regarding the natural environment. Surface survey is an effective means of gathering information about the Prehispanic occupation in the Ixtapalapa Peninsula Region, and in the Basin of Mexico generally, because:

1) Vegetation cover is everywhere so light it does not obscure surface remains of Prehispanic occupations.

2) Except for some low, flat areas, and the alluvial plains along the edges of the ancient lakes, alluviation has not covered sites. Even in many of the areas where alluviation has taken place sites are often visible as scatters of sherds on the surface, or as mounds protruding above the modern ground level.

3) Erosion of piedmont slopes, like alluviation, has destroyed some, but apparently not many, sites. Even in the most severely eroded areas sites often remain on erosional remnants, or as piles of rock and sherds on bare bed-rock, where surface soil has completely eroded away. The most severe problem in this respect has been the marked widening and deepening of piedmont barrancas, a process which apparently began on a large scale after the Spanish conquest, and which has continued to the present day (Gibson, 1964:305-6). It is likely that some sites which were located adjacent to barrancas have been eroded downstream.

The data was recorded on airphotos at a scale of 1:6,600. These photos were blown up from 1:25,000 airphotos purchased from the Compañía Mexicana de Aerofotos. Archaeological sites were located and mapped directly on the airphotos by noting their location and size relative to field boundaries, trees, roads, and distinctive topographic features. In addition, detailed notes were taken at every site regarding such things as periodization, density of artifact cover, cultural features within sites such as tlateles, relationship of the site to general features of the environment, and modern land use within and near the site area. Normally a surface sample of 50 to 100 chronologically diagnostic sherds, was collected from the entire area of small sites, and several collections were made from small areas within large sites. When data from the area embraced in an airphoto were completed, the information on them was traced on paper. These sheets were then taped together to create a large mosaic of the entire survey area. At this stage, sites were delineated and numbered. In defining sites, we followed Sanders' (ibid.:12-3) description of a site as a "spatially isolatable unit...", which "...shows signs of alteration by man as observable by archaeological method." Specifically, sites are recognizable as scatters of sherds and stone tools, along with stone debris (usually the remains of destroyed structures), and, in some cases, features such as mounds, walls, plaster floors, and so on. There are other types of sites, such as quarries and isolated mounds, but since our main interest was in the remains of residential communities, these were not normally described in detail. Although we encountered some difficulties in defining the boundaries of sites, for the most part sites in this region consisted of discrete, easily defineable units.

During the time we were engaged in field survey, we worked in two teams, one of which I directed, while the other was directed by Douglas K. White, a graduate student in anthropology at the University of Michigan. Each of the survey teams consisted of a director plus one undergraduate student plus one local workman. We moved through the region systematically, field by field, with the members of each crew spaced 25 to 100 meters apart, depending upon what spacing was appropriate, such that no sites of any size would be overlooked (with the exception of preceramic sites, which were extremely difficult to find).

During the months of May and June, 1969, the information pertaining to each site was assembled and recorded on standardized site report forms. In addition, all of the surface collections were examined (a total of approximately 10,000 sherds), sorted by period and type, and recorded on standardized forms. The purpose of this latter exercise was to check our provisional chronological placements of sites which had been made in the field. In some cases examination of the pottery indicated that the original chronological placement of sites was wrong or incomplete, in which case the sites were revisited.

To conclude, it is possible a few small sites were overlooked, but I am sure that few or no sites of hamlet size or larger escaped our notice. It is more difficult to estimate the number of sites which have been obscured or destroyed by alluviation and erosion. One site, Ix-LF-4, has been covered by nearly one-half meter of lake bed silt, and would not have been easily noticed except that a drainage ditch had been cut through it, exposing hundreds of sherds. Even in this case, however, it was possible to estimate the approximate extent of the site by noting the (very light) distribution of pottery on the surface, and by examining a number of other drainage ditches and shallow wells in the immediate vicinity. There was no example of a buried site, exposed by a drainage ditch or other recent excavation, which was not at all visible on the surface. Apparently, in areas where alluviation has occurred, sherds and other debris are constantly brought to the surface during the course of well-digging, house construction, and cultivation. Gophers, which are common in the region, have also brought many artifacts to the surface. At Tlapacoya Island the Early Formative site is as much as three meters below the modern ground level, but sherds are visible on the ground today, not only where there has been recent pot-hunting, but also in yards and open fields in the modern village of Tlapacoya! Perhaps the greatest natural deterrent to site recovery has been the widening and deepening of barrancas.

By far the greatest deterrent to the recovery of Prehispanic remains in the Ixtapalapa Peninsula Region is the heavy modern occupation. This problem is particularly acute in the vicinity of the Aztec communities of Ixtapalapa, Mexicaltzingo, and Culhuacan, but is also a problem at Meyehualco, along the string of communities on the north edge of the peninsula including Astahuacan, Sta. Marta, San Sebastian, Santiago Acahualtepec, and Los Reyes, and in the vicinity of Ayotla. Except for Mexicaltzingo and part of Ixtapalapa, however, it was possible to map sites by noting sherd cover in open fields and yards, and along roads and road cuts. An additional problem that the heavy modern occupation of the region posed was that it made our work difficult and unpleasant. The morale of the crew slowly declined during the course of the work because of the constant necessity to search through smelly garbage dumps, to cross (and occasionally fall into) canals of raw sewage or industrial pollution, and to breathe the polluted air which is so prevalent in the Basin of Mexico today.

Format of This Paper: The chapter following this will contain a brief description of the environment of the Basin of Mexico as a whole, followed by more detailed descriptions of the environments of the Teotihuacán Valley Region and the Texcoco Region (necessary because there will be constant reference to these areas during the course of the paper), and the Ixtapalapa Peninsula Region. Included in this chapter will be a brief discussion of the modern population of the Ixtapalapa Peninsula Region. Each of the subsequent chapters will be concerned with one chronological period (or in one case, two periods), and will be divided into the following sections:

1) Introduction: For the most part this section will contain a brief review of the pertinent literature of the period in the Basin of Mexico, particularly that pertaining to the identification of the ceramic complex representative of the period. The chronological placement of the periods which will be utilized in this paper, and the relation of each to published Basin of Mexico periods is indicated in Table 1, page 19.

2) Comparative Material: This section will contain a brief outline of the configuration of settlement and demography in the Teotihuacán Valley Region and the Texcoco Region, based on the work of Sanders, Millon, and Parsons.

3) Site Descriptions: This section will contain information on each site, divided into the following sections:

a) Site number, in the form of a prefix Ix- which denotes the Ixtapalapa Peninsula Region, followed by a period designation, where EF = Early Formative, MF = Middle Formative, LF = Late Formative, TF = Terminal Formative, EC = Early Classic, LC = Late Classic, ET = Early Toltec, LT = Late Toltec, and A = Aztec, followed by the number of the site, which is the same number adjacent to each site on the site maps (Figs. 41-50).

b) Natural setting, indicating the environmental zone in which the site is located, elevation of the site rounded off to the nearest 10 meters, depth and type of soil in the site area and degree of erosion, and the relationship of the site to pertinent natural features.

c) Modern utilization, including a description of crops in the site area, technique(s) used in cultivation, and relationship of the site to modern cultural features. The most common designation for cultivation technique will be "rainfall cultivation" which means that there is no (apparent) indication that irrigation is used. The list of crops included in this section is not meant to be a complete list. We did the survey during the winter months from January through April, when there was no on-going cultivation, for the most part, and it was often difficult to determine what had been cultivated the year before.

d) Archaeological remains, a description of the site, including size rounded off to the nearest one-half hectare, density of occupation, and a description of features such as tlateles, terraces, etc. In most cases Prehispanic structures are badly eroded and persist only in the form of scattered rock rubble. The density of occupation is indicated according to the system of visual evaluation of the density of sherds developed by Sanders and Parsons. Parsons (MS:26) has described the categories of this visual scale of estimation as follows:

a) Very Light - A wide scattering of surface pottery, with single sherds visible only at intervals of several meters. If no effort is made to search for sherds, one's superficial impression is that surface pottery is absent.

Table 1

Chronological Chart for the Basin of Mexico
(Modified from Sanders, 1965:16, and Parsons, MS:Table 1)

Estimated Absolute Chronology	Teotihuacan Valley Phases	Basin of Mexico Phases	Ixtapalapa Region Periods
1500	Teacalco	Aztec IV	Late Aztec
1400	Chimalpa	Aztec III	
1300		Aztec II	
1200	Zocango	Aztec I	Early Aztec
1100	Hueoxtoc	Mazapan	Late Toltec
1000	Mazapan		
900	Xometla	Coyotlatelco	Early Toltec
800	Oxtotipac		
700	Metepec	Teotihuacan IV	Late Classic
600	Xolalpan	Teotihuacan III	
500			
400			
300	Tlamimilolpa	Teotihuacan II	Early Classic
200	Miccaotli	Teotihuacan I	
100	Tzacualli		Terminal Formative
A. D.			
0	Patlachique	Cuicuilco	
B. C.	Tezoyuca		
100			
200			
300		Ticomán III	Late Formative
		Ticomán II	
400	Cuanalan		
500		Ticomán I	Middle Formative
600		Zacatenco	
700	Chiconautla		
800	Altica		
900			
1000			
1100		Ixtapaluca	Early Formative
1200			

b) Light - Sherds distributed continuously, with single sherds at intervals of several cms., but no significant build up of sherd density beyond this point.

c) Light-to-moderate - A marked build up of sherd density to a point where sherds are everywhere clearly visible, and there are very few gaps in the distribution of surface pottery. Some one-meter squares selected at random might produce very few surface sherds, while others might yield up to 100, or so, pieces of pottery.

d) Moderate - A continuous layer of sherds in a situation where any randomly-placed one-meter square would produce a count of roughly 100 to 200 pieces of pottery.

e) Heavy - A continuous layer of sherds in a situation where any randomly-placed one-meter square would produce a count of several hundred pieces of pottery.

This system of density evaluation, because it is subjective, is somewhat difficult to use because different people will have different impressions of the same sherd densities. In order to alleviate this problem, I visited many of the sites in the region mapped by Douglas White, to assure that my visual impressions matched his. For the most part we agreed. Another problem with this density evaluation system is that it is difficult to estimate the density of one component on multi-component sites. This problem was in part alleviated by spending much more time on these sites, evaluating and reevaluating the density of each component.

e) Each site is classified, and an estimate of the population is made. The site categories are similar to those used by Parsons (MS:24-5), which are based on a consideration of the following variables: site size, occupational density, (estimated on the basis of the density of artifact remains on the surface), population (calculated from site size and density of occupation), and architectural complexity. The site categories are the following:

i) Isolated residence: Probably occupied by one nuclear or extended family, or a comparable small group, population 5 to 10.

ii) Hamlet: Has a population of 10-100, with no obvious civic-ceremonial architecture.

iii) Village: Population roughly 100-1000, usually lacking large-scale civic-ceremonial architecture.

iv) Secondary Regional Center: A nucleated community, usually, with a population normally between 1000 and 2000, and usually with large-scale civic-ceremonial architecture or other evidence of architectural complexity. There are some exceptions to this definition, however; Ix-EC-37 (Fig.45) for example, has an estimated population of only 380-760, and it apparently lacks civic-ceremonial architecture. It was identified as a Secondary Regional Center because it was by far the largest community in the region at that time.

v) Primary Regional Center: These are nucleated sites, usually with populations over 2000, with evidence of architectural complexity.

The population estimates of sites are derived from the area of the site in hectares and the density of occupation, utilizing the following scheme developed by Sanders (ibid.:50) and Parsons (ibid.:27), based on the population densities of modern highland Mexican communities:

i) Sherd densities of light to moderate, moderate, and heavy = 25 - 50 per hectare.

- ii) Light and light to moderate = 10 - 25 per hectare.
- iii) Very light to light and light = 5 - 10 per hectare.

The population estimate for isolated residences was derived from Carrasco (1964), in which he calculated an average of 5.6 members per household based on 16th century documents pertaining to Tlacateopan, a ward to Tepoztlan, Morelos, and Sanders (ibid.: 134) who utilizes an average of 10 per household based on 16th century documents from the Basin of Mexico.* It is possible these density estimates for sites will prove to be wrong for earlier time periods. Unfortunately there is no excavated data from earlier sites suitable for comparative purposes. An important possible source of error in calculating the total population for each period is in assuming contemporaneity of occupation of all sites. It will be impossible to assume otherwise until we have a more refined ceramic sequence.

The locations of the sites of each period are indicated on two maps. The first set (Figs. 41-50) are contour maps, with 50 meter intervals, based on the following maps published by Mexico's Secretaría de la Defensa Nacional: Huexoculco 14Q-h (90); Chalco 14Q-h (89); Xochimilco 14Q-h (88). On these maps the sites are indicated roughly correctly in terms of size and configuration, although in some cases the sizes of small sites were exaggerated in order to make them more easily visible. Sites are indicated symbolically in terms of the site classification on another set of maps (Figs. 51-60). The base-map used for this set of maps is based on the map of the environmental zones of the region (Fig.6).

4) Conclusions: At the end of each chapter, and at the end of the entire paper, conclusions regarding demography and settlement patterns will be made. The conclusions will be based upon the following set of assumptions:

- i) Communities tend to be located such that there would be maximum accessibility to the strategic resources being exploited, i.e. communities were not randomly located. A corollary of this is that if sites are not optimally located in terms of resources, particularly agricultural resources, there was a reason for it: e.g. during a time of warfare communities might have been located on hill-tops away from agriculturally productive areas for reasons of defense.

- ii) Some kinds of social units have a territorial referent, and should therefore be discernible as clusters of sites or clusters of residences within sites.

- iii) The function and status of a community can be inferred, at least in a general way, from its size and architectural complexity. For example, Secondary and Primary Regional Centers were probably administrative, religious, and/or market centers, while hamlets and villages were not.

* Editor's note - In a detailed reexamination of the 16th century sources (see Sanders 1971) Sanders would now use a figure of 7.0 as the average household size, or 3.3 as the average size of the nuclear family.

The Appendix provides data on size in hectares, population, classification, and other components present, for each site. Because of problems of interpretation of the Early Aztec period, all Aztec sites have been grouped in the Appendix such that the total population and total size in hectares indicated is for the Late Aztec period.

Chapter 3

The Natural Environment and Modern Population

General Basin of Mexico: The Basin of Mexico was a large internal drainage basin (before artificial drainage was initiated following the Spanish conquest) situated at the southern edge of the Central Highlands of Mexico (Fig.3). Detailed descriptions of the environment have been written by Sanders (ibid.:19-22) and Parsons (MS:5-8); the following section will contain only a brief outline of the environment, based primarily on these two sources. More detailed descriptions of the environments of the Teotihuacán Valley Region, the Texcoco Region, and the Ixtapalapa Peninsula Region will follow.

The Basin of Mexico is about 120 kilometers north-south by about 70 kilometers east-west, and covers a total area of about 8000 square kilometers. The floor is at an elevation of about 2236 meters above sea level. Surrounding the Basin on the east, west, south, and to a limited extent on the north, are a series of volcanic ranges with many peaks in the range of elevation of 3000 to 4000 meters, although two of these peaks, in the southeastern edge, are roughly 6000 meters in elevation. Before the Basin was artificially drained, the bottom was covered by a system of shallow lakes which extended over an area of roughly 1000 square kilometers. The maximum depth of these lakes was in the neighborhood of 4 meters, although they were even shallower during the dry season. The lake system is normally divided into three major lakes, Xaltocan-Zumpango, Mexico-Texcoco (or simply Texcoco), and Chalco-Xochimilco (or simply Chalco) (Fig.1). Lake Chalco was situated several meters higher than Lake Texcoco, and drained into it. Similarly, Lake Xaltocan-Zumpango was also slightly higher than Lake Texcoco, and also drained into it. Because Lake Texcoco was the ultimate destination of all water in the Basin before it evaporated, this lake was the most saline of the three. Lake Chalco was the freshest of the three lakes.

Average rainfall in the Basin of Mexico ranges from about 500mm. to 600mm. in the northern area to as high as 1400mm. along the steep slopes that define the south edge. Lorenzo (1968:Fig.4) has pointed out the agricultural potential of various parts of the Basin in terms of the varying amounts of rainfall. He defines the northern one-third or so as an "Arido" area, which means that agriculture without irrigation is impossible or highly risky; the central portion he classifies as a "Transición" area, which means irrigation is necessary to assure crop productivity every year; and the southern Basin of Mexico he defined as "Sub-Húmedo", where rainfall cultivation is generally secure. Lorenzo points out, however, that in a dry year the "Arido" zone includes the central and north portions, and irrigation might even be necessary in the south (ibid.: Fig.12). The relatively dry climate of the Basin, then, is a deterrent to agriculture without irrigation.

Another deterrent to agriculture in the Basin of Mexico is frost, which may occur as early as September, near the end of the agricultural season, and as late as March or April (or even later in rare cases), near the beginning of the agricultural season. Frost is a particular problem for agriculture above the 2600 meter line, and in low, flat areas where cold air settles. An exception to the latter may have been those areas adjacent to the lakes, where the water served to ameliorate temperatures.

Soils throughout the Basin are volcanic in origin, and like most soils formed in dry climates, they are highly fertile. Soil depth ranges from none at all or only a few centimeters on steep slopes, to several meters on the alluvial plains and lake-shore plains. Soils are generally loose textured and are therefore highly susceptible to erosion. The most common subsoil is a compact yellow-white formation, which is highly impervious to water, called tepetate.

Sanders has succinctly stated the key environmental variables pertinent to Precolumbian use of the Basin of Mexico as follows:

1. The soils are easily cultivated using neolithic tools and are generally fertile and capable of sustained cultivation with modest application of simple soil restoration techniques (i.e., animal and vegetable fertilizers, crop rotation, short-phase fallowing, intercropping, floodwater and permanent irrigation, terracing). There is, however, a high percentage of sloping terrain where soils are markedly susceptible to erosion, and constant effort is required to control this destructive process.
2. The plant cover is fragile and easily controlled with simple tools.
3. The rainfall-temperature regime is favorable to maize cultivation only in the south. In the central and north parts of the Basin the combination of early frosts and retarded rains plus internal droughts make maize cropping difficult and crop loss frequent.
4. In a number of areas local, permanent water resources are available for permanent irrigation and the numerous barrancas are sources of water for floodwater irrigation. Such systems, however, require intensive land use; heavy expenditure of labor per man; and supra-family, often supra-community, cooperation to maintain, construct, and operate.
5. Since the summer rains generally provide adequate moisture in areas with moderately deep to deep soils, the primary need is a pre-planting irrigation. This enables the farmer to get a head start on the rainy season and gives the plant more time for growth before the arrival of the fall frosts. Most of the humidity for plant growth, even in areas of permanent irrigation, is derived from rainfall. This means that a small amount of irrigation water goes a long way. Mexican agronomers call this system "medio riego".
6. The lakes were an enormously significant resource for the Prehispanic and Colonial population. They provided a natural highway system for a people lacking beasts of burden. They linked all parts of the Basin, and most of the population centers in 1519 were located near the shore or within the lakes. The lakes were important sources of protein foods for a population with few domestic animals, and of other products, especially salt. The freshwater Lake Chalco-Xochimilco was nearly covered by artificial island-like gardens called chinampas, which were the most intensively cultivated and productive lands in Mesoamerica and provided much of the surplus foods for the support of urban communities in 1519.
7. Internally there is considerable variability in geographical characteristics within the Basin, a characteristic that stimulated local specialization and trade. Variations in amount and distribution of rainfall, vegetation, topography, soil depth, water resources, elevation, and spatial position with respect to mountain passes and

lake shores, along with the distribution of specialized resources (salt, clay, obsidian, lumber, lime, stone, etc.) all acted as factors promoting this specialization and trade (Sanders, *ibid.*:21-2).

Environment of the Teotihuacán Valley Region (Fig.4): This brief description of the environment of the Teotihuacán Valley Region is based on Sanders (*ibid.*:22-7). The Valley covers an area of 505 square kilometers. The survey region includes the Teotihuacán Valley plus the adjacent north slopes of Cerro Gordo, a total area of about 600 square kilometers. Not all of this area was intensively surveyed. The south and southeastern edge of the Valley is defined by the Patlachique range, while the north edge is defined by the range of volcanoes dominated by Cerro Gordo. To the northeast the Valley is separated from the Tepeapulco-Apan Plain by a low ridge.

Above the lower portion of the Valley, water runs downslope in seasonal, deeply-eroded streams called barrancas, which drain into the Rio San Juan. In the vicinity of the modern town of San Juan Teotihuacán there are 80 permanent springs which currently supply approximately 600 liters of water per second. This flow also runs into the Rio San Juan and makes it a permanent stream. Irrigation is necessary in the Valley for cultivation because the average rainfall is only about 550mm. The high slopes of the hills surrounding the Valley, however, probably receive more rain. Sanders has divided the Teotihuacán Valley Region into the following environmental zones:

1) Upper Valley: This is a relatively dry area which receives little in the way of rainfall run-off except in its south portion. The center of the area is a small deep-soil plain, surrounded by gentle piedmont slopes with shallow soil. Today this area is used primarily for maguey cultivation. An important resource here in Prehispanic times was a large obsidian flow, the only one within the Basin of Mexico.

2) Middle Valley: This is a topographically complex area characterized by a series of ridges and low hills separating barrancas and their associated floodplains. The Middle Valley is an ideal area for floodwater cultivation because of the close juxtaposition of major drainage systems on steep slopes and deep soil plains. The piedmont slopes in this area, along the bases of Cerro Gordo, Cerro Malinalco, and the Patlachique range are areas of gentle slopes with shallow soil cover. Specialized resources in the Middle Valley include good pottery clay and volcanic detritus suitable for construction material.

3) Lower Valley: In the center of this area there is a large deep-soil plain that covers an area of 3000 hectares. The permanent springs at San Juan supply water to irrigate this plain, which makes this the most prized agricultural land in the Teotihuacán Valley. Sanders (*ibid.*:38) indicates this irrigated plain can now support 18,000 people, and perhaps supported as many as 30,000 in the days before the numerous deep wells up-Valley depleted the flow at the springs. East and west of the alluvial plain there are bands of piedmont slopes with shallow soil, in some places severely eroded.

4) Delta: This is really a continuation of the main alluvial plain of the Lower Valley, and is adjacent to Lake Texcoco. This area is somewhat less productive as

agricultural land than the Lower Valley because it is further from the springs, and there is less water available for floodwater or permanent irrigation.

5) Patlachique Range: This is the largest continuous expanse of high ground in the Teotihuacan Valley. In some places, which are not characterized by severe erosion, this is a desirable place for cultivation because more rain falls here than on the Valley floor, and there is less frost danger. Sanders feels this area was once covered with dense vegetation, and that the barrancas were small permanent streams. Severe erosion makes most of the area suitable today only for grazing.

6) North Tributary Valleys: In this area a series of barrancas collect water from the north sides of some of the hills that define the north edge of the Valley, then carry that water through a series of passes between those hills to the Lower and Middle Valleys. Although there are deep-soil plains along some of the barrancas, most of the area is characterized by gentle, eroded slopes.

7) Cerro Gordo-North Slope: This is the only portion of the Teotihuacan Valley Region that does not drain into the Rio San Juan. This area is characterized by a series of long ridges separated by deeply incised barrancas. The area is intensively cultivated today, utilizing flood-water irrigation and either earth or stone-faced terraces.

Environment of the Texcoco Region (Fig.5): This region is defined as the area east of Lake Texcoco from the Patlachique range on the north to the Cerro Pino massif on the south. The region extends east to the chain of mountains, including Mt. Tlaloc, which define the east edge of the Basin of Mexico. The total area of the region is about 700 square kilometers. Within this region Parsons and his crew intensively mapped three large strips which are outlined in solid black in the Texcoco Region maps (Fig.5, Figs.32-40). The total area surveyed intensively was 301 square kilometers. In addition, most of the area between the central and southern survey strips was surveyed in less intensive fashion.

Precipitation at the center of the region, as measured at the Chapingo Meteorological Station just south of Texcoco, from 1962-66, is about 600mm. per year. Precipitation increases slightly east and south of the Chapingo area at higher elevations. Frost was recorded at the Chapingo station during every month except July, August, and September (although only one frost occurred in June during the four year period).

Following Wolf and Palerm (1955:266-8), Parsons (ibid.:9-15) has divided the Texcoco Region into the following natural zones:

1) Sierra: This is the rugged mountainous zone above the 2750 meter contour. The slopes are covered with dense vegetation consisting mostly of oaks, conifers, and grass. There is no modern occupation here today, and very little cultivation is done. The prime use of the area is for grazing and forest resources such as construction wood, firewood, and charcoal. Several permanent springs in this area supply water for communities below on the piedmont slopes above Lake Texcoco.

2) Upper Piedmont: This is the "arid zone" defined by Wolf and Palerm (ibid.), which covers the area between 2500 and 2750 meters. This zone extends over an area of roughly 100 square kilometers in the Texcoco Region. For the most, this zone is characterized by a series of east-west ridges separating barrancas incised 15 to 30 meters. At the upper edge of the zone there are several communities where the inha-

bitants practice subsistence cultivation and produce pulque and charcoal for consumption by communities further downslope. Otherwise there is no modern occupation of the area, and not much cultivation because of the generally severe erosion.

3) Lower Piedmont: This is an area of gentle slopes, deeper, less eroded soils than the Upper Piedmont, and barrancas which are not as deeply incised as those of the Upper Piedmont. The Lower Piedmont ranges in elevation from 2275 to 2500 meters, and covers an area of 197 square kilometers. In the northern Texcoco Region the Lower Piedmont zone contains two permanent streams, the Rio Papalotla and the Rio Jalopango. These are the only permanent streams of any size in the region. The floodplain formed by these two rivers is the largest expanse of low-lying, gently-sloping ground in the Lower Piedmont. Along the upper part of the Lower Piedmont there are a series of communities where intensive agriculture is practiced, involving mostly irrigated terraces. The lower, flatter, portion of the Lower Piedmont is used today primarily for rainfall cultivation of maize, beans, and barley, and for irrigated alfalfa.

4) Lakeshore Plain: This is the zone between the edge of ancient Lake Texcoco at about 2240 meters and the Lower Piedmont, at about 2275 meters, covering an area of 127 square kilometers. This zone is the largest expanse of deep-soil plain in the eastern Basin of Mexico, and is the most intensively occupied and cultivated zone in the region today. Cultivation here involves mostly irrigation of alfalfa, using water from gasoline and electric-powered pumps. At the juxtaposition of the Lakeshore Plain and the Lower Piedmont there are a series of nucleated communities, including Texcoco, Huexotla, and Coatlinchan, which are the largest communities in the Texcoco Region. West of the Lakeshore Plain is the Lake-Bed, which consists mostly of a barren wasteland with highly salitre soils.

Environment of the Ixtapalapa Peninsula Region (Fig.7): This region extends east from the vicinity of Cerro de la Estrella along the Ixtapalapa Peninsula, east across most of the Cerro Pino massif, and east of that massif as far as the Sierra zone between the southern border of the Texcoco Region and the old Puebla highway, and includes Tlapacoya Island (Fig.6). Along the Ixtapalapa Peninsula, the survey limit north and south was normally a line several hundred meters out from the shorelines of ancient Lakes Texcoco and Chalco. The total area of the region is 215 square kilometers, all of which was intensively surveyed. The region is in the south-central portion of the Basin of Mexico and in part formed the division between the freshwater Lake Chalco and the saline Lake Texcoco. Although there is no weather station in the region from which to obtain precipitation data, rainfall here is probably about 600-700 mm. per year (García, 1968: Mapa 8). During an average year or a wet year, this region is within the area classified by Lorenzo (1968: Figs. 4 and 12) as "Transición", which implies that irrigation is necessary to assure success of agriculture every year. During the dry years, however, Lorenzo (ibid.: Fig.11) places this area in the "Arido" classification, which implies that cultivation is not possible without irrigation. There are no permanent streams within the region today, with the exception of several rivers of sewage which do not originate within the region, and there are no springs. According to the descriptions of the area which I was able to find from the early Colonial period, there were no streams at that time, either. There were, however, three fresh-water springs at Tlapacoya Island (Peñafiel, 1884: Lam. 3a), and there were several springs in the vicinity of Mexicaltzingo, at the edge of Lake Texcoco near the western-most tip of the peninsula (Paso y Troncoso, Vol.6:194). None of these springs function today.

Much of the Ixtapalapa Peninsula Region is steep and rugged. Two large volcanic massifs dominate the region, the Cerro Pino massif and the Cerro Sta. Catarina massif (Fig.6), and there are several smaller volcanic mountains, including Tlapacoya Island, Cerro Caldera, and Cerro de la Estrella. The Cerro Pino massif and the Cerro Sta. Catarina massif are situated along a major recent (i.e. post-Pliocene) volcanic fracture which is one of several crossing the southern Basin of Mexico at an angle of west southwest--east northeast (Mooser, 1956:Fig.6;page 16). Volcanic activity occurred along this fracture very recently at Cerro Xitli in the southwestern Basin of Mexico, which erupted during the end of the Formative period. Cerro de la Estrella, on a parallel fracture to the north of the latter fracture, is much older than Cerros Pino and Sta. Catarina (ibid.), and is consequently much more eroded.

The Ixtapalapa Peninsula Region has been divided into several provisional environmental zones, as indicated in Figure 7. A brief description of each of these zones follows:

1) Sierra: This is the steep, mountainous, heavily wooded zone above 2750 meters, a southward extension of the Sierra zone of the Texcoco Region (Plate 16). Only a small area within this zone was surveyed, 1.5 square kilometers. There is no modern occupation of this area today, and no evidence of Prehispanic occupation. This zone is used today primarily for grazing and exploitation of forest resources.

2) Upper Piedmont: This is the area directly below the Sierra zone, between 2500 and 2750 meters, and is a direct continuation of the Upper Piedmont zone of the Texcoco Region. Topographically, the Upper Piedmont is characterized by a series of east-west ridges which are separated by deeply incised, steep walled barrancas 5 to 15 meters in depth. Soil in this zone is generally one meter or less in depth, and is completely eroded away, exposing tepetate in many places (Plate 1). There is no modern occupation of this zone. The area is used primarily for rainfall cultivation of maize, wheat, barley, nopal, maguey, and some grazing. Although portions of the area are severely eroded, it is my impression that this zone is not as severely eroded as the Upper Piedmont of the Texcoco Region. This zone covers an area of 11 square kilometers.

3) Lower Piedmont: There are two areas within the Ixtapalapa Peninsula Region which have been classified as Lower Piedmont. In the eastern portion of the region, this includes the area below the Upper Piedmont, extending west to the lower slopes of the Cerro Pino massif. In the western portion of the region, the slopes of Cerro de la Estrella have been included in this environmental classification.

The large area of Lower Piedmont in the eastern portion of the region is between 2280 and 2500 meters in elevation, and covers an area of 52.5 square kilometers. For the most part this zone is characterized by medium to gentle slopes and soil generally less eroded and deeper than that of the Upper Piedmont zone. Plate 2 shows a typical Lower Piedmont scene taken in the area just below the Upper Piedmont. Douglas White is shown in this plate standing on a low, flat ridge covered with one to two meters of soil, bordered north and south by barrancas which are only several meters deep (although two barrancas in this zone are 10 meters or so in depth). Most barrancas in the Lower Piedmont zone are shallow enough to be used for floodwater cultivation. On the Cerro Pino massif, the Lower Piedmont zone is that area along the lower flanks (Plate 3). The Lower Piedmont zone in the eastern portion of the survey area is not occupied today, but is used intensively

for rainfall cultivation of maize, maguey, wheat, barley, and some nopal. There is abundant evidence that during the Colonial period and later this area of Lower Piedmont was flood-water irrigated. One kilometer or so southeast of the modern town of San Francisco Acuautla there is a large stone and concrete dam (constructed in the 18th century according to an inscription found on the dam) which is roughly 8 meters high and 300 meters long, oriented roughly north-south (Plate 15). The dam no longer functions because it is silted up. One barranca leads directly into the dam, and another to the north was tapped by a canal. A canal runs from the dam to the main alluvial plain below in the vicinity of the abandoned Hacienda Carmen, located roughly one kilometer southwest of the dam. Several other dams and canals, not now functioning, attest to the intensity of floodwater irrigation in this area during the Colonial period and later. Some apparently Colonial and recent jagueys and dams on a ridge adjacent to the Puebla Highway are still functioning today.

The Cerro de la Estrella Lower Piedmont, which covers an area of 6.5 square kilometers, ranges in elevation from about 2260 meters to the summit of the hill at about 2500 meters (Plates 4 and 5). This area is characterized by low, broad ridges separating barrancas which are generally not more than several meters deep. Most of the zone is blanketed by one meter or more of light grey-brown loam, although there are several eroded areas on the south and west slopes. The bedrock here is loosely compacted tepetate containing numerous pumice chunks. The summit of the hill, which is generally steeper and rockier than the remainder of the area, is a state recreational park, covered with a grove of "alcanfór" trees (*Cinnamomum camphora* [L.]). The modern towns of Ixtapalapa, Tomatlan, and Culhuacan are expanding at an increasing rate upslope onto the Lower Piedmont zone. Open fields on the Cerro de la Estrella Lower Piedmont are used mostly for rainfall cultivation of maize and maguey. One of Mexico City's largest graveyards, the Panteon Civil covers a large area on the south-eastern slopes of the hill.

One additional area that fits into the category of Lower Piedmont zone is the summit area of Tlapacoya Island (Plates 6 and 7).

4) Cerro Pino Upper Slopes: This zone is in approximately the same elevation range as the Upper Piedmont (i.e. 2500 to 2750 meters), but is environmentally unlike the Upper Piedmont. This is a large area of relatively flat, broad ridges separated by gullies which become barrancas further downslope. The only steep slopes in the area are the sides of the gullies and the slopes near the tops of the dominant volcanic cones, Cerro Pino, Tejocote, and Tejolote (Plate 8). Surrounding this high, flat zone on all sides are the steeper eroded slopes of the Cerro Pino Lower Slopes zone and upper edge of the Lower Piedmont zone. For the most part the Cerro Pino Upper Slopes zone is grass-covered, but there are several dense stands of conifers. There is no modern occupation of this zone, and it is utilized today mostly for grazing and a very limited amount of rainfall cultivation of maize, wheat, barley, nopal, and maguey. The zone covers an area of 9.1 square kilometers.

5) Cerro Pino Lower Slopes: This zone is in the same elevation range as the Lower Piedmont (i.e. roughly 2250 to 2500 meters), but is generally distinctive from the Lower Piedmont zones in the region. This side of the Cerro Pino massif, the west side, is steeper and much more eroded than the remainder of the slopes of Cerro Pino. In general, the Cerro Pino Lower Slopes is characterized by deeply incised barrancas and extensive washes where the soil has been eroded away to expose tepetate (Plate 9). Even where there are occasional flat areas the soil is thin and rocky (Plate 7). Near the lower edge of the zone, however, slopes become less steep

and are more like the Lower Piedmont zone. There is no modern occupation of the Cerro Pino Lower Slopes, except around Ayotla, which has recently begun to expand up the steep slopes. The zone is used primarily today for cultivation of nopal and maguey because these plants will thrive even in relatively dry, soiless areas, although there is also a limited amount of cultivation of maize, wheat, and barley, particularly on the gentler lower slopes. In addition, there are a series of stone-faced terraces in the vicinity of Ayotla which make cultivation of the steep slopes possible. The Cerro Pino Lower Slopes covers an area of 11.4 square kilometers.

6) Lomas and Hoyas: This is a very distinctive environmental zone, consisting of the Cerro Sta. Catarina massif (Plate 10). This zone ranges in elevation from about 2250 meters to the summit of Cerro Sta. Catarina at about 2700 meters. For the most part the topography here is very rough, consisting of low miniature valleys, the "Hoyas" surrounded by small but rugged and steep hills, the "Lomas". The outstanding feature of this zone is that it is very rocky. Apparently the volcanic activity which created this massif was so recent that the pumice has only begun to break down into soil. Plate 11 gives a good impression of the nature of this desolate zone, although not all of the zone is as rugged as that pictured. Vegetation over most of the Lomas and Hoyas is sparse and consists mostly of scattered Peru trees, weeds, grass, nopal, maguey and "palo loco", a small tree-like shrub which will grow where there is very little soil. In the Lomas and Hoyas generally soil is about one-half to one meter of light grey-brown loam containing numerous pumice chunks. There is no modern occupation of the area today, but it is used in some places for rainfall cultivation of maize, beans, and squash. In order to create flat fields with enough soil for cultivation, the farmers have piled rocks along the edge and within the fields. These rocks now form terraces, walls around fields, or just plain piles (Plate 12). Crawling over these walls, terraces, and piles of rock during survey was like crossing an obstacle course all day. In the highest and most rugged and desolate portions of the zone, not used today for cultivation, there are numerous ancient terraces and rock walls (Plate 13), which indicate the area was more intensively cultivated at some time in the past than it is today. In some cases, there are Aztec residences associated with these abandoned features, suggesting the Aztec period was the period of most intensive utilization of the Lomas and Hoyas. Associated with some of the modern fields there are small rock huts where the cultivators spend a few nights a year guarding the crops during the height of the agricultural season (Plate 14).

It is my impression that the northwest portion of the Lomas and Hoyas receives more precipitation and therefore has more vegetation than the remainder of the area.

An important resource in this zone today is pumice and cinder, for use as construction material and fill. There are a large number of small quarries scattered over the zone, and several very large quarries on the steep slopes of the volcanic cones.

The Lomas and Hoyas zone covers an area of 36 square kilometers of which at least 4 square kilometers is unusable steep slope.

7) Lakeshore Plain: This is the low, generally flat alluvial plain along the bases of the Lower Piedmont, Cerro Pino Lower Slopes, Tlapacoya Island, Lomas and Hoyas, and Cerro de la Estrella. Elevation of this zone ranges from about 2240 meters to as high as 2280 meters. Throughout the Lakeshore Plain there are several meters of light brown loam, not eroded. For the most part the Lakeshore Plain is a narrow band between steep slopes and the Lake-Bed, but there are two relatively large expanses of Lakeshore Plain, one west of the Lomas and Hoyas zone, and one

east of the Cerro Pino massif. This latter area will be referred to as the Acuatla Lakeshore Plain because the modern town of Acuatla is located there (Plate 3). The Acuatla Lakeshore Plain is a much more valuable agricultural resource than the large expanse of Lakeshore Plain west of the Lomas and Hoyas because the former area is adjacent to a series of barrancas which carry water seasonally to the plain and could be used for floodwater irrigation.

Almost all of the modern population of the Ixtapalapa Peninsula Region resides in the Lakeshore Plain zone. This zone is also the most intensively cultivated zone within the survey region, probably because the deep soil retains moisture better than shallow soil. Most of this zone today is used for rainfall cultivation of maize, but several large dairy farms in this zone have irrigated alfalfa fields, using electrically pumped water from wells.

The Lakeshore Plain zone covers an area of about 60 square kilometers.

8) Volcanos: These are the isolated volcanic cones which, like those in the Lomas and Hoyas zone and the Cerro Pino Upper Slopes, are steep-sided with little or no flat land or soil suitable for cultivation. Included in this category are the steep slopes of Tlapacoya Island (except for the summit area, which is an area of Lower Piedmont), Cerro Caldera (which is not a volcanic cone, but rather consists of lake-bed sediments lifted up into their present position, apparently by a massive release of gas), Cerro Xaltepec, and Cerro de San Nicolas (Fig.6). Although Cerro Xaltepec is as steep-sided as the other volcanic cones, part of its slopes are now under cultivation.

9) Lake-Bed: This is the zone beyond the Lakeshore Plain that was once covered by the waters of Lakes Chalco and Texcoco previous to their drainage. In the vicinity of ancient Lake Texcoco (except for the area around the modern town of Ixtapalapa, which was converted into chinampas during the Aztec period), the Lake-Bed zone is flat and nearly devoid of vegetation except for patches of grass of a variety which will grow in the salitre soils. The Lake-Bed of ancient Lake Chalco is similarly flat, but soils here are not salitre, and most of the area is covered with thick grass or is utilized for cultivation of maize, sugar-beets, or alfalfa. The Lake-Bed of Lake Chalco is criss-crossed by a series of drainage canals which were dug apparently in order to lower the water-table enough to allow cultivation.

East of Cerro de la Estrella there is a low, flat area which has soil transitional in color and texture between the light-grey salitre Lake Texcoco soil and the darker, non-salitre Lake Chalco soil. This was probably an area through which water passed seasonally from Lake Chalco into Lake Texcoco when the former overflowed. At times, therefore, Cerro de la Estrella was an island.

To conclude, the Ixtapalapa Peninsula Region is a complex area geographically, with environments ranging from high, rugged Sierra, to piedmont slopes, deep-soil alluvial plains, and, before the Spanish conquest, lakes. Water for agriculture is now, and probably always has been, scarce. The juxtaposition of steep slopes and alluvial plains, however, in a number of locations would have allowed flood-water irrigation, and rainfall cultivation, while risky, is more dependable than, for example, in the Teotihuacan Valley. Special resources in the area include, in the Sierra zone and the Cerro Pino Upper Slopes, forest products, construction stone in the Lomas and Hoyas and several other localities, and lacustrine products, for example salt along the edge of Lake Texcoco.

Environmental Changes in the Basin of Mexico From the Formative Through the Postclassic: Several authors have addressed themselves to the problem of changes in precipitation in the Basin of Mexico since the Formative (cf. Sears and Clisby, 1955; Lorenzo, 1956; Sanders, 1965:27-31). I do not wish to take time here to review all of this literature, but the following is a brief outline of the evidence along this line which is most convincing:

1) The Early and Middle Formative might have been a relatively wet period when lake levels were high, as evidenced by periodic flooding at Zacatenco, Ticoman, and El Arbolillo (Vaillant, 1930, 1931, 1935). This is not adequate evidence of a wet period, however, because there could have been floods during some years even in a generally dry period.

2) Several Late Formative sites (Ix-LF-4, Tx-LF-13 and 14), in the eastern Basin of Mexico, and one Terminal Formative site (Tx-TF-46, which is El Tepalcate, excavated by Noguera, 1943), are below Aztec lake levels, possibly indicating the Late and Terminal Formative periods were relatively dry compared to preceding and subsequent periods.

There is not, as far as I can tell, sufficient evidence to show that there were other important periods of fluctuations in lake levels or other indications of climatic fluctuation, so it will be assumed that, for the most part, except for the possible fluctuations outlined above, there were no significant changes in the environment of the Basin of Mexico from the Early Formative through the Aztec periods.

Modern Population in the Ixtapalapa Peninsula Region: Figure 8 is a map of modern communities in the region. Table 2, page 33, gives the names of the communities, corresponding to the number adjacent to each community on the map. The heavy black lines on the map are major roads. The old Puebla highway runs roughly east-west from Los Reyes through Ixtapaluca. The Texcoco highway branches off of the former road just south of Los Reyes. The double line which crosses the Ixtapalapa Peninsula beginning at Sta. Marta and continuing around the south edge of Tlapacoya Island is the Mexico-Puebla Autopista.

Table 2 indicates the population, area in hectares, and population density in people per hectare for all of the modern communities in the region. The population data was obtained from the 1960 census (VIII Censo General de Poblacion, Mexico, 1963, the volumes for the Estado de Mexico and the Distrito Federal). Nearly all of the communities have grown considerably in recent years, such that today it is difficult to tell where one community stops and another begins. I measured the areas of the communities using maps made around 1960 before most of this rapid growth occurred (the topographic maps published by Mexico's Secretaria de la Defensa Nacional). The maps include Xochimilco (14 Q-h(88)), Huexoculco (14 A-h (90)), and Chalco (14 Q-h (89)).

The total population of the Ixtapalapa Peninsula Region, as indicated in Table 2 is not exact because I could not determine what percentage of the total population of Ixtapalapa and Mexicaltzingo was within the limit of the survey. The total population for these two communities is about 26,000; I estimated 20,000 were within the survey area. In another respect the total population of the region indicated in Table 2 is not correct because the populations of many communities, particularly those close to Mexico City, or which are a part of it, have apparently increased

Table 2

Modern Population of the Ixtapalapa Peninsula Region

Number	Name	Population	Area	Population/Hectare	Comments
1	San Francisco Acuatla	2000	42 hectares	47	
2	Ixtapaluca	3373	72 hectares	47	
3	Tlapacoya	862	15 hectares	55	This population and area refers to the village of Tlapacoya proper, and does not include Colonia Tlapacoya, which extends east from Tlapacoya Island along the old Puebla Highway, for which no population data was available.
4	Ayotla	4654	46 hectares	101	
5	Tlapizahua	958	14 hectares	68	
6	La Magdalena	1331	21 hectares	64	
7	Tecamachalco	884	19 hectares	46	
8	Los Reyes	3851	53 hectares	73	
9	Sta. Catarina	679	23 hectares	30	
10	Santiago Acahualtepec	1428	9 hectares	158	This population figure seems too high.
11	Sta. Marta	2720	18 hectares	151	
12	San Sebastian	1447	20 hectares	72	
13	Sta. Maria Astahuacan	4097	41 hectares	100	
14	Sta. Cruz Meyehualco	3151	57 hectares	55	
15	Tlaltenco	5743	44 hectares	130	
16	Zapotitlan	5163	60 hectares	86	
17	San Lorenzo Tezonco	7364	25 hectares	294	This population figure seems too high.
18	Tomatlan	624	41 hectares	15	
19	Culhuacan	17,206	81 hectares	212	This includes San Francisco Culhuacan and the city of Culhuacan.
20	Ixtapalapa	20,000	567 hectares	35	This includes Mexicaltzingo. The population density figure seems to be low; perhaps the population figure which I estimated is incorrect. It is also possible the population density of Ixtapalapa is low because so much area is covered by industrial buildings.
Totals		87,535	1464 hectares		

substantially in size since 1960. This is particularly the case in the area of the lake bed of ancient Lake Texcoco which is being rapidly populated now.

The density of occupation of the Ixtapalapa Peninsula Region is far greater today than for any Prehispanic period (Fig.61), and probably represents a density of occupation which exceeds the agricultural potential of the region. A dense population exists here because a large segment of the population is engaged in the economic system of industrialized Mexico City. There are some subsistence agriculturalists in San Francisco Acuautla, Ayotla, Ixtapaluca, Sta. Catarina, Tlaltenco, and Zapotitlan, but even in these relatively rural communities large numbers of people commute daily by bus into Mexico City to work, or work in local industries or on mechanized farms. Because of the nature of the modern adaptation to the region, it would be of little value to compare the modern population of the region in any respect to the Prehispanic populations here, which consisted largely of agricultural peasants.

Chapter 4

Early and Middle Formative

INTRODUCTION

The Olmec problem has attracted the attention of many Mesoamerican archaeologists in recent years. Interest in the Olmec became particularly intense when it was shown that La Venta long preceeded Classic Maya civilization (Drucker, Heizer, and Squier 1957, 1959; Berger, Graham, and Heizer, 1967). Even more exciting was Coe's discovery that San Lorenzo Tenochtitlan had flourished during the latter part of the Early Formative (Coe, Diehl, and Struiver, 1967; Coe, 1968a, 1968b, 1969). This discovery demonstrated beyond any doubt that Olmec culture had been centered in the tropical lowlands of southern Veracruz and part of Tabasco. The distinctive Olmec art style and ceramic assemblage apparently diffused from centers like San Lorenzo Tenochtitlan in the "Olmec heartland" widely over much of Mesoamerica during part of the Early Formative.

The pottery of the Chicharras (1250 - 1150 B. C.) and San Lorenzo (1150 - 900 B.C.) phases at San Lorenzo Tenochtitlan display the distinctive features which can be identified as Olmec (Coe, 1969). The Chicharras phase is distinguished by such things as white-rim black ware; "kaolin" ware; hematite-slipped tecomates with exterior decoration of incised parallel lines, zoned crosshatching, or "false rocker stamping", or real rocker-stamping; Olmec figurines; and evidence that during this time the first large stone monuments were carved. During the subsequent San Lorenzo phase, San Lorenzo Tenochtitlan reached its maximum Formative population, and major architectural activities were carried out. In addition, during this time, numerous large stone monuments were carved. The pottery of the San Lorenzo phase represents in part a continuation of the Chicharras, with two additional types which Coe (ibid.: 10-1) describes as "...two pottery types which can only be called Olmec. Calzadas Carved largely consists of flat-bottomed bowls with outslanting or nearly vertical sides; the rims may be plain bolstered on the exterior, or slightly everted. Exteriors were carved when leather-hard in broad gouges with sharp edges, the ends of the gouges either squared or carved and tapered to resemble claws. The motifs on Calzadas Carved vessels show familiar Olmec elements like crossed-bands, jaguar paw-wing, flame brows, and fire serpent jaws. Red hematite filled the gouges and roughened areas associated with them. Calzadas Carved varies from tan to grey to black in color, with some white-rimming through differential firing."

"The other pottery marker is Limon Carved-Incised. In shapes, color, and firing it is identical with Calzadas Carved, but the grooved or incised designs are pretty much restricted to the opposed rotated scrolls known as the ilhuitl motif". Following the San Lorenzo phase there was destruction of numerous stone monuments on the site and major construction activities came to a halt.

I have quoted Coe's description of pottery of the Chicharras and San Lorenzo phases at length because these same ceramic markers occur in many places in Mesoamerica and are the markers of the latter part of the Early Formative. For example, pottery of this type has been described for the Cuadros phase of the Pacific coast of Guatemala (Coe and Flannery, 1968), the San Jose phase in the Valley of Oaxaca (Flannery, 1968), the La Juana phase in Morelos (Grove, 1970), the Chiapa I phase in the Grijalva depression (Dixon, 1959), the Ajalpan phase in the Tehuacan Valley (Macneish, 1962), and the Ixtapaluca phase in the Basin of Mexico (Tolstoy and Paradis, 1970).

The last-cited reference represents the most recent attempt to clarify the Early

and Middle Formative ceramic sequence in the Basin of Mexico. The Formative sequence there was first outlined by G. C. Vaillant based on his well-known excavations at Zacatenco, Ticoman and El Arbolillo (Vaillant, 1930, 1931, 1935). Vaillant (1941: 28-49) divided the Formative into two basic periods, the Lower-Middle (also called Copilco-Zacatenco), and Upper Middle (also called Cuicuilco-Ticomán), a division which, as will be pointed out below, is still basically valid today. His further sub-divisions of the Lower Middle period are somewhat more difficult to use, particularly for survey. Probably the major problem of the Basin of Mexico Formative sequence was the chronological placement of the Tlatilco burials in terms of Vaillant's sequence (cf. Covarrubias, 1957; Porter, 1953; Tolstoy and Guenette, 1965). The recent discoveries at San Lorenzo Tenochtitlan, and some recent stratigraphic excavations in the Basin of Mexico by Tolstoy and others, however, have thrown new light on the subject. Tolstoy has defined a new phase, present at Tlatilco and Tlapacoya (which he calls Ayotla), the Ixtapaluca phase (Tolstoy and Paradis, *ibid.*). This is the earliest known ceramic phase in the Basin of Mexico, and it is Early Formative in date. The ceramic markers of this phase are the Olmec types which pertain to the San Lorenzo phase at San Lorenzo Tenochtitlan. At El Arbolillo, Tlatilco, and Ayotla, Tolstoy and Paradis were able to isolate a subphase (the Iglesia-El Arbolillo, which is called the Bomba subphase at Ayotla) which is transitional between the Early and Middle Formative. The important ceramic markers of this subphase include "brown-paste white ware" decorated on the interior with "grater-bowl" incision, combined with incised design below the rim in the double-line break motif. Rocker-stamped decoration disappears and differentially-fired wares (e.g., white-rimmed black ware) and flat-bottomed dishes decline. Round-bottom bowls, some of which are composite-silhouette in form, increase. Tolstoy and Paradis use the term Zacatenco to refer to the general Middle Formative period; in addition to the transitional Iglesia-El Arbolillo subphase, they have defined two other subphases of the Zacatenco phase. These two subphases are characterized by pottery types which I have used to identify the Middle Formative. The markers which I used include: thick, flaky cream-slip; incised interior walls, often with the double-line break; composite-silhouette bowls, often with elaborate incised designs in cream-slip above an interior ledge, or red on white decoration in the same place; bowls, usually cream-slipped, with flanged, thickened or bevelled rims, often with grooved lips; and light brown to reddish-brown direct-rim ollas and basins. The table on page 19 shows the chronological positions of the Early and Middle Formative phases in the Basin of Mexico and their relation to published sequences.

Comparative Material

No Early Formative sites were found in the Teotihuacan Valley or the Texcoco Region. The first occupation of these two areas by ceramic-using groups was the Middle Formative. Middle Formative occupation of the Teotihuacan Valley was limited to 18 hamlets (Sanders, 1965:92-3; 153-6; 163-7; Fig.4). The focus of occupation was the Patlachique Range, in the upper piedmont and higher. All of the Patlachique sites are located adjacent to barrancas. Two sites are located on the upper edge of the piedmont at the base of steep slopes and near barrancas on Cerro Gordo. Middle Formative was also noted on the alluvial plain, at three localities in the archaeological zone of Teotihuacan, at one locality on the Lakeshore Plain, and at one locality in the Upper Valley on the edge of the piedmont.*

* Editor's note - Reevaluation of the Middle Formative by Sanders indicates that there were only seven hamlets in the valley, only one of which was on the plain.

In the Texcoco Region (Fig.32) the Middle Formative occupation displays a similar pattern (Parsons, MS:294;304-8;395-401). Eighteen of the 19 sites encountered are small hamlets situated in the upper part of the Lower Piedmont adjacent to barrancas or rivers. A large site at Chimalhuacan (Tx-MF-13), 45 hectares in area, contained at least two-thirds of the total population. It is located adjacent to Lake Texcoco at the base of the steep slopes of Cerro Chimalhuacan.

Early and Middle Formative Site Descriptions (Figs. 41,42, and Figs. 51,52).

Ix-EF-1 Ayotla

NATURAL SETTING: The narrow Lakeshore Plain along the southwest edge of Tlapacoya Island, at about 2240m. Soil is deep dark grey to black. Water table is now less than five meters below the surface.

MODERN UTILIZATION: The north part of the site is under the modern town of Tlapacoya. For this reason, it was difficult to define the north edge of the site. Near the south edge of the site there is evidence of pot-hunting in an area which apparently had numerous burials (judging from the number of human bones scattered around the back-dirt piles of the pot-holes). In addition to this potting, the southern part of the site has been modified recently by earth-moving in connection with construction of the Mexico-Puebla Autopista. Today most of the site area is used for grazing, although some sugar-beets, maize, nopal, and maguey are rainfall-cultivated around some of the modern residences. Above the site on the steep slopes of the volcano there are several rock quarries in operation today.

ARCHAEOLOGICAL REMAINS: localized and variable sparse to light but in some places moderate, Early Formative scattered over an area of nine hectares. No structures noted. Abundant rock rubble is scattered over the site area, but it is not possible to determine whether this is construction debris from the Early Formative occupation or detritus which has eroded down from the nearby steep slopes. Also on the site are components of Middle Formative (Ix-MF-1) and Late Aztec, although the density of the latter is very light. The north part of the site (Fig.9) overlaps with the south part of the Tlapacoya site (Ix-LF-2 and Ix-TF-4).

Olmec pottery from "Tlapacoya" (now called Ayotla) has been illustrated by Coe (1965), and illustrated and described by Weaver (1967), and described by Tolstoy and Paradis (ibid.), whose article has been described above. We made a substantial surface collection from the site as part of our work there. Examination of this material indicated that Ayotla Early Formative pottery is like the San Lorenzo phase pottery at San Lorenzo Tenochtitlan except for the scarcity of, as far as I could tell, "kaolin ware", and tecomates are not common. Our collections include a large quantity of crude utilitarian ware which as far as I know has never been described before. I cannot say whether this crude material pertains to the Early Formative or to the Middle Formative Bomba subphase which is also abundantly represented on the site. This utilitarian pottery consists mostly of dark-brown to black flaring mouth ollas and basins with bolstered rims and sharp interior lip edges.

Other artifacts noted on the surface included gray obsidian scrapers, blades and debitage. No ground-stone was noted.

A series of three excavations have been carried out at Tlapacoya Island under the direction of Jose Luis Lorenzo; two of these are in the vicinity of the Ayotla

site (Fig.9). The excavations have been designated Tlapacoya I (E. and M. Goodliffe, 1966; C. Vance Haynes Jr., 1967), Tlapacoya II (L. Mirambell, 1967), and Zohapilco (C. B. Niederberger, 1969). The Tlapacoya I excavation consisted of two parallel trenches which ran from the slopes of the volcano south into the bed of Lake Chalco. The deposits encountered consist primarily of volcanic deposits alternating with beaches, peat, and paleosols which date from the last part of the last glaciation down to the Formative. Some early evidence of human activity was encountered including a quartz scraper, from the vicinity of a beach deposit which was dated at $22,200 \pm 2,600$ BP (A-790A). The gravels of this beach were covered by a level of mud which contained a circle of rocks roughly two meters in diameter which was presumably a hearth. Charcoal in the hearth yielded a date of $24,000 \pm 4,000$ BP (A-790A).

Tlapacoya II was excavated in 1967 (Mirambell, *ibid.*). A long section was exposed here from a cave up on the slopes of the volcano north to the bed of Lake Chalco. Like Tlapacoya I, the strata consist of volcanic levels alternating with peat and four distinct beaches. One tool was found in the preceramic levels, an obsidian blade dubiously associated with a tree trunk which yielded a date of $23,150 \pm 950$ BP (GX 1959), which is roughly the time of the hearth at Tlapacoya I.

Zohapilco has been reported upon in preliminary fashion (Niederberger, *ibid.*). Here a meter-wide trench, roughly 50 meters long was dug from the base of the volcano out into the lake-bed. The earliest cultural material, from roughly 3.5 meters below the surface, comes from a level called Zohapilco I which has dates of $7,040 \pm 115$ BP (I 4405) and $6,200 \pm 125$ BP (I 4192). The dominant artifacts in this level are grey obsidian chips, along with some projectile points, pounding stones, artifacts of basalt (ground stone?), and worked wood. Based on the evidence from faunal remains in this level, the excavator suggests hunting and fishing were the basis of subsistence, although teosinte (*Euchlaena mexicana*) is also present and was probably part of the diet. Above Zohapilco I there are two sterile levels followed by Zohapilco II, which has a radiocarbon date of $4,250 \pm 110$ BP (I 4404). Hearths, consisting of local stones arranged in circles, are present in this level. The preponderance of milling tools suggests that by this time vegetal foods had become more important in the diet. Tezontle was used to make ground-stone bowls (*ibid.*, Foto 24). No ceramic vessels were noted, but a baked-clay figurine of unknown type was found.

The next level up which has cultural material is a Formative level with Olmec figurines which surely corresponds to Ix-EF-1. This level is approximately three meters below the surface. A radiocarbon date from peat just a few centimeters below this level is $3,310 \pm 110$ BP (I 4406), which agrees reasonably well with the 1150 B. C. date likely for the beginning of the Ixtapaluca phase.

These three excavations will be of great importance when they are fully published. Tlapacoya Island is the only location in the Basin of Mexico where an apparently continuous sequence of fauna, flora, and cultural material, including domesticated foods, from the end of the Pleistocene to the Formative has been excavated.

As mentioned above, Tolstoy and Paradis (*ibid.*) conducted an excavation at Ayotla. They dug three four-meter deep shafts apparently in the vicinity of the pot-hunted portion of the site 100 meters or so south of the Zohapilco trench, although the exact location of their excavation is not indicated in the report. The results of the excavation were briefly discussed above, and need not be repeated here. No

mention was made in their article of the presence of residences or other features. Maize cobs were recovered which have been turned over to Paul Mangelsdorf for analysis, and the faunal material was submitted to Kent Flannery. Flannery (personal communication) found that deer, rabbits (*Sylvilagus* and *Lepus*), gophers, mud turtle, and fowl are abundant, which suggests wild food resources were important in the Early Formative diet.

CLASSIFICATION: Village, pop. 90-225.

Ix-EF-2

NATURAL SETTING: Lakeshore Plain at about 2240 meters, near the south edge of the Lomas and Hoyas. The site is located on a small rocky promontory which projected slightly out into the ancient lake. Soil is 1 meter or so of light grey-brown loam, which contains numerous pumice chunks.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, but also of some nopal and maguey around the edges of fields.

ARCHAEOLOGICAL REMAINS: Light and in some places light to moderate pottery of many periods including some Early Formative, scattered over an area of three hectares. No structures noted. Depth of the deposit could not be determined. The Early Formative is mixed with Middle Formative (Ix-MF-2), Late Formative (Ix-LF-5), Classic (Ix-EC-23, Ix-LC-4), Early Toltec (Ix-ET-15), Late Toltec (Ix-LT-45), and Aztec (Ix-A-57). No explanation is obvious for the long-term occupation of the site.

CLASSIFICATION: Hamlet, pop 30 to 75.

Ix-EF-3

NATURAL SETTING: Lakeshore Plain, near the edge of Aztec-level Lake Texcoco, at about 2240 meters. The location is near the north edge of the Lomas and Hoyas. Soil is 1 meter or so of light grey-brown loam containing numerous pumice chunks. The site faces what appears to have been a small bay or inlet of the ancient lake. Across from the site there is a rocky tongue of land which projects into the lake-bed which forms the western boundary of the bay.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, with some nopal and maguey around the edges of fields. A large functioning tezontle quarry is located 200 meters south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and in some places light to moderate pottery, some of which is Early Formative, over an area of 4 hectares. No structures were noted, but fragments of plaster are scattered over part of the site area. The Early Formative is mixed with Middle Formative (Ix-MF-3), Late Formative (Ix-LF-8), Terminal Formative (Ix-TF-11), Classic (Ix-EC-30, Ix-LC-6), Early Toltec (Ix-ET-9), and Late Toltec (Ix-LT-33). An isolated pyramid-mound, which is roughly 30 meters square at the base (oriented north-south) and four meters high, is located roughly 25 meters south of the site. Although there is very little pottery on and around the structure, making it difficult to estimate when the mound was constructed and used, it is probably Postclassic in date.

CLASSIFICATION: Hamlet, pop. 40-100.

Ix-MF-1 Ayotla

NATURAL SETTING: On the narrow Lakeshore Plain along the south-east edge of Tlapacoya Island, at about 2240 meters. Soil is deep dark-gray to black loam. No erosion. Water table is 5 meters or less below the ground level.

MODERN UTILIZATION: The north part of the site is covered by the modern town of Tlapacoya. For this reason, it was difficult to define the north edge of the site. Near the south end of the site there is evidence of pot-hunting in an area which apparently had numerous burials (as evidenced by a number of human bones scattered on the surface, and in the back-dirt piles of the pot-holes). In addition, the southern third or so of the site has been modified by recent earth-moving related to the construction of the Mexico-Puebla Autopista. Today most of the site area is used for grazing, although some sugar-beets, maize, nopal and maguey are grown around some of the modern residences. Above the site on the steep slopes of the volcano there are several rock quarries in operation today.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light and in some cases moderate pottery scattered over an area of nine hectares. No structures were noted. Most of the pottery is Early Formative (Ix-EF-1), but there is abundant evidence of the Bomba subphase on the surface. Very little of the pottery in our surface collections pertains to the later subphases of the Middle Formative. Presumably, this area of the site (the Ayotla site) was abandoned sometime during the early part of the Middle Formative. North of the Ayotla site, in the area called Tlapacoya, Beatriz Barba de Piña Chan conducted a series of excavations which exposed some Middle Formative pottery (Barba, 1956). Most of the material on the Tlapacoya site pertains to the Late and Terminal Formative periods; however, some earlier material was noted in the lower levels of several of Barba's stratigraphic excavations. Very little Middle Formative pottery was noted by me on the surface of the Tlapacoya site, probably because the abundant later occupations there, plus the modern community, have obscured the Middle Formative material. Some Middle Formative was noted on the surface where the Tlapacoya site overlaps the Ayotla site.

The pottery encountered by Barba in the lower levels of her excavations was described by her as "Middle Preclassic". This may not be a useful term for our purposes since the site was written up long before the stratigraphic work by Tolstoy and others, which has greatly clarified the Early and Middle Formative ceramic sequence in the Basin of Mexico, was done. Fortunately, Barba illustrated some of the Middle Preclassic material which she obtained. Middle Preclassic was encountered in the following excavations:

1) In level XIII of the geological test made in the "zona de habitaciones" (Fig.9) she encountered a bell-shaped pit which contained Middle Preclassic sherds (ibid. pp. 53-55; lam.1). None of this material was described or illustrated in the text. This bell-shaped pit was located roughly 4 meters below the surface. More than a meter of sterile earth was encountered between this feature and the lowest level of Late Formative pottery.

2) "Pozo 1", located at the lower (north) edge of the site, probably in the vicinity of the old lake edge (Fig.9). The earliest cultural material here occurred in a level 1.75-2.00 meters below ground; it contained some "Middle Preclassic" sherds which are described and, in part, illustrated in the text.

3) In "Pozo 3" (Fig.9), "Capa III" some Middle Preclassic was noted. "Capa III" is the lowest stratigraphic level of this excavation. Some of the material from this excavation is described, and in part, illustrated.

Because Barba excavated by arbitrary levels, there seems to be some mixture of Middle Formative and Late Formative pottery in the levels outlined above. No Early Formative or Bomba subphase material is present which is illustrated, as far as I can tell, but there are a number of sherds which pertain to the other subphases of the Middle Formative. For example, she illustrates cream-slipped incised bowls, both hemispherical and composite-silhouette (lam. 2 and 3), "cafe rojizo" and "cafe obscuro" ollas (lam. 2,a,f; lam.6, a-i,k,l,n), and red-on-white composite-silhouette bowls (lam. 8), which seem to be Middle Formative.

Barba suggests the "Middle Preclassic" occupation of the site was very light, judging from the small number of sherds encountered. This probably explains why no Middle Formative material was noted by me in the area of the site which she excavated.

CLASSIFICATION: (Ayotla), village, pop. 90-225. No estimate of the size or nature of the Middle Formative occupation of the Tlapacoya site can be made because of the absence of surface material.

Ix-MF-2

NATURAL SETTING: Lakeshore Plain at about 2240 meters, near the south edge of the Lomas and Hoyas. The site is located on a small rocky promontory which projected slightly into the ancient lake. Soil is 1 meter or so of light grey-brown loam which contains numerous pumice chunks.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, but also some nopal and maguey around the edges of fields.

ARCHAEOLOGICAL REMAINS: Light and some places light to moderate pottery of many periods including some Middle Formative scattered over an area of three hectares. No structures noted. Material from other phases is also present on the site including Early Formative (Ix-EF-2), Late Formative (Ix-LF-5), Classic (Ix-EC-23, Ix-LC-4), Early Toltec (Ix-ET-15), Late Toltec (Ix-LT-45), and Aztec (Ix-A-57). No explanation can be offered for the long-term occupation of the site.

CLASSIFICATION: Hamlet, pop. 30-75.

Ix-MF-3

NATURAL SETTING: Lakeshore Plain, near the edge of Aztec-level Lake Texcoco, at about 2240 meters. The location is near the north edge of the Lomas and Hoyas. Soil is 1 meter or so of light grey-brown loam containing numerous pumice chunks. The site faces what appears to have been a small bay or inlet of the ancient lake. Across from the site there is a rocky tongue of land which projects into the lake-bed which forms the western edge of the bay.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, with some nopal and maguey around the edges of fields. A large functioning tezontle quarry is located 200 meters south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and in some places light to moderate pottery, some of which is Middle Formative, scattered over an area of 4 hectares. No structures noted, but fragments of plaster are scattered over part of the site area. Other components represented on the site mixed with the Middle Formative are: Ix-EF-3, Ix-LF-8, Ix-TF-11, Ix-EC-30, Ix-LC-6, Ix-ET-9, and Ix-LT-33. An isolated pyramid mound, which is roughly 30 meters square at the base (oriented north-south) and four meters high, is located roughly 25 meters south of the site. Although there is very little pottery on and around the structure, making it difficult to estimate when the structure was constructed and used, it is probably Postclassic in date.

CLASSIFICATION: Hamlet, pop. 40-100.

Ix-MF-4

NATURAL SETTING: Lakeshore Plain between the Lomas and Hoyas and Lake Chalco at about 2240 meters. The site area was probably a low, flat peninsula which projected into Lake Chalco. Soil is 1 meter or so of light grey-brown loam, with abundant pumice chunks. No erosion.

MODERN UTILIZATION: A large modern graveyard defines the northwest corner of the site, and probably covers some of it. The remainder of the site is under the north and northwest part of the modern town of Tlaltenco. Open fields interspersed between residences and roads in Tlaltenco are used for rainfall cultivation of maize and some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and in some places light Middle Formative over an area of 12.5 hectares. No Middle Formative structures were noted. Depth of the deposit could not be determined. The pottery includes some types which pertain to the Bomba subphase. The site is covered by Ix-LF-6, and overlaps in part with Ix-EC-32 and Ix-LT-38.

CLASSIFICATION: Village, pop. 125-313.

CONCLUSIONS

Population: Total estimated population for the Early Formative is 160-400. This climbed somewhat during the Middle Formative to an estimated 285-713 (Fig. 6). The Middle Formative estimate may be low because of the problems of estimating the size of the occupation at Tlapacoya. In addition to the obvious problem of estimating site size at Tlapacoya, the estimates given for the other Early and Middle Formative sites are probably only approximate because of the problems of site preservation. In spite of this problem, it is obvious that the population density during the early part of the Formative was very low compared to later periods, and it grew very little during a span of 550 years. This long-continued low population density can probably best be understood in terms of the productivity of Early and Middle Formative cultigens. We have no studies as yet in the Basin of Mexico of the food-value or productivity of the maize utilized by these populations, but it was probably very low compared to later types. In the Tehuacan Valley, Mangelsdorf, MacNeish and Galinat (in Byers, ed., 1967:187-198; Fig. 123) found that the highly productive varieties of maize which became popular during the Classic and Postclassic (e.g., the Nal-Tel Chapalote Complex, Late Tripsacoid, Slender Pop, etc.) had not yet developed, or were relatively scarce during the Early Formative Ajalpan phase. It is unlikely that these highly productive varieties would have evolved significantly earlier in

the nearby Basin of Mexico, so the Early Formative situation was probably much the same in both valleys.

Kent Flannery (personal communication) recently analyzed the faunal remains from Tolstoy's excavations of Early and Middle Formative levels at Tlatilco, Ayotla and El Arbolillo. He identified abundant remains of aquatic animals (particularly water fowl and turtle), and land mammals (particularly the white-tail deer, but also including jack-rabbit, pocket gopher, mule deer, and domestic dogs). Although we do not have adequate data on subsistence from any Early or Middle Formative (or any other period) site in the Basin of Mexico such that it would be possible to estimate quantitatively the relative importance of hunting and collecting versus cultivated food in the diet, the abundance of wild-food remains from Tolstoy's excavations suggests wild food was very important.

Site Locations: The environmental variables which were apparently influencing the locations of Early and Middle Formative sites in the Basin of Mexico have been pointed out by Parsons (MS:305) and Sanders (1956:165).

1. They suggest that the optimum location for agriculture, given the absence of elaborate water-control technology, would have been high up on the slopes away from the low, flat areas, because frost danger is less in higher locations. In addition, mountain ranges tend to catch more rainfall than lower areas.
2. Locations near barrancas or streams were favored because of the possibilities of utilizing flood-water or simple canal irrigation.
3. Location near the ancient lakes was another favored niche as evidenced by the Chimalhuacan Middle Formative site, both because of the possibilities of utilizing aquatic resources, and the possibility of utilizing the high water-table found in low flat areas adjacent to the lakes for increasing agricultural productivity, perhaps like the "pot irrigation" done in the alluvial plain of the Valley of Oaxaca where the water-table is near the surface (Flannery, et.al., 1967). Also, as I noted, the lake edge may have been favored because the water ameliorated temperatures so there was less danger of frost.

As noted above, the bulk of the Teotihuacan Valley Middle Formative sites are high above the alluvial plain, and are located near barrancas. All but one Middle Formative site in the Texcoco Region are located adjacent to the Upper Piedmont near barrancas or streams. The large Chimalhuacan Middle Formative site is located at the base of a hill where there would have been ready access to steep slopes and the agricultural potential of the high water-table zone along the edge of Lake Texcoco (Parsons, *ibid.*:305).

Other Early and Middle Formative sites in the Basin of Mexico are situated in environmentally optimal locations. Tlatilco is located on the lower piedmont adjacent to the confluence of two small rivers which would have been suitable, perhaps, for some sort of simple irrigation. Although the site is located 35 to 40 meters above the level of the ancient lake and hence high enough to reduce the severity of the frosts, Lake Texcoco was presumably close enough to make exploitation of that niche possible as well. The sites excavated by Vaillant, El Arbolillo and Zacatenco, are also located in an optimum niche in terms of the variables pointed out above. They are close to Lake Texcoco and the steep slopes of the Guadalupe Range to the north (Fig. 2).

The locations of Early and Middle Formative sites in the Ixtapalapa Peninsula Region can probably be explained in terms of the suggested environmental variables.

The narrowness of the peninsula and close juxtaposition of ecological zones permitted great variability in settlement locations. All of the sites are located on the alluvial plain adjacent to the ancient lakes, in locations where high water-table agriculture was probably feasible, where aquatic resources would have been readily available (Figs. 10 and 11) and within easy distance of higher relatively frost-free agricultural land. The slopes of the Tlapacoya volcano are in part steep and nearly soil-less but near the top of the peak is an area of gentle slopes and deep soil. Another factor which could have encouraged occupation at Tlapacoya Island was the presence there of three fresh-water springs. These springs are now dry, but they were reported functioning in the 19th century (Peñafiel, 1884;85, and Lam.3a.). The map of Tlapacoya Island (Fig.9) shows the locations of these springs, two of which are in the area of the Ayotla site.

Aside from the environmental factors which influenced the locations of Early and Middle Formative sites, there might have been an important cultural variable in operation, namely, large sites are located on or near presumed major trade routes. This factor was first suggested by Jimenez Moreno (1966), and the idea has been more fully developed by Grove (1968a, 1968b). As a result of a survey of Formative sites in Morelos, Grove pointed out that Olmec sites tend to occur at natural passes between major valleys where the movement of long-distance trade goods could have been controlled. He suggests the same factor was important in determining the locations of Tlapacoya (Ayotla) and Tlatilco. Tlatilco is located near the major pass from the Basin of Mexico to the area of Toluca and points west. Ayotla is located where it could have controlled the movement of goods to and from the Basin of Mexico and Morelos and the Puebla Valley. This seems to be the best explanation so far presented to explain the locations of these two largest (as far as we know) Early Formative sites in the Basin of Mexico, but probably has nothing to do with the locations of Ix-EF-2 and Ix-EF-3. During the Middle Formative this factor seems to have been of less importance. Ayotla seems to have decreased in size during the Middle Formative (at least as far as I am able to tell from surface evidence), while a new site Ix-MF-4, larger than Ayotla, was founded in a location which probably had little to do with control of long distance trade routes. The largest Middle Formative site in the Basin of Mexico so far mapped, Chimalhuacan (Tx-MF-13), is not located on or near any important long distance trade routes. Tlatilco, however continued as an important center during the Middle Formative.

Local Organization: Very little can be said about local organization in the Ixtapa-Tapa Peninsula Region during the Early and Middle Formative, given the absence of suitably complete excavations and a sample of only a few sites. Evidence of ranking as early as Early Formative and continuing into the Middle Formative is probably present at Tlatilco, manifested as high-status burials. The elaborate Early Formative pottery from Tlapacoya illustrated by Coe (1965) may also be from high-status burials but none have, as yet, been excavated. The nature and basis of this ranking cannot be adequately understood until more is known of the nature of Olmec influence in the highlands. Several theories to explain the Olmec phenomenon have been offered: Covarrubias (1957:83) and Coe (1968b:111) have suggested that Olmec sites in the highlands represent outposts of an Olmec empire which militarily controlled local populations. Roman Pina Chan (Pina Chan and Covarrubias, 1964:25,28) has suggested that trade may have been a key factor in the spread of Olmec culture; as I mentioned above, Grove (ibid.) and Jimenez Moreno (ibid.) have also suggested this. Flannery (1968) has offered perhaps the most convincing explanation of Olmec influence in the highlands. Simply stated, Flannery suggests that during the Early Formative some societies in the highlands were in the process of becoming ranked. The emerging high-status members of these groups used Olmec goods and other exotic materials as status markers. The consumption of these goods served to reinforce a widespread economic system which was developing in much of Mesoamerica at that time,

which involved long-distance exchange. It is probably the case that control of movement of these goods, by groups in location near trade routes, could have served to further reinforce the already emergent ranking. Flannery and Schoenwetter (1970) have suggested that this widespread economic system was adaptive. They argue that "Among primitive agriculturalists, such trade is more than a luxury : it is often closely linked to the subsistence economy and thus indirectly related to the agricultural adaptation. Given the erratic rainfall of semi-arid regions like Oaxaca, unusually good years - and hence maize surpluses - are unpredictable. One way of 'banking' unpredictable maize surpluses (as an alternative to storage) is to convert them into imperishable trade goods which can be used either (1) as 'wealth' in times of shortage, or (2) as part of a ritual exchange system, used to establish reciprocal obligations between neighboring peoples. Such exchange systems help to 'even out' the differences between good and bad years by circulating foodstuffs and trade goods between regions with different crop cycles."

Chapter 5

Late Formative

INTRODUCTION

The best descriptions of Late Formative ceramics are in Vaillant's Zacatenco report (1930), the Late Period, and in his Ticoman report (1931). Subsequent to Vaillant's work a number of sites of this type were reported; R. Piña Chan (1955) mentioned 18 known "Preclásico Superior" sites in the Basin of Mexico. Previous to the Teotihuacán Valley project, however, only two sites of this period, other than Vaillant's sites, had been excavated. These two are Cuicuilco (Cummings, 1933; Heizer and Bennyhoff, 1958), and Tlapacoya (Beatriz Barba de Piña Chan, *ibid.*). These reports indicated that during the Late Formative there was widespread similarity of ceramics all over the Basin of Mexico. This proved to be the case as far as the sites in the Ixtapalapa Peninsula Region were concerned; here the Late Formative pottery is almost identical to the Ticoman Material. For this reason the Late Formative ceramic assemblage will not be described here.

COMPARATIVE MATERIAL

Teotihuacán Valley: The local variant of the Late Formative in the Teotihuacán Valley is called Cuanalán (Sanders, 1965: 167). This phase is characterized by material much like that from Ticoman with some minor variations which are of no importance here. Cuanalán settlement pattern differs only slightly from the preceeding Middle Formative (Sanders, 1965: 93-4; 153-6; 167-9; Fig. 5). Population increased somewhat over the Middle Formative levels, but still remained sparse compared with later phases. A total of 29 localities with Cuanalán pottery were located. All but two of these were hamlets or occupational traces. The remaining two sites were small villages, each with an estimated population of between 250 and 300. One of these is the type site of Cuanalán, where limited excavations were carried out. The site covers a total area of only six hectares. No civic-ceremonial architecture could definitely be attributed to the Cuanalán phase.

The Cuanalán hamlets and occupational traces were concentrated in the same environmental situation as the bulk of the Middle Formative sites, although the Patlachique Range was not as densely occupied. High land adjacent to barrancas or streams continued to be a favored settlement location. The most important departure from the Middle Formative settlement pattern was the appearance of the villages, on low, flat ground at the edge of the alluvial plain. One of these villages (TF-35) is located near the main springs. Sanders (*ibid.*: 168) feels the locations of these sites indicate the beginnings of irrigation agriculture in the alluvial plain during the Caunalan phase.

Texcoco Region (Fig. 33): Parsons (*ibid.*: 295; 309-13) and his group encountered a total of 29 Late Formative sites. These represent a population estimated to have been between 3860 and 9000. This represents a considerable increase over the 790 to 2150 estimated for the Middle Formative. As in the Middle Formative, hamlets, consisting of less than 50 people each, remained the dominant site type numerically, but 8 nucleated villages, ranging in size from 100 to 1800 people, were present (Tx-LF-8, 9, 12, 14, 17, 18, 22, 29). One site (Tx-LF-12) covered an area of 86 hectares and had a population estimated between 1700 and 3500, which represents one third to one half the total population of the region.

These villages are generally located in the Lower Piedmont. This represents a departure from the Middle Formative pattern, when the bulk of the population, at Tx-MF-13, was located at the junction of lakeshore and steep slopes. Parsons suggests that this first extensive agricultural use of the Lower Piedmont, during the Late Formative, was dependent upon elaboration of soil and water-control techniques, including floodwater and canal irrigation and hillslope and barranca-bed terracing.

Three small Late Formative sites were located in what must have been marshy ground adjacent to the salt lake where agriculture could not have been practiced. Parsons feels that this small population was adapted to the exploitation of lacustrine resources.

Late Formative Site Descriptions (Fig. 43, Fig. 53):

Ix-LF-1

NATURAL SETTING: Lower edge of the Upper Piedmont, at about 2500 meters, on gentle to moderate slope. The site is located just north and west of a large barranca which is 8 to 10 meters deep. Erosion is severe in the area, and tepetate is exposed in many places. Soil is sandy dark brown loam.

MODERN UTILIZATION: None, except for some scattered nopal and maguey. North and east of the site is a flat deep soil area which is used for rainfall cultivation of maize and wheat.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse and in some places moderate Late Formative over an area of 2.2 hectares. Two soil remnants with abundant pottery and rock rubble on them may be the remains of residences which have been severely modified by erosion. The site overlaps, in part, with Ix-LT-1. The site is located south and downhill less than 50 meters from Tx-LF-23, in the Texcoco Region, and might have been at one time physically a part of it.

CLASSIFICATION: Hamlet, pop. 22-55.

Ix-LF-2

Tlapacoya

NATURAL SETTING: Lakeshore Plain, on an alluvial fan at the base of the Tlapacoya Volcano, at the edge of Lake Chalco. Elevation is about 2240 to 2250 meters. Soil is deep light brown loam, very rocky. No erosion.

MODERN UTILIZATION: The extent of the site conforms closely to the extent of the modern town of Tlapacoya, therefore the site is largely obscured by modern roads and buildings. In the site area there are some kitchen gardens and small fields where rainfall cultivation of maize is done along with nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and light to moderate Late Formative and Terminal Formative over an area of 37 hectares. Abundant rock rubble over the site area is probably in part the remains of Formative structures and in part detritus which has eroded from the slopes of the volcano. Near its south edge the site overlaps Ix-EF-1 and Ix-MF-1. Ix-TF-4 is coextensive with the Late Formative site.

Beatriz Barba de Piña Chan (ibid.) excavated at several localities on the site. Figure 9 illustrates the locations of her five excavations. As was mentioned above in the description of Ix-MF-1, Barba described and illustrated some of the materials from two of these five excavations. Some Middle Formative, as was pointed out above, was encountered in the lowest levels of these excavations, but by far the dominant material from these excavations is Late Formative and Terminal Formative, which she

describes as "Preclásico Superior". At the time she published this report the distinctive Terminal Formative Tezoyuca-Patlachique phase had not been well defined, so she grouped Late and Terminal Formative.

One of the excavations described by Barba is "Pozo 1" (Fig. 9). Here she encountered a level of very dense "Preclásico Superior" between 1.4 and 1.75 meters below the surface. During the course of our survey we encountered a large open trench more than 20 meters long and two meters deep by about two meters in width, which seems to be an extension of "Pozo 1". The level of dense debris described by Barba is readily visible in the side of the trench (Plate 17). Here John Jordon is pointing to this level. Most of the sherds we observed in this level were Late Formative. The density of occupational debris in this level suggests the site was nucleated.

As part of her work at Tlapacoya, Barba excavated and reconstructed a large pyramid-mound (ibid.: 156-61; 178-9; planos 5-8). Plates 18 and 19 show the northwest face and the southwest corner, respectively, of this structure. Figure 14 is an oblique view of the structure, adopted from Barba's plano 7. The structure is located directly at the base of the steep slopes of the volcano. Orientation of the structure is 52 degrees east of true north. During the first of three construction phases a low mound was constructed, 24 meters across the front and 26 meters deep, with a small staircase in front. During the second phase the basal platform remained unmodified, but a platform with staircase was constructed in the center of the platform to increase the total elevation to about 4 meters. The last construction phase involved only the addition of small platforms here and there which did not substantially modify the size or configuration of the structure. Construction throughout was of unmodified, or slightly modified stone, set in mud. Floors were of earth.

Because Barba did not describe the pottery encountered in the fill of the structure, it is difficult to date its construction in terms of the phases I am utilizing here. A clue to the date of construction and use of the structure, however, comes from the contents of tombs which were discovered in the fill of the structure. Two offerings which included pottery were also encountered in the fill, but as far as I can tell the pottery included with these is not diagnostic. A brief description of the contents of the tombs follows:

Tomb 1: Contains disarticulated bones representing the secondary burials of at least four individuals. The offering consists of 63 ceramic vessels, five figurines, and a breastplate of slate. The feature corresponds to the second construction phase of the pyramid. The ceramic material is not illustrated in the site report, for the most part, but it includes some orange ware pottery which Barba feels may be a type ancestral to Classic-period "thin orange". The presence of this material suggests a Terminal Formative date. The contents of the tomb are illustrated by Barba in a photograph (Foto 1), which is not clear, but it is possible to see vessels with bulbous supports, which suggest the tomb is Late Formative or Tezoyuca-Patlachique in date.

Tomb 2: Contains one adult male with an offering of seven ceramic vessels, cloth (which may be cotton), obsidian tools, a painted seashell, two serpentine borers, and a jade bead. The tomb corresponds to the first construction phase of the pyramid, but unfortunately cannot be dated because the pottery is not illustrated in the site report.

Tomb 3: Contains the remains of one individual, probably, whose bones were very poorly preserved. This tomb corresponds to the second construction phase of the pyramid. The offering consists of 74 ceramic vessels, 5 obsidian knives, and a

slate plaque. Most of the vessels are polished black ware, which is probably a special burial pottery or high-status pottery (polished black is not common on the surface of the site). The contents of the tomb in situ are illustrated by Barba (Lam. 14). Many of the forms are not diagnostic as to period, probably because this is not normal utilitarian pottery, but several vessels have large, bulbous vessel supports which should pertain to the Late Formative or the Terminal Formative Tezoyuca complex.

To conclude, it is not possible to determine from the site report whether this large structure pertains to the Terminal Formative phase only, or also the Late Formative.

During the course of the excavations at Tlapacoya, Barba uncovered a total of 14 non-tomb burials, 12 of which pertained to the "Preclasico Superior", and two to the Aztec period. In addition to these, the author mentions in passing (p. 97) a burial uncovered at the site, which she did not excavate, which was reputedly Classic in date. None of the offerings associated with these burials exceeded more than four ceramic vessels, and were otherwise simple, with one exception. This was a multiple burial containing two males and one female. It included several pots plus tools which included polishers made of pumice, quartz and obsidian.

Along the base of the volcano on both sides of the reconstructed pyramid we noted several stone-faced terraces and mounds which may be Formative in date. Some of these function today as agricultural terraces. The largest of these, located in the vicinity of Barba's "zona de habitaciones" (Fig. 9), is a platform oriented northeast-southwest, is roughly two meters high, and is 25 by 35 meters at the base. It was not possible to determine whether this structure or the other probable structures date to the Late Formative, Terminal Formative, or both.

A barranca-like valley goes up from the vicinity of the reconstructed pyramid to the gentle deep-soil slopes at the top of the volcano. Numerous ancient stone-faced terraces were noted on these gentle slopes (Plate 6). It was not possible to date the construction or use of these terraces from surface evidence, except for one small terrace associated with an isolated Aztec residence (Ix-A-31).
CLASSIFICATION: Secondary Regional Center, pop. 925-1850.

Ix-LF-3

NATURAL SETTING: Lakeshore Plain along the east edge of the Lomas and Hoyas, at about 2240 meters. Soil is one-half to one meter deep, of light grayish-brown loam containing numerous pumice chunks. The site is located on a rocky promontory which projects slightly into the ancient lake, and on the Lakeshore Plain around the promontory.

MODERN UTILIZATION: The Mexico-Puebla Autopista runs roughly north-south through the middle of the site. A paved secondary road runs east-west through the site. A hospital at the southwest edge of the site probably covers some of it. In addition, there are several residences north of the hospital, also in the west portion of the site. Agricultural use of the site area is slight and consists only of a few fields of rainfall-cultivated maize, along with some scattered nopal and maguey. At the northeast edge of the site, in an area of Lakeshore Plain, there is intensive irrigated cultivation of alfalfa, utilizing water from electric pumps.

ARCHAEOLOGICAL REMAINS: Evenly scattered light to moderate Late Formative over an area of 20 hectares. The density of occupational debris suggests this was a compact settlement. Sections exposed in road cuts show the depth of the deposit is about one-half meter. No structures remain on the surface, but fragments of

plaster floor were noted in one locality near the north edge of the site. Ix-EC-19 overlaps the site in part.
 CLASSIFICATION: Village, Pop. 400 - 1000.

Ix-LF-4

NATURAL SETTING: Lake-Bed, at about 2240 meters. This was probably Lakeshore Plain during Late Formative times. The site is covered by 30 to 50 cm. of what appears to be lake-bed silt, suggesting that Lake Chalco increased in size subsequent to occupation of the site, and covered it.
 MODERN UTILIZATION: Located at the southeast edge of the modern town of Sta. Catarina. A paved road runs roughly north-south through the site, and a drainage ditch runs east-west through the site. The archaeological material would possibly have been missed except for the ditch which has exposed it in cross-section. Few sherds were visible on the surface, which made it difficult to determine the site size. There is no agricultural use of the site.
 ARCHAEOLOGICAL REMAINS: Where the occupational debris is exposed in the drainage ditch there is light to moderate Late Formative and construction rubble; otherwise there is only very light pottery on the surface over an area of 2.5 hectares. The deposit is roughly 20 cm. thick. No structures noted.
 CLASSIFICATION: Hamlet, pop. 50 - 100.

Ix-LF-5

NATURAL SETTING: Lake shore Plain at the south edge of the Lomas and Hoyas, at about 2240 meters. The site sits on a rocky promontory which projects slightly into Lake Chalco. Soil is one meter or so deep, of light gray-brown loam containing numerous pumice chunks.
 MODERN UTILIZATION: Rainfall cultivation of maize, along with some nopal and maguey around field edges.
 ARCHAEOLOGICAL REMAINS: Light to moderate pottery of many phases, including Late Formative, scattered over an area of 3 hectares. No structures noted. Depth of the deposit could not be determined. The Late Formative is mixed with Early Formative (Ix-EF-2), Middle Formative (Ix-MF-2), Classic (Ix-EC-23, Ix-LC-4), Early Toltec (Ix-ET-15), Late Toltec (Ix-LT-45), and Aztec (Ix-A-57). No obvious reason for the long-term occupation of the site could be determined.
 CLASSIFICATION: Hamlet, pop. 30 - 75.

Ix-LF-6

NATURAL SETTING: Lakeshore Plain along the south edge of the Lomas and Hoyas, at about 2240 meters. The site sits on what was probably a low, flat peninsula which projected into Lake Chalco. Soil is one meter deep or more of light gray-brown loam, with some pumice chunks.
 MODERN UTILIZATION: The modern town of Tlaltenco covers the site. Interspersed between modern residences there are some kitchen gardens and small fields which are used mostly for rainfall cultivation of maize and some nopal and maguey.
 ARCHAEOLOGICAL REMAINS: Light and light to moderate Late Formative evenly scattered, except where covered by modern roads and houses, over an area of 65 hectares. Within the site there is a Middle Formative site (Ix-MF-4), a Late Toltec site (Ix-LT-38), and a Classic site (Ix-EC-32). Along the north edge of the site it overlaps somewhat with Ix-ET-11.

A possible Late Formative pyramid-mound was noted in the north portion of the site. The structure is now damaged almost beyond recognition. In addition, it has been covered by modern garbage. The original configuration and size of the structure cannot be determined, but it was at least two meters in elevation. Adjacent to this feature a fragment of plaster floor was noted, in situ, which is probably Late Formative in date. No other mounds on the site could be definitely attributed to the Prehispanic period. Road cuts in several places have exposed an average of about one-half meter of Late Formative deposit.

CLASSIFICATION: Secondary regional center, pop. 1625 - 3250.

Ix-LF-7

NATURAL SETTING: Lomas and Hoyas, mostly on gentle slope, but in some places on steep slopes, between 2300 and 2400 meters. Soil is one meter or less in depth, and consists of light gray-brown loam containing numerous pumice chunks.

MODERN UTILIZATION: The western and northern portions of the site are on relatively flat ground where some rainfall cultivation of maize, beans, and tomatoes, along with nopal and maguey is done. The steeper part of the site is not used for agriculture except for some nopal and maguey. Within and near the site there are several volcanic sand quarries in operation today.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Formative ranging in density from sparse to moderate, over an area of 30 hectares. Ix-TF-10 covers the western portion of the site. Near the center of the site, over an area roughly 200 meters in diameter, a scatter of very light to light Classic granular red-on-white was noted, although no other Classic ceramic types were present. No structures were noted on the site, but on the steep slopes in the south and west, stone-faced terraces were noted with Late Formative and Terminal Formative sherds on them (Plates 20, 21). Most of the terracing in the area is associated with Ix-TF-10, but some of it seems to be associated with the Late Formative occupation.

CLASSIFICATION: Village, pop. 600 - 1200.

Ix-LF-8

NATURAL SETTING: Lakeshore Plain, near the north edge of the Lomas and Hoyas at about 2240 meters. Soil is one meter or so of light gray-brown loam containing numerous pumice chunks. The site is located near the edge of ancient Lake Texcoco facing what appears to have been a small bay or inlet. Across from the site is a rocky tongue of land which projects out into the Lake-Bed and which forms the western boundary of the inlet.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, along with some nopal and maguey around the edges of fields. A large functioning tezontle quarry is located about 200 meters south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Formative over an area of seven hectares. The site has several other components, which are: Ix-EF-3, Ix-MF-3, Ix-TF-11, Ix-EC-30, Ix-LC-6, Ix-ET-9, and Ix-LT-33. No structures were noted on the site, but some fragments of plaster are scattered over part of the site. An isolated pyramid-mound located about 25 meters to the south is probably Post Classic in date, although surface pottery on and around the structure is sparse.

CLASSIFICATION: Village, pop. 70 - 175.

Ix-LF-9

NATURAL SETTING: Lomas and Hoyas, on the edge of a ridge which drops off to the north and northwest, at about 2270 meters. Soil is one meter or so of light gray-brown loam with many pumice chunks. No erosion.

MODERN UTILIZATION: Some rainfall cultivation of maize, tomatoes, nopal, and maguey. Several tezontle quarries are in the vicinity of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered light to moderate Late Formative over an area of several hundred square meters. Ix-LT-31 covers the site. No structures noted.

CLASSIFICATION: Hamlet, pop. 10 - 25.

Ix-LF-10

NATURAL SETTING: Lakeshore Plain, at the north edge of the Lomas and Hoyas at about 2240 meters. Soil is one meter or so of light gray-brown loam with numerous pumice chunks.

MODERN UTILIZATION: Rainfall cultivation of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light to moderate Late Formative over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Hamlet, pop. 10 - 25.

Ix-LF-11

NATURAL SETTING: Lakeshore Plain, on what appears to have been a small peninsula which projected into Lake Texcoco, at about 2240 meters. Soil is one meter or so of gray-brown loam.

MODERN UTILIZATION: Currently none, although the area has been plowed at some time in the past.

ARCHAEOLOGICAL REMAINS: Evenly scattered sparse to light Late Formative over an area of 2.6 hectares. Ix-EC-26 covers the site. No structures noted.

CLASSIFICATION: Hamlet, pop. 26 - 65.

Ix-LF-12

NATURAL SETTING: Lower Piedmont, on the slopes of Cerro de la Estrella, on gentle slopes at about 2260 meters. West of the site fairly steep slopes drop off, leading to the edge of the ancient lake. Soil is generally one meter or so, of light brown loam. Some erosion has occurred along the steep slopes at the west edge of the site.

MODERN UTILIZATION: The site is covered by scattered residences which make up the eastern outskirts of the modern town of Culhuacan. Some small fields in the area are used for rainfall cultivation of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Formative ranging in density from sparse to moderate, scattered over an area of 15 hectares. No structures noted. The north edge of the site is mixed with Ix-ET-13. The site was noted by Vaillant (1931: 338), and by R. Pina Chan (1955: Plano 3). In 1946 Dr. James B. Griffin visited the site and made a surface collection which is now in the Museum of Anthropology in Ann Arbor, Michigan.

CLASSIFICATION: Compact Village, pop. 150 - 375.

Ix-LF-13

NATURAL SETTING: Lomas and Hoyas, at about 2410 meters. Soil is one meter or so of light gray-brown loam, not eroded.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light Late Formative over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Hamlet, pop. 10 - 25.

CONCLUSIONS:

Demography and Settlement Locations: The most significant difference between the Middle Formative and the Late Formative occupations of the Ixtapalapa Peninsula Region was the jump in population from an estimated 285 - 713 to an estimated 3928 - 8220 for the Late Formative. This represents a jump in population comparable to that observed in the Texcoco Region, but more extensive than the increase which occurred in the Teotihuacan Valley. Perhaps the relative dryness of the Teotihuacan Valley continued to act as a deterrent to the use of the area by cultivators who were primarily dependent upon rainfall cultivation.

All of the Middle Formative sites on the peninsula continued to be occupied into the Late Formative, and with only one exception (Ix-LF-5, a hamlet), all increased in size. The two largest Middle Formative sites (Ix-MF-1 and Ix-MF-4) increased substantially in size during the Late Formative, and continued to be the dominant sites in the area. While the only environmental zone occupied during the Middle Formative was the Lakeshore Plain, during the Late Formative other zones were colonized. The bulk of the Late Formative population continued to live on the Lakeshore Plain, but there was for the first time occupation in the Upper Piedmont (Ix-LF-1), on the Lower Piedmont of Cerro de la Estrella (Ix-LF-12), and in the Lomas and Hoyas (Ix-LF-7, 13) (See Figure 15).

Subsistence: Sanders and Parsons, as noted above, have suggested the population increase and the first occupation of previously unimportant environmental zones which characterized the Late Formative could be attributed to improvements in agricultural technology. This included, they suggest, the beginnings of irrigation in the alluvial plain of the Teotihuacan Valley, and floodwater and canal irrigation, and terracing in the Texcoco Region. The data from the Ixtapalapa Peninsula Region seems to confirm this hypothesis somewhat since occupation of the Lomas and Hoyas at Ix-LF-7 involved construction of stone-faced terraces, apparently the earliest in the area. There is no evidence, however, of terracing or irrigation at Ix-LF-1, which is in the Lower Piedmont, or at Ix-LF-12 in the Upper Piedmont, or at Ix-LF-13, in the Lomas and Hoyas, and the remaining sites are located along the margins of lakes where there was probably a continued emphasis on the agricultural use of the Lakeshore Plain as during the Early and Middle Formative. In short, the population expansion and occupation of new environmental zones in the Ixtapalapa Peninsula Region does not seem significantly related to improvement of agricultural technology.

I would suggest that an important factor which allowed Late Formative population growth and occupation of previously unused areas was the appearance, during the Late Formative, of types of maize which were better adapted to the cold, dry highlands. These improvements in maize were the result of ongoing selection for desirable features by the Formative cultivators. Another possible explanation for the Late Formative increase in population and use of new environmental zones calls for

increased rainfall during that time. Although there is little in the way of direct evidence which bears on this problem, it is not likely that that was the case. Two Late Formative sites in the Texcoco Region (Tx-LF-13, 14) and one site in the Ixtapalapa Peninsula Region (Ix-LF-4) are below the level of the conquest period lake. As was pointed out above, it is likely that this fluctuation of the Lake level suggests the Late Formative and Terminal Formative were drier periods.

Local Organization: Compared with the Early and Middle Formative periods, the Late Formative is characterized by a more pronounced hierarchy of site types (Fig. 16). Middle and Early Formative sites are all villages and hamlets (Figs. 12 and 13); Late Formative site types are hamlet (Ix-LF-1, 4, 5, 9, 10, 11, 13), village (Ix-LF-3, 7, 8, 12), and Secondary Regional Center (Ix-LF-2, 6). Both of the latter sites are relatively large, and at least Ix-LF-6 has definite civic-ceremonial architecture (and the Tlapacoya Pyramid may have a Late Formative component).

Parsons (ibid.:311) suggests the Late Formative is the first period in which it is possible to recognize the presence of small, independent socio-political entities which were probably like chiefdoms. Each of these units in the Texcoco Region consists of a Secondary Regional Center (Ix-LF-9, 12, 22, 29), plus a hinterland containing a dependent rural population residing in hamlets and villages. It is likely that Ix-LF-2 and 6 are centers of political units of this type. Ix-LF-5, 7, 8, 9, 10, 11, and 13, all villages and hamlets, are grouped more-or-less closely around Ix-LF-6; this group may represent a unit of the type noted by Parsons. The group of dependent communities which may have been associated with Tlapacoya is not as obvious.

Late Formative in the Basin of Mexico: To reiterate briefly, the most important changes which occurred between the Middle Formative and the Late Formative in the eastern Basin of Mexico are: a drastic increase in population (except in the Teotihuacan Valley); and an increase in the complexity of social organization. The latter is reflected by the marked hierarchy of site types, ranging from regional centers with large populations and civic-ceremonial architecture, to villages and hamlets, and the presence of more-or-less easily definable clusters of settlements, each dominated by a Secondary Regional Center, which may be discrete socio-political units like chiefdoms. Outside the eastern Basin of Mexico there is more evidence of the complexity of Late Formative social organization. The most important site in the Basin which dates to this period is Cuicuilco, in the southwestern corner. Unfortunately the site was covered by a lava flow during the Terminal Formative period, but enough remains to indicate something of its former size and importance. Palerm (1961: 300) suggests the occupation there may have been continuous for a distance of at least four to five kilometers between two large pyramids, Cuicuilco and Tenatongo. The site is located on what was probably a broad expanse of piedmont plain which may have been suitable for large-scale irrigation. Palerm (ibid.) has also noted what he considered to be ancient canals running under the lava suggesting that large-scale irrigation was practiced there during the Formative. Cuicuilco was probably the center of an even larger socio-political unit than those proposed in the Texcoco and Ixtapalapa Peninsula Regions. An acute problem at this time is lack of evidence of the size of the Late Formative compared to the Terminal Formative occupation at Cuicuilco; it is possible that the extent of the site, as proposed by Palerm, was not achieved until the Terminal Formative.

Chapter 6

Terminal Formative

INTRODUCTION

The Terminal Formative was a time of drastic restructuring of the organization of society in the Basin of Mexico. We are still far from being able to explain the changes which occurred during that time, but intensive archaeological research during the last ten or so years has produced an impressive body of data bearing directly on these problems. By far the most important data pertaining to the Terminal Formative has come from the settlement pattern studies undertaken by Sanders (*ibid.*), Millon (1960, 1964, 1967a, 1967b), and Parsons (1969, MS).

One of the most important results of the work directed by Sanders and Millon in the Teotihuacan Valley has been the clarification of the Terminal Formative ceramic sequence. Previous to their work, the chronological relationships between the Ticoman and the Teotihuacan I (Tzacualli) material was not clear. Millon first identified a transitional ceramic complex now called Tezoyuca. Later, Sanders identified another complex, like that excavated at El Tepalcate by Noguera (1943), which also displayed transitional qualities. Sanders named this the Patlachique complex. Both the Tezoyuca and the Patlachique complexes are transitional between Late Formative and Tzacualli, but they are slightly distinct. The chronological relationship between these two ceramic complexes is not yet clear (cf. West, 1965; Dixon, 1966; Sanders, *ibid.*, 95-7; Bennyhoff, 1967). West (*ibid.*) has hypothesized that the Patlachique complex in the Teotihuacan Valley represents an invasion of people displaced from Cuicuilco as a result of the eruption of the volcano Xitli. This group of invaders, West suggests, blended with the local Teotihuacan Valley population, who were using Tezoyuca pottery. This blend resulted in the Tzacualli complex. Sanders (*ibid.*), on the other hand, suggests the Tezoyuca complex was contemporary with the Patlachique complex, but Tezoyuca was utilized only by high-status individuals who resided in ceremonial-elite centers. Bennyhoff (*ibid.*) suggests the difference between the two complexes is due to change through time; he feels the Tezoyuca preceeds the Patlachique.

Given the complexity of the Tezoyuca-Patlachique problem, I have decided to group the two complexes into one, the Tezoyuca-Patlachique. This was done at the suggestion of Parsons, based on his experience in the Texcoco Region. I feel this is a justifiable approach because the two complexes are not readily distinguishable in the Texcoco Region or the Ixtapalapa Peninsula Region. No pure Tezoyuca sites were located. The dominant component of all Terminal Formative sites in this region is the Patlachique. The Tezoyuca complex may prove to be particular to the Teotihuacan Valley. Tezoyuca-Patlachique sites of all types in the Ixtapalapa Peninsula Region have very similar ceramic debris on them. This consists typically of abundant light-brown to reddish-brown wedge rim ollas and basins, often with tab handles below the rim; less abundant are small, undecorated shouldered bowls; red-on-buff flaring bowls and shallow dishes; white-on-red bowls (the white decoration is thickly applied, often in geometric motifs); and "saddle-supports", sometimes decorated in red-on-buff or white-on-red.

Early work by Noguera and others in the Pyramid of the Sun produced pottery of Formative affiliation which became known as Teotihuacan I, and later, Tzacualli (Armillas, 1950). The relationship of this complex to earlier Formative material

was clarified by work in the Teotihuacan Valley, as was pointed out above. The relationship of this complex to the later Classic material was also a problem before the work by Millon and others (Millon, 1960; Millon and Bennyhoff, 1961; Millon, Drewitt, and Bennyhoff, 1965). They have been able to show that the Tzacualli complex is a transitional phase between the Tezoyuca-Patlachique phase and the Early Classic Miccaotli phase. The details of the transitional nature of Tzacualli need not be repeated here. The Tzacualli phase pottery (which is now divided into two subphases) has been described by Millon, Drewitt, and Bennyhoff (*ibid.*), Muller (1967), and Bennyhoff (1967).

COMPARATIVE MATERIAL

Teotihuacan Valley: During the early part of the Terminal Formative, for the first time, there was an impressive occupation at the location at the head of the large springs which later became the huge city of Teotihuacan. This occupation is predominantly represented by the Patlachique complex. This community covered a total area of four square kilometers, divided between two large sites and two small sites, all close together (Millon, 1967b, pp. 60, 71, Fig. 3). Temple mounds have been provisionally identified which pertain to this occupation, including one of large size a short distance northeast of the Pyramid of the Sun. Population is estimated by Millon to have been about 5000. The location of this site represents the increasing emphasis, in the Teotihuacan Valley, on agricultural use of the alluvial plain, a trend which began, importantly, in the Late Formative. In particular, the location of the site adjacent to the main springs suggests these people were beginning to exploit the possibilities of large-scale irrigation agriculture of the Lower Valley alluvial plain.

There was also a population increase in the rural Teotihuacan Valley during the Tezoyuca-Patlachique phase (Sanders, *ibid.*, pp. 94-7, Fig. 6). Five sites were located which have the Tezoyuca ceramic complex. These are all hilltop sites in defensible positions at the edge of the Patlachique range. They are all situated such as to have access to the agriculturally valuable alluvial plain. In addition, 62 Patlachique occupations were found. All of these are dispersed hamlets which lack civic-ceremonial architecture. Patlachique sites, except for Teotihuacan itself, are predominantly located in the same environmental situations where Cuanalan sites are. The Patlachique Range continued to be heavily occupied, and hillside locations were favored.

Sanders suggests the hilltop Tezoyuca sites were centers of small polities, each surrounded by dependent Patlachique communities. The large size of the Patlachique settlement at Teotihuacan (discovered subsequent to Sanders' publication) suggests this interpretation requires modification. If it were correct, then Teotihuacan, a large site with civic-ceremonial architecture, should be a Tezoyuca site. Perhaps the Tezoyuca hilltop settlements represent a phase previous to the Patlachique, when the Valley was divided into a series of small competing social units whose settlements were on hilltops for purposes of defense. The Patlachique sites may represent a transition to a situation where the Teotihuacan Valley was integrated into one socio-political unit which consisted of a center at Teotihuacan plus dependent settlements scattered over the hill-slopes. If this interpretation is correct, then there must have been a population decline during the Tezoyuca phase followed by a considerable population increase during the Patlachique.

The population increase which occurred at Teotihuacán during the Patlachique phase continued into the subsequent Tzacualli phase. During this time Teotihuacán grew to 17 square kilometers (plus an additional population concentration just south of the main site which covered an area 1.5 square kilometers), and had a population estimated to have been around 30,000 (Millon, *ibid.*: 71-2; Fig.4). During this time the basic lay-out of the city was established, which was maintained during the Classic period.

In the rural Teotihuacán Valley, Sanders (*ibid.*: 99-101; 170-2; Fig.7) found that a considerable transition had occurred between the Tezoyuca-Patlachique phase and the Tzacualli phase settlement patterns. The Patlachique Range was abandoned. New population clusters grew up around the lower flanks of Cerro Malinalco, a small mountain just northwest of the site Teotihuacán, and on the Cerro Gordo north slopes. In other parts of the Valley settlement was on gentle slopes often adjacent to the alluvial plain. All rural sites were scattered villages and hamlets, none with civic-ceremonial architecture. Total rural population probably increased somewhat over the Tezoyuca-Patlachique level; approximately 90 rural sites were located.

Certainly by the Tzacualli phase the Teotihuacán Valley was organized as a single socio-political unit centered at Teotihuacán. Sanders suggests that for the first time, during this time, the entire Lower Valley was integrated into one large-scale irrigation network.

Texcoco Region (Fig.34): Parsons (*ibid.*: 319-327) located a total of 52 Terminal Formative sites. Tezoyuca-Patlachique occupation of the region was a period of population growth (from an estimated 3860 to 9000 for the Late Formative to 10,070 to 20,200 in the Tezoyuca-Patlachique phase); there are more sites and more nucleated sites. Population expanded both on the Lower Piedmont and on the shore-line of Lake Texcoco, although the most important Late Formative sites (Ix-LF-9,12,22) were largely abandoned. Several large sites were founded on defensible hill-top locations (Tx-TF-2,4,6,14,36,51), and all of these had abundant civic-ceremonial architecture. Parsons refers to these sites as "segregated elite districts". In contrast, low-lying communities on the Lower Piedmont and Lakeshore Plain lack recognizable civic-ceremonial architecture. Parsons suggests there might have been several distinct socio-political units in the Texcoco Region, perhaps similar to those suggested for the Late Formative. Each of the units consists of one or two segregated elite districts plus several adjacent low-lying communities. He delineated four of these units: one in the southwest sector of the survey area, dominated by Tx-TF-51 (which is the Temesco site, partially excavated by Dixon (1966)); one in the Lower Piedmont between the central and southern survey strips dominated by Tx-TF-36; one in the central survey strip dominated by Tx-TF-14; and one along the southern edge of the Patlachique range dominated by Tx-TF-4. Populations of these clusters range between 2300 and 5000. Parsons did not note a significant difference in ceramic assemblages of segregated elite districts and other sites. Unlike the Teotihuacan Valley, where Patlachique phase Teotihuacan had obviously assumed a dominant position in the Valley, none of the sites or clusters of sites in the Texcoco Region was obviously dominant over the others. The defensible positions of the segregated elite districts suggests there was competition between the several socio-political units.

Parsons noted very little Tzacualli pottery in the Texcoco Region. He concluded that this could reflect either a drastic population decline at the end of the Terminal Formative, or that the Tzacualli ceramic complex was particular to the Teotihuacan Valley, while Tezoyuca-Patlachique pottery continued to be used by groups outside

the Teotihuacán Valley.

Terminal Formative Site Descriptions (Fig.44 and Fig.54).

Ix-TF-1

NATURAL SETTING: Cerro Pino Lower Slopes at about 2310 meters, on gentle slope. The site is located on a flattish ridge between two barrancas, both of which are about 10 meters deep. Unlike the area around the site, which is severely eroded, soil in the site area consists of 1 meter or so of light-brown loam, not substantially eroded.

MODERN UTILIZATION: Mostly grazing, along with some cultivation of nopal and maguey. Some of the maguey here is grown on stone-faced terraces.

ARCHAEOLOGICAL REMAINS: Very light to light Tezoyuca-Patlachique scattered over an area of several hundred square meters. There is also light to moderate rock rubble, probably the remains of structure(s). Very light Tezoyuca-Patlachique pottery was noted over an area of 30 hectares between the site and the Lakeshore Plain to the south, but not abundant enough to consider the whole area a site. The town of Ayotla is located generally south of the site. On the slopes in and around the modern community there are numerous stone-faced terraces, at least some of which may be ancient. A number of these terraces are in use today. On the slopes of a barranca roughly 100 meters east of Ix-TF-1 a large area of earth terraces was noted. These consist of long parallel ditches dug along the slope; no stone has been used in their construction. These terraces are not in use today. Total area covered by the terraces is about 7 hectares. Plate 22 shows the terraced slope looking east across the barranca. Date of construction and use of the terraces could not be determined.

CLASSIFICATION: Isolated Residence, pop. 5-10.

Ix-TF-2

NATURAL SETTING: Lower Piedmont, and extending onto the Lakeshore Plain at about 2240 to 2260 meters. The site is located adjacent to, and partially on, the alluvial fan of a large barranca. That portion of the site on the Lower Piedmont is somewhat eroded, with light brown loam generally less than 1/2 meter deep. On the alluvial fan, soil is deep, light-brown loam.

MODERN UTILIZATION: The portion of the site on the Lower Piedmont is mostly obscured by a Seagram's distillery, such that the extent of the site could not be accurately determined. Plate 23 shows the distillery in the background, behind the alluvial fan of the barranca in the foreground, looking north. The lower part of the site (on the alluvial plain) is used for rainfall cultivation of maize. The rainfall run-off from the barranca is directed into a ditch and flows toward the ancient lake.

ARCHAEOLOGICAL REMAINS: Very light to light and in some places light Tezoyuca-Patlachique evenly scattered over an area of 16 hectares. No structures noted.

Ix-LT-16 overlies the site. A recent ditch excavated in the south part of the site reveals 1/2 meter or so of Terminal Formative deposit. An aerial photograph of the site area taken previous to the construction of the distillery was obtained from the Seagram's public relations office. Examination of these photos indicated that no mounds or other prominent features were located in the area now covered by the distillery.

CLASSIFICATION: Village: pop. 160-400.

Ix-TF-3

NATURAL SETTING: Cerro Pino Lower slopes, at the edge of the Lakeshore Plain, on gentle to moderate slopes between 2240 and 2300 meters. The lower part of the site, on moderate slopes is somewhat eroded and rocky; otherwise soil is 1 meter or so of light-brown loam.

MODERN UTILIZATION: The eastern part of the modern town of Ayotla covers the hill-slope which is the south part of the site. The remainder of the site is on gentle slopes used for rainfall cultivation, mostly of maize, along with some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and in some places light Tezoyuca-Patlachique scattered over an area of 20 hectares. Two probable Terminal Formative structures were noted. One was probably a residence, located in the northeastern part of the site, which now consists of rock-rubble scattered over an area about 15 meters in diameter. The other structure was probably a pyramid-mound, now damaged almost beyond recognition. A dirt road runs roughly north-south through the structure, exposing the fill which consists of blocks of tepetate. In addition, the mound is now being dismantled by the local people, possibly in order to obtain fill-dirt for nearby construction. Originally the structure was a platform roughly 10 meters square at the base, oriented north-south, and about 2 meters high.

CLASSIFICATION: Village, pop. 200-500.

Ix-TF-4 Tlapacoya

NATURAL SETTING: Lakeshore Plain, on an alluvial fan at the base of the Tlapacoya volcano, at the edge of ancient Lake Chalco. Elevation is about 2240-2250 meters. Soil is deep, light-brown loam; very rocky. No erosion.

MODERN UTILIZATION: The extent of the site conforms closely with the extent of the modern town of Tlapacoya, therefore the site is largely obscured by modern roads and buildings. In the site area there are some kitchen gardens and small fields, mostly devoted to rainfall cultivation of maize, maguey, and nopal.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and in some places light to moderate Late Formative and Terminal Formative, (predominantly Tezoyuca-Patlachique), over an area of 37 hectares. The structures encountered on the site have been described as part of Ix-LF-2. Near its south edge the site overlaps Ix-EF-1 and Ix-MF-1. Ix-LF-2 is nearly exactly coextensive with the Terminal Formative material.

The excavations on the site by Beatriz Barba de Pina Chan (ibid.) have been outlined above in the descriptions of Ix-MF-1 and Ix-LF-2. Although Barba did not distinguish the Tezoyuca-Patlachique phase (which was not defined adequately until after she published the report) from the Late Formative material which she uncovered, she illustrated a number of sherds from the "Preclasico Superior" levels which are Tezoyuca-Patlachique. The obvious examples of this phase are Lam. 9; i,j,k,l,v,w,x,y,z; Lam. 10; Lam. 11. Although Barba concluded that Tlapacoya was occupied during the "Preclasico Superior", "Proto-Clasico" (Tzacualli), and "Clasico Temprano" (ibid.:138;cuadro 2), little is illustrated in the report which pertains to the Tzacualli or Early Classic. Two figurines are illustrated which are Miccaotli (Lam. 19, n; Lam. 20, k), but she reports encountering only a total of three of these. Two vessels of "orange ware" were encountered in Tomb 1, which is a type she suggests is ancestral to Classic Thin Orange, which could be Tzacualli, but the other vessels in the tomb (Foto 1) have bulbous supports which suggest an earlier date. Our surface collections from the site contain abundant Late Formative and Tezoyuca-Patlachique; no Tzacualli or Early Classic could be identified.

CLASSIFICATION: Secondary regional center, pop. 925-1850.

Ix-TF-5

NATURAL SETTING: Lomas and Hoyas at about 2350 meters. The site sits on a large flat area which has steep slopes dropping off in every direction except southwest. The site stops abruptly at the edge of the flat area. Soil is 1/2 meter or so of light grayish brown loam with many pumice chunks.

MODERN UTILIZATION: Rainfall cultivation of maize, beans, squash, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and in some places light to moderate Tezoyuca-Patlachique over an area of 32 hectares. Seventeen mounded structures were noted. These were all apparently pyramid platforms, ranging in elevation from 1 1/2 to 7 meters. Figure 17 shows the distribution of the central cluster of structures. Two other large mounds, not included in Fig. 17 are located 100 meters or so east of the central cluster near the edge of the site. Both of these are badly damaged. Although most of the mounds are indicated in the plan view as circular, which is how they appear now, it is likely that originally they were square or rectangular. They are all severely eroded, and in most cases pumice chunks have been thrown up around the bases of the mounds by recent cultivators clearing rocks out of their fields, which has further obscured the configuration of the structures. Plate 24 shows two of the mounds, covered with weeds and palo loco and rocks thrown up around their bases. Construction of the mounds is of rock and mud. No plaster was noted on any of the structures. The location of the site is easily defensible. There is little suitable land for cultivation in the vicinity of the site.

CLASSIFICATION: Secondary regional center, pop. 800-1600.

Ix-TF-6

NATURAL SETTING: Cerro Pino Upper Slopes at about 2500 meters. The site is located on the point of a flattish ridge. Steep slopes drop off in every direction except southwest. Soil is light brown loam, 1/2 meter or less in depth.

MODERN UTILIZATION: Grazing only. This location is probably too high and inaccessible for cultivation.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Tezoyuca-Patlachique over an area of 4 hectares. No definite Terminal Formative structures were noted. The site is in a position which is defensible, but which is not advantageously located in terms of agricultural production.

CLASSIFICATION: Hamlet, pop. 40-100.

Ix-TF-7

NATURAL SETTING: Lakeshore Plain, at about 2260 meters, on gentle slope. Soil is deep, light-brown sandy loam; not eroded.

MODERN UTILIZATION: The site is located in an open field between a lumber mill and a mechanic's garage. The southwest edge of the site is defined by the old Puebla highway. Most of the site has been covered, probably, by these modern features. The field is not used for agricultural purposes.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light Tezoyuca-Patlachique mixed with some Tzacualli over an area of several hundred square meters. No structures noted, but there is a light scatter of rock rubble. A few Early Classic sherds were noted.

CLASSIFICATION: Full extent of the site cannot be determined, but it was probably a hamlet, pop. 20-50.

Ix-TF-8

NATURAL SETTING: Lomas and Hoyas at about 2570 meters. Located on a narrow ridge which projects east from the volcanic cone of Cerro Sta. Catarina. Soil is 1/2 meter or so of light gray-brown loam; very rocky. Little or no erosion.

MODERN UTILIZATION: Some cultivation of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light and very light-to-light Tezoyuca-Patlachique over an area of 2 hectares. One structure was noted which was probably a small pyramid-platform, constructed of rock and dirt. This structure is 10 meters on a side, oriented roughly north-south, and is about 1 meter high. Several ancient terraces were noted on the south side of the ridge, but these could not be accurately dated.

CLASSIFICATION: Hamlet, pop. 20-50.

Ix-TF-9

NATURAL SETTING: Lomas and Hoyas, at about 2270 meters. Soil is 1 meter or so

of light grayish-brown loam, with many pumice chunks. No erosion in the area. The site sits on a flat plain at the edge of steep slopes which drop off to the south of the site.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Tezoyuca-Patlachique scattered over an area of 2 hectares. No structures noted. A few Late Formative and Aztec sherds were also noted.

CLASSIFICATION: Hamlet, pop. 20-50.

Ix-TF-10

NATURAL SETTING: Lomas and Hoyas, between 2320 and 2400 meters. Most of the site is located on a large ridge which projects north from Cerro San Pablo. On the top of the ridge there is a depressed area which forms a hidden valley. The site also extends west of the ridge down onto the lower, flatter area which is the location of Ix-LF-7. Soil over most of the site consists of at least one meter of light, gray-brown loam; not eroded.

MODERN UTILIZATION: The high portion of the site, on the ridge, is not utilized at all except for some scattered nopal and maguey. The lower (western) portion of the site is used for rainfall cultivation, mostly of maize, nopal, and maguey. There are several large functioning tezontle and cinder quarries in the area.

ARCHAEOLOGICAL REMAINS: Localized and variable Tezoyuca-Patlachique ranging in density from very light-to-light, to light-to-moderate, over an area of 32 hectares. No structures noted, but there are stone-faced terraces on every sloping area within the site, none of which are in use today (Plates 20 and 21). These terraces even extend for some distance up the steep face of Cerro San Pablo. Very few Tzacualli sherds were noted. In the western, lower, portion of the site there is an area of scattered Classic period "granular red-on-white", although no other Classic pottery types were present. Perhaps this was a granular red-on-white workshop or more probably a special activity area involving the use of these vessels. Because the ridge area is so steep and inaccessible, the area has not been used much for cultivation, and as a result that part of the site is very well preserved. The ridge-top would have been an easily defensible position.

CLASSIFICATION: Village, pop. 800-1600.

Ix-TF-11

NATURAL SETTING: Lakeshore Plain, near the north edge of the Lomas and Hoyas at about 2240 meters. Soil is 1 meter or so of light, gray-brown loam containing numerous pumice chunks. The site is located near the edge of Lake Texcoco facing what appears to have been a small bay or inlet. Across from the site to the west there is a rocky tongue of land which projects out into the lake bed and which formed the western boundary of the inlet.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, but including some nopal and maguey around the edges of fields. A large functioning tezontle quarry is located 200 meters south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light pottery of many phases, including some Tezoyuca-Patlachique, over an area of 6 hectares. No structures were noted, but fragments of plaster are scattered over part of the site. The Tezoyuca-Patlachique is mixed with Ix-EF-3, Ix-MF-3, Ix-LF-8, Ix-EC-30, Ix-LC-6, Ix-ET-9, and Ix-LT-33. An isolated pyramid-mound located about 25 meters south of the site is probably Classic in date.

CLASSIFICATION: Village, pop. 60-150.

Ix-TF-12

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light gray loam like the salitre soil in the bed of ancient Lake Texcoco.

MODERN UTILIZATION: The site is located in an open field with residences on the east and west, a road on the north, and a cultivated field to the south. Some of the site may be covered by these modern features. This is the south edge of the modern town of San Sebastian. The lot functions today as a garbage dump.

ARCHAEOLOGICAL REMAINS: Light Tezoyuca-Patlachique evenly scattered over an area of several hundred square meters. No structures noted. The sherds are water-worn and badly broken, suggesting the site was under water subsequent to its occupation.

CLASSIFICATION: Hamlet: pop. 10-20.

Ix-TF-13

NATURAL SETTING: Lower Piedmont, along the summit of Cerro de la Estrella. The area is partly rocky and partly gentle to medium slopes, generally covered with 1 meter or less of light, gray-brown loam. To the east, the site area drops off steeply along a large barranca. The summit of the hill is now covered with an alcamphor (*Cinnamomum camphora* (L.)) forest (Plate 4 shows the summit of Cerro de la Estrella, looking southeast).

MODERN UTILIZATION: The site area is a state recreational park, and there is a religious shrine at the summit of the hill. No agriculture.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light and in some places light Tezoyuca-Patlachique over an area of 41 hectares. Overlying the Terminal Formative, in part, are Ix-EC-35, Ix-EC-37, Ix-LC-8, Ix-ET-13, and Ix-A-76. No structures were noted, but the following features may be Terminal Formative in date:

1) Several stone faced terraces, not now in use and badly eroded, are located on the slopes south of the large Aztec Pyramid on the hill-top.

2) In the steep barranca which the site follows for some distance to the east there are ancient stone faced terraces and ramps. Several caves in the same area have some Terminal Formative sherds in them. One cave was noted which has partially plastered walls.

CLASSIFICATION: Village, pop.410-1025.

Terminal Formative

CONCLUSIONS

Population and Settlement Locations: Unlike the increase in population which occurred during the Tezoyuca-Patlachique phase in the Texcoco Region, and in the Teotihuacan Valley attendant with the rise of Teotihuacan population, the Ixtapalapa Peninsula Region seems to have declined somewhat from Late Formative levels. The total estimated Late Formative population was 3,928-8,220; for Tezoyuca-Patlachique the estimated total is 3,470-7,405. Most Late Formative sites not in defensible positions were abandoned (including Ix-LF-1,3,4,5,6,12,9,10,11), and Ix-LF-7 was moved up, in part, to a high ridge. Several new sites were founded, one on a hill-top (Ix-TF-13), four on high ground in locations which have steep slopes in at least one direction (Ix-TF-5,6,8,9). This movement of sites represented a drastic change from the patterns which characterized the Early, Middle, and Late Formative periods, when there was emphasis on occupation of the Lakeshore Plain. The dominant zone of Tezoyuca-Patlachique occupation was the Lomas and Hoyas (Fig.18). Although the Tlapacoya site (Ix-TF-4) did not increase in size from the Late Formative, settlement grew up across the lake at Ix-TF-2 and 3. These three sites together form a community 73 hectares in extent which contained a total estimated population of 1285 to 2750. This is the only large site in the area which is not located in a defensible position. I would suggest that in the case of this community, nucleation was adopted as a defensive posture rather than movement to a high location. In addition, the island setting of the main part of the site would have had some defensive advantages.

It is likely that the apparent population decline which occurred during the Tezoyuca-Patlachique phase can be attributed to at least two factors. First, warfare could have been responsible for some of the decline. Second, and probably just as important, population decline has resulted from the necessity for communities to assume a defensive position, either by moving to high locations, or, as in the case of Tlapacoya, by nucleation of population. The Lomas and Hoyas zone is an ideal location for defense, since it is high and rugged, but it is not now, and probably never was a highly productive agricultural zone. Throughout the Lomas and Hoyas there is rocky, shallow soil, and there is no water except that from rainfall. Presumably the groups living in the Lomas and Hoyas were also cultivating the Lakeshore Plain and the Lower Piedmont below their settlements, but the long travel time to and from their fields would have meant less time available for field preparation and maintenance, and guarding of fields. Access to lacustrine resources would have been similarly diminished. The net effect of occupation of the Lomas and Hoyas could have been decreased agricultural production, which might have resulted in a population decline. The elaborate terracing noted within Ix-TF-10 reflects an attempt to make the immediate area of the site agriculturally productive, but lack of water for irrigation would have been a severe limitation.

The increased population of Tezoyuca-Patlachique phase Tlapacoya, which expanded to the Lakeshore Plain and Lower Piedmont opposite the island, probably placed a strain on the agricultural productivity of the area around the site. I would suggest that in order to increase the productivity of that area, stone-faced terraces were constructed. This terracing probably included that on the upper slopes of Tlapacoya Island (Plate 6), that around the modern town of Ayotla (much of which is in use today), and probably included the large area of earth terraces

described as part of Ix-TF-1.

Very little Tzacualli pottery was encountered in the Ixtapalapa Peninsula Region. Only Ix-TF-7, a badly damaged site, has a significant amount. Faced with the same situation that Parsons encountered in the Texcoco Region, I can only reiterate the two alternatives which have been offered to explain the situation:

- 1) The Tzacualli ceramic complex was particular to the Teotihuacan Valley Terminal Formative.
- 2) There was a drastic population decline after the Tezoyuca-Patlachique phase which lasted until the Early Classic. The relative merits of these two arguments will be discussed below.

Local Organization: It is possible that the cluster of sites in the Lomas and Hoyas, which includes Ix-TF-5,7,8,9,10,11 and 12 forms a political unit of the type noted by Parsons in the Texcoco Region. This unit consists of a site comparable to Parsons' "segregated elite districts" (Ix-TF-5), plus several dependent hamlets and villages. Tlapacoya may have been the center of another of these units, tightly nucleated, with Ix-TF-2 and 3 as dependent communities. The situation of Ix-TF-13 in terms of these proposed socio-political units is not clear. Perhaps it was part of another unit predominantly located west of Cerro de la Estrella, out of the survey area. The populations of the two proposed units in the Ixtapalapa Peninsula Region are: Lomas and Hoyas cluster, 1690-3470; Tlapacoya, 1285-2750. Both of these units are smaller than those units noted in the Texcoco Region.

Conclusions, Basin of Mexico

Parsons (ibid.:326-7) suggests that during the Tezoyuca-Patlachique phase in the Basin of Mexico there was competition between social units at three levels:

- "1) At the highest level, between the major regional centers of Cuicuilco and Teotihuacan, in which the primary concern was over securing the allegiance of secondary political centers for purposes of trade, tribute, and military alliance;
- 2) at an intermediate level, between a major center (Cuicuilco, Teotihuacan) and any one of several secondary centers which might attempt to resist the efforts of the major center to incorporate it within its symbiotic-extractive network; and
- 3) at the lowest level, between individual secondary centers, over access to local resources."

By the end of this period of competition and warfare in the Basin of Mexico it is clear that Teotihuacan emerged as the dominant center. This process was possibly helped by the eruption of Xitli, which destroyed Cuicuilco. The near absence of Tzacualli pottery in the Texcoco and Ixtapalapa Peninsula Regions suggests that the dominance of Teotihuacan toward the end of the Terminal Formative was manifested as an elaborate population nucleation program which involved movement of conquered groups into the city. The existence of a policy of this type could explain the extremely rapid population growth at Teotihuacan. The growth of the city from A.D. 1 to A.D. 150 was from an estimated 5,000 to an estimated 30,000 (Millon, ibid.). This increase, which took place during approximately 7.5 generations could be accounted for by rapid in situ population growth, but may have been augmented by relocation of rural population into the city. It is not likely, however, that the total population from the Texcoco and Ixtapalapa Peninsula Regions

was moved into the city; this total population would have amounted to approximately 13,000-27,000, more than needed to account for the population growth at Teotihuacan. Perhaps the apparent population decline was a combination of population relocation as a state policy at Teotihuacan, plus a population decline which resulted from intensive warfare during the Tzacualli phase. That some kind of disruption and movement of groups did occur following the Tezoyuca-Patlachique phase is evident from the fact that most Tezoyuca-Patlachique sites were abandoned and were not occupied during the Classic period.

In order to understand why some communities became dominant during the Terminal Formative in the Basin of Mexico, while others declined, it is necessary to consider at least the following variables (there are undoubtedly others about which we are not aware):

- 1) The two dominant centers at that time, Cuicuilco and Teotihuacan, are both located, as has been noted above, on large expanses of irrigable, gently-sloping land. That there was large-scale irrigation in the Teotihuacan Valley during the Terminal Formative period is widely accepted. Whether or not this was the case at Cuicuilco is still debatable, but Palerm (1961:300) has reported seeing ancient canals which run under the lava. I will return to this problem at a later point.
- 2) Teotihuacan and Cuicuilco are located where they could have controlled some of the movement of goods in and out of the Basin of Mexico. The Teotihuacan Valley offers easy access to the North Gulf Coast and the Huasteca. Cuicuilco is located adjacent to the best pass to Morelos. It is interesting to note that Tlapacoya remained a relatively important center (judging from the presence of the large pyramid-platform and the high-status burials) during the Terminal Formative Tezoyuca-Patlachique phases in spite of the absence there of any suitable large alluvial plain with abundant water for large-scale irrigation (although the Chalco Lakeshore Plain zone might have been suitable). Perhaps the location of Tlapacoya, adjacent to the main route between the Basin of Mexico and the Puebla Basin, where it could have controlled the movement of long-distance trade goods (as was possibly the case during the Early Formative) helps explain why it remained relatively influential. This factor alone, however, was apparently not important enough such that Tlapacoya could survive in competition with the two dominant centers in the Basin of Mexico; Tlapacoya was probably eclipsed by Teotihuacan or Cuicuilco during the Tezoyuca-Patlachique phase and was completely abandoned, never to be occupied again on a large scale. From this we can probably infer that large-scale irrigation agriculture was a more important factor in the rise of the two dominant centers than was the control of long-distance trade routes.

Chapter 7

Classic Period

INTRODUCTION

Previous to the settlement pattern projects directed by Millon, Sanders, and Parsons, the nature of Classic period occupation of the Basin of Mexico was poorly understood. Vaillant (1944:55-6;158), for example felt that Teotihuacan was only a religious and ceremonial center, without a large resident population. He concluded that the massive pyramids were constructed through the cooperation of communities all over the Basin of Mexico because "Its scale and vastness could not have been achieved by a single resident community" (ibid.:158). As recently as ten years ago Mayer-Oakes (1959:365-71;1960) hypothesized that Teotihuacan was an "urban elite residence and pilgrimage ceremonial center", serviced by "secular centers" such as Portezuelo and Azcapotzalco, where craftsmen resided, and "rural loci" where peasants resided.

Recently, a much different view of Teotihuacan and the Classic period in the Basin of Mexico has come to the fore. The urban nature of Teotihuacan was first realized by Armillas (1950) and Sanders (1956). Ample confirmation of the conclusions of Armillas and Sanders has come from the Teotihuacan mapping project directed by Millon, whose conclusions to date will be outlined below. Perhaps equally exciting as the discovery of the urban nature of Teotihuacan has been the work of Sanders and Parsons which show the marked impact which Teotihuacan had on the rural population of the Teotihuacan Valley and the Texcoco Region. The purpose of this chapter will be to further examine the influence of what was probably the first state to evolve in the area. Hopefully this will lead to a fuller understanding as to how and why that state evolved.

The Classic Period at Teotihuacan is divided into four phases (Miccaotli, Tlamimilolpa, Xolalpan, Metepec). For the Ixtapalapa Peninsula Region the ceramic markers which define these phases have been used, except that, for the sake of simplicity the first two phases have been grouped into one, the Early Classic, and the last two have been grouped to create the Late Classic phase. The ceramic assemblages of the Classic phases at Teotihuacan have been described by Muller (1967), Bennyhoff (1967), and in the Texcoco Region by Parsons (MS: Appendix A).

Comparative Material

Teotihuacan Valley: The growth of Teotihuacan which began during the Patlachique and Tzacualli phases continued impressively into the Classic period (Millon, 1967b:72-7; Figs. 5-9, 1970). Millon concluded that by the Miccaotli phase the city attained a size of 22.5 square kilometers and had a population around 45,000. During the Tlamimilolpa phase Millon estimates the population reached 65,000 in an area of 22 square kilometers. The peak population occurred during the subsequent Xolalpan phase, an estimated 75,000 to as high as 200,000 in an area of 20.5 square kilometers. It was during the Xolalpan phase that, for the most part, the city assumed the configuration it has today. The Metepec phase seems to represent the beginning of the end for Teotihuacan, although it certainly maintained its position, during that time, of the largest community in Mesoamerica. Millon estimates the Metepec-phase population was around 70,000, in an area of 20 square kilometers.

The rural settlement pattern in the Teotihuacan Valley (Sanders, 1965:107-21;

Fig.7) reflects the marked influence of the main center. Only five Classic period sites in the Valley were located which have substantial civic-ceremonial architecture, and all of these are in peripheral locations, in the Upper Valley and north and west of Cerro Gordo. This probably meant that for activities involving the use of civic-ceremonial architecture, rural groups residing close to the city had to come into it. Most rural communities were nucleated hamlets or villages located on piedmont slopes far from the agriculturally-valuable alluvial plains. Teotihuacan, on the other hand, is located between the Lower Valley and the Middle Valley in an optimum position to exploit the agricultural potential of alluvial plains of both of these zones, in addition to being located where it would be possible to best control the water flowing from the main springs. One of these rural sites in the piedmont, T-C-8, located several kilometers west of Teotihuacan, was partially excavated by Sanders (ibid.: and 1967). In terms of the density of occupation, architecture, and artifact assemblage, the site was very similar to Teotihuacan itself. One significant difference, however, was the presence there of abundant obsidian scrapers of a type probably used in the production of maguey products. Based on the evidence from T-C-8, and considering that most rural sites are located in agriculturally marginal areas, Sanders concludes that the rural population of the Teotihuacan Valley was engaged largely in specialized production of products for consumption in Teotihuacan. These communities, Sanders feels, were closely tied to the economic life of the main center. They were closely tied to Teotihuacan in other ways, too. Evidence for this includes, for example, the fact that a number of piedmont communities are located in line with the main north-south and east-west avenues of the city, which suggests their locations were dictated by the central bureaucracy. In addition, some of the large rural sites were organized around a grid system which duplicated in miniature the plan of Teotihuacan.

During the Late Classic, the rural population of the Teotihuacan Valley was increasingly pulled into the main center. During the Early Classic, probably two-thirds of the Valley population resided in Teotihuacan; by the Metepec phase, Sanders estimates that 90% of the Valley population resided in the city.

Texcoco Region (Figs.35,36): The Classic period occupation of the Texcoco Region contrasts sharply with the Teotihuacan Valley. While the Classic in the Teotihuacan Valley was generally characterized by urbanization, nucleation, and population growth, in the Texcoco Region there was increasing dispersal of settlements and population decline (from an estimated 10,070-20,200 during the Tezoyuca-Patlachique to 1335-4000 estimated for the Classic period). With only one exception, sites were scattered hamlets and villages lacking civic-ceremonial architecture. Most of the sites are located in the Lower Piedmont, although some sites were located along the lakeshore and a few are in the Upper Piedmont. The clusters of sites which were probably independent socio-political units during the Late and Terminal Formative periods are not discernible in the Classic settlement pattern. Only one site in the region is relatively large, the Portezuelo site (Tx-EC-32, Tx-LC-18), which has been partially excavated (Hicks and Nicholson, 1964). The Classic occupation at Portezuelo, however, is badly obscured by the heavy Early Toltec component (Tx-ET-18) which made it difficult to estimate the density of Classic occupation. Parsons estimates a population there during the Early Classic of at least 300-900, and a Late Classic population of at least 400-1200. Although the Portezuelo site increased somewhat in population and size during the Late Classic, the picture in the Texcoco Region generally, during that time, was one of population decline. Most of this decline occurred in the southern half or so of the survey area, excepting the Portezuelo site. This decrease in rural settlement density in the southern Texcoco Region is comparable to the decline which occurred in the Late Classic in the Teotihuacan Valley rural settlement.

Classic period Site Descriptions (Figures 45,46 and Figs. 55,56).

Ix-EC-1

NATURAL SETTING: Lower Piedmont at about 2360 meters. Soil is deep, light brown loam, not eroded. A barranca roughly four meters deep defined the north edge of the site.

MODERN UTILIZATION: Rainfall cultivation, mostly of wheat and/or barley, but also including maize and maguey. Adjacent to the site on the southwest is a large colonial dam (Plate 15), which is now silted up. A ditch runs from the barranca north of the site which used to direct water into the dam.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic scattered over an area of 8 hectares. Ix-LT-7 is nearly coextensive with the Classic site. One structure was noted, a platform one meter high, constructed in two levels, 12 meters north-south at the base by 12 meters east-west. Some plaster was noted on the structure. The abundant utilitarian pottery scattered over the structure suggests it was residential in function, perhaps for a high-status group.

CLASSIFICATION: Hamlet, pop. 40-80.

Ix-EC-2

NATURAL SETTING: Lakeshore Plain at about 2260 meters. Soil is deep, light brown loam, not eroded. Two small barrancas, one north of the site and one west, were apparently colonial canals which are now eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and maguey. South and west of the site there is irrigated alfalfa, using water pumped electrically. The site is roughly 100 meters north of the abandoned Hacienda Carmen.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic over an area of 8 hectares. Ix-LT-6 covers the Classic site. Three mounded areas with abundant rock rubble and ceramic debris were noted which were probably residences. The main component of each of these was probably Late Toltec. Although Classic pottery is not abundant on the surface of the site, many Classic sherds were noted in back-dirt piles around gopher holes.

CLASSIFICATION: Hamlet, pop. 40-80.

Ix-EC-3

NATURAL SETTING: Upper Piedmont at about 2560 meters. The site is located on the flat top of a ridge between two deep barrancas at the base of steep slopes, which lead east up to the Sierra zone. Soil on the ridge-top is one meter or so of light brown loam, little eroded. Off of the ridge to the north and south there is severe erosion.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and wheat.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Early Classic, over an area of 2.2

hectares. No structures were noted, but there is light to moderate rock rubble on the surface.

CLASSIFICATION: Hamlet, pop. 11-22.

Ix-EC-4

NATURAL SETTING: Upper Piedmont, at about 2540 meters, just downhill from, and on the same ridge as, Ix-EC-3. Soil is one meter or so of light brown loam. There is severe erosion north and south of the site, along the edges of the ridge.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and wheat, with some maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic, evenly scattered over an area of slightly less than one hectare, although Early Classic sherds are lightly scattered over a much larger area along the top of the ridge. No structures were noted, but abundant rock rubble is scattered over the site area.

CLASSIFICATION: Small hamlet or isolated residence, pop. 5-10.

Ix-EC-5

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2400 meters. The site is located at the north edge of a large barranca, which is about three meters deep in the vicinity of the site. This is a severely eroded area, and it is likely that much of the site is eroded away.

MODERN UTILIZATION: None except for some nopal and maguey, and grazing.

ARCHAEOLOGICAL REMAINS: Localized and variable Early Classic, ranging in density up to light to moderate, over an area of a few hundred square meters. Light rubble is scattered over the site area.

CLASSIFICATION: Isolated residence or small hamlet, pop. 5-10.

Ix-EC-6

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2350 meters. The site is located at the point where a major barranca ends in a large alluvial fan at the edge of the alluvial plain. The area is severely eroded today; soil is completely washed away in some places.

MODERN UTILIZATION: Some scattered nopal and maguey, but generally the site is too eroded for agricultural use.

ARCHAEOLOGICAL REMAINS: Localized and variable Early Classic, ranging in density from very light to moderate, over an area of 10 hectares. Abundant rock rubble is scattered over the site, and several fragments of stone walls were noted in soil remnants. Ix-LT-4 covers part of the site.

CLASSIFICATION: Hamlet, pop. 50-100.

Ix-EC-7

Ix-LC-1

NATURAL SETTING: Lower Piedmont, at about 2350 meters. The western half or so of the site is on fairly steep, eroded slopes around the base of the Cerro Pino massif. The remainder of the site is on the gently sloping deep-soil alluvial plain below the slopes. Soil is light brown loam, ranging widely in depth and degree of erosion from the slopes to the alluvial plain.

MODERN UTILIZATION: The deep-soil alluvial plain is used for rainfall cultivation of maize and maguey. The south edge of the site is defined by a high earth bank running east-west adjacent to a colonial road. Two canals north of the earth bank run roughly north-south through the site. Apparently the earth bank at one time stretched to the base of the steep slopes such that water coming south in the two trenches would collect behind the bank. The earth bank is probably colonial.

ARCHAEOLOGICAL REMAINS: Localized and variable Early Classic, ranging in density from very light to light to moderate, scattered over an area of 36 hectares. Some Late Classic was also noted. Other components on the site are Ix-ET-1, Ix-LT-10, and Ix-A-11. One structure was noted, a pyramid mound roughly circular in plan-view (the original configuration was probably square or rectangular), 25 meters in diameter and three meters high, located on the eroded slopes overlooking the lower part of the site. The structure cannot be dated from surface evidence.

This is that portion of the Portezuelo site identified by Hicks and Nicholson (1964:498, Map 2) as the El Resumidero area.

CLASSIFICATION: Part of the Secondary Regional Center of Portezuelo, pop. 360-900.

Ix-EC-8

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2420 meters. The site sits on the north edge of a flat plateau which drops off to the north and east. Soil is one-half meter or so of light brown loam, partially eroded.

MODERN UTILIZATION: The flat plateau is used for rainfall cultivation of maize and wheat.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic over an area of 7 hectares. One possible structure was noted, badly eroded, which was probably a platform roughly one meter in elevation. Ix-LT-11 covers part of the site. This was probably also a part of the Portezuelo site.

CLASSIFICATION: Hamlet, pop. 35-70.

Ix-EC-9

NATURAL SETTING: Lower Piedmont on gentle slope at about 2410 meters. Soil is at least one meter of light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation, predominantly of maize.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Isolated residence or small hamlet, pop. 5-10.

Ix-EC-10

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2400 meters. Soil is one-half meter or so of light brown loam, little eroded.

MODERN UTILIZATION: Rainfall cultivation, primarily of maize and wheat. A large functioning tezontle quarry is located on the small volcanic cone to the west of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of several hundred square meters. No structures were noted, but abundant rock rubble is visible on the surface. Ix-ET-3 covers the Classic site.

CLASSIFICATION: Isolated residence or small hamlet, pop. 5-10.

Ix-EC-11

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2400 meters. Soil is one meter or so of light brown loam, not eroded. A large barranca four to six meters in depth defines the north edge of the site.

MODERN UTILIZATION: Rainfall cultivation of maize, wheat, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Early Classic, over an area of 11 hectares. No structures noted, but rock rubble is scattered over the site area.

CLASSIFICATION: Village, pop. 110-275.

Ix-EC-12

NATURAL SETTING: Lakeshore Plain, at the junction of the Lower Piedmont, at about 2250 meters. Soil is deep, light brown loam.

MODERN UTILIZATION: A modern graveyard and a small rancho define the west edge of the site, and possibly cover some of it. The area is otherwise used today for some rainfall cultivation of maize, but mostly for irrigated alfalfa, using water pumped electrically. In order to create flat fields suitable for irrigation some of the area has been artificially flattened. This has modified the site somewhat.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic scattered over an area of 3 hectares. No structures noted, but some rock rubble is scattered over the site area.

CLASSIFICATION: Hamlet, pop. 15-30.

Ix-EC-13

Ix-LC-2

NATURAL SETTING: Lower Piedmont, on gentle slopes at about 2300 meters. Soil is one-half meter or so of light brown loam, little eroded.

MODERN UTILIZATION: The area is currently not under cultivation except for some

scattered nopal and maguey. Several rock quarries are in operation on a ridge west of the site, along a basalt outcrop.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of 17 hectares. Very few Late Classic sherds were noted. No structures remain, but there is abundant rock rubble on the surface.

CLASSIFICATION: Village, pop. 85-170.

Ix-EC-14

NATURAL SETTING: Lower Piedmont, adjacent to the Lakeshore Plain at about 2250 meters. The site sits on a rocky promontory just west of the alluvial fan of a barranca. Soil in the site area is one-half meter of light brown loam, little eroded.

MODERN UTILIZATION: The site is located on the southeastern edge of the modern town of Ayotla, and is, therefore, partially obscured by residences and garbage. No agriculture on the site area.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of 2.5 hectares. No structures were noted. Other components on the site are Ix-TF-3 and Ix-LF-17.

CLASSIFICATION: Hamlet, pop. 13-25.

Ix-EC-15

NATURAL SETTING: Cerro Pino Lower Slopes, at the edge of the Lakeshore Plain, at about 2250 meters. The site sits on a small rocky hill which overlooks the Lakeshore Plain below. Soil on the hill is one-half meter or so of light brown loam, slightly eroded.

MODERN UTILIZATION: A modern house sits on top of the mound that composes the site. Some scattered nopal and maguey are cultivated on the site area. Two small basalt quarries, not now in use, are located a few meters north of the structure. These could have been the source of fill in the mound.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light Early Classic over an area of several hundred square meters. The pottery is scattered on and around a mound which was probably a pyramid-platform. The structure is about 35 meters square at the base oriented roughly north-south, and is about 4 meters high. The platform at the top is roughly 15 meters north-south by 12 meters. On the northwest corner of the structure there is a small, lower platform 10 meters north-south by 15 meters east-west. Sparsity of artifact cover on the site suggests it was not residential.

CLASSIFICATION: Isolated civic-ceremonial structure, probably without a permanent population.

Ix-EC-16

NATURAL SETTING: Lakeshore Plain at about 2240 meters, adjacent to the alluvial fan of a barranca. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: Located on the southeast edge of the modern village of Tlapizahua. The old Puebla highway defines the south edge of the site. Open fields in this area are used mostly for rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of several hundred square meters. Other components on the site are Ix-ET-17, Ix-LT-19, and Ix-A-34. No structures were noted but some rock rubble is scattered over the surface.

CLASSIFICATION: Hamlet, pop. 5-10.

Ix-EC-17

NATURAL SETTING: Lakeshore Plain, at about 2240 to 2250 meters. The site was probably directly adjacent to the edge of Lake Chalco. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: The site area is surrounded by modern structures. The northeast corner of the site is defined by the Hacienda San Isidro. A government agricultural school covers the northwest portion of the site. The southeast and southwest edges of the site are obscured by two separate ranchos. The one on the southeast corner of the site is owned by an American who told us there are "so many Indian burials in my back yard you can't plant a tree." The flat-land immediately south of the site, which was lake-bed, is used for irrigated cultivation of alfalfa, using water electrically pumped.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light and light Early Classic, over an area of 15 hectares. One structure was noted, a pyramid platform about two meters high. Pot hunters have exposed several wall fragments along the base of the structure such that it is possible to estimate that the structure was roughly square, 20 meters on a side at the base oriented north-south. No plaster was noted. A sewage ditch in the south portion of the site has exposed roughly one-half meter of Classic deposit. In part, Ix-LT-20 overlaps the Classic site.

CLASSIFICATION: Village, pop. 75-150.

Ix-EC-18

Ix-LC-3

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light brown loam. The north edge of the main body of the site is adjacent to a low area that has salitre soil typical of the lake-bed of ancient Lake Texcoco. This appears to have been a small bay or inlet of the lake.

MODERN UTILIZATION: The site is on the southeast edge of the modern town of Los Reyes. The old Puebla Highway and the Texcoco Highway, which branches off of the former road in the site, run through the southwest portion of the site. Open fields in the site area are used for rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light and in some places light to moderate Early Classic, scattered over an area of 22 hectares.

Some Late Classic was noted. Three structures are present on the site, two of which are badly damaged. The best preserved structure is a pyramid-platform roughly 30 meters in diameter at the base (the original shape was probably square or rectangular, oriented north-south), and 4 meters high (Plate 25). A second structure which was probably a low platform, is located a few meters southwest of the pyramid. Recent excavation on the platform, apparently for the purpose of removing some of the pumice chunks to make the area more suitable for cultivation, has exposed about 1.5 meters of a rock wall oriented east-west. The original size of the structure cannot be determined because it is so badly damaged. The third structure, located roughly 150 meters east of the other two, is a badly damaged mound roughly 15 meters north-south by 20 meters, at the base, and is one meter or so high. Rock rubble is scattered continuously over the site area. Density of Classic occupation here seems to have been relatively greater than on most Classic sites in the region. Other components on the site include Ix-ET-5, Ix-LT-22, and Ix-A-38.

CLASSIFICATION: Village, pop. 220-550.

Ix-EC-19

NATURAL SETTING: Lakeshore Plain at about 2240 meters. The site was probably directly adjacent to the shore of Lake Chalco. Soil is deep, light gray-brown loam, except in the east edge of the area, which is on a rocky promontory.

MODERN UTILIZATION: The Mexico-Puebla Autopista runs roughly north-south through the site, and residences on the eastern outskirts of the modern village of Sta. Catarina cover some of the area. Open fields here are used for rainfall cultivation, mostly of maize, beans, squash, and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light and light Early Classic evenly scattered over an area of 33 hectares. No structures were noted, but plaster was noted in an area near the center of the site. Other components here are Ix-LF-3 and Ix-A-53.

CLASSIFICATION: Village, pop. 165-330.

Ix-EC-20

NATURAL SETTING: Cerro Pino Lower Slopes, on a small rocky finger of land which projects into the Lakeshore Plain, at about 2250 meters. Directly north there is the alluvial fan of a major barranca. Soil is of variable depth, up to as much as one meter, of light brown loam, eroded in some places.

MODERN UTILIZATION: Some rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Classic, almost all Early, over an area of 5 hectares. No structures noted. Other components which overlap the Classic are Ix-ET-4, Ix-LT-21, and Ix-A-37.

CLASSIFICATION: Hamlet, pop. 25-50.

Ix-EC-21

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. The site is located on a

small rocky promontory slightly higher than the surrounding alluvial plain. Soil is one meter or so of gray-brown loam containing numerous pumice chunks, not eroded.

MODERN UTILIZATION: Some rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of about one hectare. No structures noted. Ix-A-56 covers the site.

CLASSIFICATION: Isolated residence, pop. 5-10.

Ix-EC-22

NATURAL SETTING: Lomas and Hoyas at about 2250 meters. The Lake Chalco beach was probably less than 50 meters south of the site. Soil here is one-half meter or so of light gray-brown loam containing numerous pumice chunks.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic over an area of a few hundred square meters. No structures noted. Ix-LT-27 covers the site.

CLASSIFICATION: Isolated residence, pop. 5-10.

Ix-EC-23 Ix-LC-4

NATURAL SETTING: Lakeshore Plain, on a rocky promontory which projects slightly into the lake-bed, at about 2240 meters. Soil is one meter or so of light gray-brown loam containing numerous pumice chunks. No erosion.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, with some maguey around the field boundaries.

ARCHAEOLOGICAL REMAINS: Light and light to moderate pottery of many periods including some Early and Late Classic scattered evenly over an area of 3 hectares. The other components present here are: Ix-EF-2, Ix-MF-2, Ix-LF-5, Ix-ET-15, Ix-LT-45, and Ix-A-57. Most of the Classic here is Early. No structures noted.

CLASSIFICATION: Hamlet, pop. 15-30.

Ix-EC-24

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2250 meters. Soil is less than one meter of light gray-brown loam with numerous pumice chunks. No erosion.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. Several small pumice quarries were noted on a hill adjacent to the site, which are not now in use.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Classic, over an area of about one hectare. No structures noted. Other components on the site are Ix-ET-6 and Ix-LT-28.

CLASSIFICATION: Isolated residence, pop. 5-10.

Ix-EC-25

NATURAL SETTING: Lakeshore Plain on gentle slopes at about 2240 meters. This is the north edge of the Lomas and Hoyas. Soil is deep, light brown loam somewhat eroded.

MODERN UTILIZATION: The west edge of the site is covered by the carcel para mujeres, while the north edge is covered by the interchange of Calz. Ermita, Calz. Zaragoza, and the Mexico-Puebla Autopista. This is the almost continuously built-up area between the modern towns of Sta. Marta and Los Reyes. Open fields here are used mostly for rainfall cultivation of maize. There are several functioning tezontle quarries in the area of the site.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic over an area of 3.5 hectares. The full extent of the site cannot be determined because of the heavy modern occupation of the area. No structures noted. Ix-A-43 covers the site.

CLASSIFICATION: Hamlet, pop. 18-35.

Ix-EC-26

NATURAL SETTING: Lakeshore Plain at about 2240 meters. The site is located on what appears to have been a small rocky peninsula which projected into Lake Texcoco. Soil is generally a meter or so of light grayish-brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic evenly scattered over an area of 10 hectares. No structures noted. Ix-ET-8 and Ix-LF-11 are mixed with the Classic in parts of the site.

CLASSIFICATION: Hamlet, pop. 50-100.

Ix-EC-27

Ix-LC-5

NATURAL SETTING: Lomas and Hoyas on gentle slopes at about 2280 meters. Soil is one meter or so of light gray-brown loam, very rocky. No erosion.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. Several functioning tezontle quarries are located in the vicinity of the site.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic, and a little Late Classic, scattered over an area of 3 hectares. No structures noted. There are ancient terraces located on steep slopes east of the site, but the date of construction of them could not be determined. Other components on the site are Ix-ET-19, Ix-LT-32, and Ix-A-58.

CLASSIFICATION: Hamlet, pop. 15-30.

Ix-EC-28

NATURAL SETTING: Lomas and Hoyas on gentle slope at about 2290 meters. Soil is one-half meter or so of light gray-brown loam, with numerous pumice chunks.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. Pumice chunks thrown up out of the fields form terrace-like boundaries around fields which prevent erosion. I cannot say whether the boundaries are ancient or recent.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic scattered over an area of 2 hectares. No structures noted. This is the only Classic site located deep in the Lomas and Hoyas - the others in the zone are located near the edge close to the lakes.

CLASSIFICATION: Hamlet, pop. 10-20.

Ix-EC-29

NATURAL SETTING: Lomas and Hoyas on medium slope at about 2270 meters. Soil is one-half meter or so of light gray-brown loam. Stones have been thrown up out of the fields here to create wide terraces along the slope.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic evenly scattered over an area of 4.5 hectares. No structures noted. The age of the terraces on which the site is located cannot be determined.

CLASSIFICATION: Hamlet, pop. 23-45.

Ix-EC-30

Ix-LC-6

NATURAL SETTING: Lakeshore Plain, at the north edge of the Lomas and Hoyas, at about 2250 meters. Soil is one meter or so of light gray-brown loam containing numerous pumice chunks. No erosion visible in the area. The site is located near what was probably a small bay or inlet of Lake Texcoco. West of the site is a rocky point of land which formed the western boundary of the inlet.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Classic, mostly Early but including some Late, evenly scattered over an area of 8 hectares. No structures were noted, but plaster was noted on part of the site. Other components on the site are: Ix-EF-3, Ix-MF-3, Ix-LF-8, Ix-TF-11, Ix-ET-9, and Ix-LT-33.

CLASSIFICATION: Hamlet, pop. 40-80.

Ix-EC-31

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is one-half meter or less of light brown loam, severely eroded in some places.

MODERN UTILIZATION: The site is in the modern town of Astahuacan. Sherds are visible here in several open fields, but for the most part the site is obscured by

modern occupation.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic scattered over an area of several hundred square meters. No structures noted. Other components on the site are Ix-LT-37 and Ix-A-61.

CLASSIFICATION: Hamlet, pop. 5-10.

Ix-EC-32

NATURAL SETTING: Lakeshore Plain at about 2240 meters. The site is located on what was probably a low, flat peninsula which projected into Lake Chalco. Soil is deep, light gray-brown loam, with some pumice chunks. No erosion was noted.

MODERN UTILIZATION: The site is in the modern town of Tlaltenco, and is therefore mostly obscured by modern residences. Open fields here are used for rainfall cultivation of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light and in some places light Early Classic scattered over an area of 2.5 hectares. No structures were noted. Other components on the site are Ix-MF-4 and Ix-LF-6.

CLASSIFICATION: Hamlet, pop. 13-25.

Ix-EC-33

NATURAL SETTING: Lakeshore Plain at about 2250 meters. The site is located on gentle slopes at the base of a small hill. Soil is generally one meter or so of light gray-brown loam, containing some pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize. The site is located along the north edge of the modern town of Zapotitlan.

ARCHAEOLOGICAL REMAINS: Very light to light, and in some places light, Early Classic evenly scattered over an area of 10 hectares. No structures noted.

CLASSIFICATION: Hamlet, pop. 50-100.

Ix-EC-34

Ix-LC-7

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: The site is located in the industrial area along the highway between the modern towns of Tezonco and Zapotitlan. Open fields here are used for rainfall cultivation, mostly of maize, and some maguey and tomatoes.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Classic over an area of 12 hectares. Some Late Classic was noted. No structures remain. The site is partially covered by Ix-ET-12, Ix-LT-41, and Ix-A-65.

CLASSIFICATION: Hamlet, pop. 60-120.

Ix-EC-35

NATURAL SETTING: Lower Piedmont, on the gentle slopes of Cerro de la Estrella. Soil is one meter or less of light brown loam, severely eroded in some places.

MODERN UTILIZATION: The eastern one-half of the site is located inside the wall of the panteon civil; the rest is just outside the wall. Outside the panteon the site area is used for rainfall cultivation of maize, wheat, and/or barley, and some tomatoes and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Early Classic evenly scattered over an area of about one hectare. No structures noted. Ix-TF-13 covers the site.

CLASSIFICATION: Isolated residence, pop. 5-10.

Ix-EC-36

NATURAL SETTING: Lakeshore Plain at about 2240 meters. The site is located on what appears to have been a low flat peninsula which projected into Lake Texcoco. Soil is light gray loam, very deep, and probably all salitre. In some places the soil is dark brown less than a half meter below the surface. The tough grass associated with Aztec salt mounds grows in some places here.

MODERN UTILIZATION: A main avenue, Calz. Ermita, runs east-west through the site. Along this road there are many industrial buildings. In addition, this area is becoming densely covered with low-income housing.

ARCHAEOLOGICAL REMAINS: Localized and variable Early Classic, ranging in density from very light to very light to light, scattered over an area of 33 hectares. The Classic component here has been mostly obscured by the subsequent occupations, particularly Ix-ET-14, and Ix-A-67, but also including Ix-LT-43. The site is covered with a series of mounds, almost all badly damaged, that were in part Aztec salt-mounds. Most of these have an Early Toltec component, and Classic pottery is scattered on and around some of them. The dominant pottery type on the surface of the site is Aztec "fabric-marked" which is always abundant on salt-mounds. In some areas of the site there is a pottery type as abundant on the surface as "fabric-marked". This pottery type is roughly burnished, usually dark brown in color, in the form of direct-rim bowls with very thin walls. The paste is poorly fired and very friable. The abundance of this pottery, on a Classic and Early Toltec site which was later important as a salt making locale, suggests the type might be the Classic and/or Early Toltec analogy to Aztec "fabric marked", and might have been associated with salt-making. I intended to do a detailed description of this pottery type in order to compare it with excavated Classic and Early Toltec types described from other parts of the Basin of Mexico, but the surface collection of this material was mistakenly left in Texcoco. Based on my visual impression of this pottery, however, I suggest that it is the same as the Post-classic "burnished ware" complex described by Tolstoy (1958:37), which he calls the "Tepeyac complex". He describes this pottery as being poorly fired, soft and friable, with large cavities caused by fiber-tempering. The "Tepeyac complex" comes from an area on the northwest edge of saline Lake Texcoco where salt-making would have been feasible. Mayer-Oakes conducted excavations in the Tepeyac area at El Risco (Mayer-Oakes, 1959). The site was undoubtedly an Aztec salt-making location; in the lower levels, which Mayer-Oakes identified as "Teotihuacan" and "Toltec", he encountered abundant brown ware pottery that he feels is, in part,

analogous to Aztec "fabric marked" salt-making pottery (ibid.:368). Although the evidence from these two sources is not conclusive, it does suggest there may have been a brown-ware pottery associated with salt-making before "fabric-marked" of the Aztec period. I cannot say whether this brown ware was used as early as the Classic period, or whether it is particular to the Early Toltec. The pottery is by far the most abundant on the surface in association with Coyotlatelco red-on-buff and related Early Toltec types.

It is difficult to estimate the density and extent of the Early Classic occupation of this site because of the heavy overlay of Early Toltec and Aztec pottery, but it is my impression that the Classic occupation was lighter than that of later periods.

CLASSIFICATION: Village, pop. 165-330.

Ix-EC-37 Ix-LC-8

NATURAL SETTING: Lower Piedmont, on the gentle to medium north slope of Cerro de la Estrella. Soil is generally one meter or less of light brown loam, eroded in some places.

MODERN UTILIZATION: The site is just south of the Delegacion of Ixtapalapa, and is partially obscured by modern residences and roads. Most of the site area is used for rainfall cultivation of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and in some places very light to light Early Classic (with very little Late Classic) scattered over an area of 76 hectares. The Classic occupation here has been largely obscured by the heavy overlay of Early Toltec (Ix-ET-13). In addition, Ix-A-69a covers some of the north part of the site, and Ix-LT-44 is within the site area. Several ancient terraces and structures were noted, but these probably pertain to the Early Toltec site, and will be described as part of that site description. Although the site is large, I would suggest that the Classic occupation here was not dense.

CLASSIFICATION: Secondary Regional Center, pop. 380-760.

Early Classic

Conclusions

Population and Settlement Locations: The Early Classic occupation of the Ixtapalapa Peninsula Region contrasts sharply with the preceding Terminal Formative period. The defensible positions on which Tezoyuca-Patlachique sites were located were abandoned in favor of low-lying areas. Population declined from a total estimated 3470-7405 for the Tezoyuca-Patlachique to a total estimated 2133-4607 for the Early Classic. Although there are more Early Classic sites than Tezoyuca-Patlachique sites, most are small villages and hamlets, and all have a relatively light scatter of artifacts on the surface which suggests they were not tightly nucleated like the Tezoyuca-Patlachique sites.

The shift of population to lower areas, presumably in order to have better access to agriculturally productive land, is reflected in Fig. 20. The Lomas and Hoyas, which was heavily occupied during the Terminal Formative, was nearly abandoned. The few Early Classic sites that are located near the edge of the zone,

are close to the Lakeshore Plain. Ix-EC-28, although it is located deep in the Lomas and Hoyas, is adjacent to one of the largest expanses of flat, deep-soil plain in that zone, where cultivation would have been relatively productive. On the Peninsula, the locations of Early Classic sites indicate there was an emphasis on cultivation of the Lakeshore Plain in much the same way as during the Early, Middle, and Late Formative. Accessibility to lacustrine resources was undoubtedly another reason for the heavy emphasis on occupation of the peninsular Lakeshore Plain. One exception to this partial return to the Formative pattern of settlement was the complete abandonment of Tlapacoya Island. The rocky point adjacent to the island, which had been a Terminal Formative site (Ix-TF-3), however, was the location of a small Early Classic site (Ix-EC-14).

Once away from the Lakeshore Plain of the Peninsula, the Early Classic occupation of the Ixtapalapa Peninsula Region is divergent from the patterns of the Early, Middle, and Late Formative. One aspect of this divergence was the increased emphasis on occupation of the Lower Piedmont zone. For the first time the Lower Piedmont east of the Acuatla Plain was relatively densely occupied. The same can be said of the east slopes of the Cerro Pino massif and the north slope of Cerro de la Estrella. Except for two hamlets (Ix-EC-2 and 12) there are no sites on or directly adjacent to the Acuatla Lakeshore Plain. It is possible that during the Classic, hill-side locations were favored for cultivation because of the lessened dangers of frost. It is also possible that this agriculturally-productive zone was controlled by the population of the nearby Portezuelo site (Tx-EC-32, Ix-EC-7,8) in Classic times, although it would be difficult to explain why that community would have been located so far from the land which sustained it.

Early Classic occupation of the Cerro Pino Lower Slopes, the Lakeshore Plain around the Cerro Pino massif, and the Lower Piedmont, except for Cerro de la Estrella, displays a consistent pattern. These sites are located adjacent to barrancas or adjacent to the alluvial fans of barrancas, presumably in order to practice flood-water cultivation. Sites located close to barrancas or the alluvial fans of barrancas, presumably in order to practice flood-water cultivation. Sites located close to barrancas or the alluvial fans of barrancas include Ix-EC-1,3,4, 5,6,11,13,14,16, and 20. The small size and even spacing of these communities and those along the Lakeshore Plain of the Peninsula suggests that each was agriculturally self-sufficient; surrounded by a sufficient amount of land to support the members of the community; utilizing rainfall cultivation and small-scale flood water irrigation, on the edges of the lakes.

There are two exceptions to the pattern outlined above. Ix-EC-37, which is the only site in the region large enough to qualify as a regional center, is not located directly adjacent to any major barranca system or large expanse of deep-soil plain. The relatively large size of this site, then, cannot be explained in terms of the presence in the vicinity of Cerro de la Estrella of a highly productive agricultural resource. This site could have grown to large size, however, if it had been a local market and/or administrative and religious center. I will return to consider this possibility shortly.

The other exception to the Early Classic pattern of site location is Ix-EC-36, which was probably a salt-producing site. Its relatively large size can probably be attributed to specialized production of salt.

Central Place Theory, as originally developed by Christaller (1966) is based on the assumption that people are only willing and able to travel a certain distance

in order to obtain needed goods and services. Travel to and from a market, religious, or administrative center can be costly and time consuming for a rural population. For this reason, centers which supply these goods and services will tend to grow up in locations central to their regions, in order to maximize the number of people which can be effectively served. Centers which are optimally located will tend to prosper at the expense of centers which are not centrally located. Teotihuacan was undoubtedly the major market, administrative and religious center in the Basin of Mexico during the Early Classic period. At least one structure has been identified as a possible market place, the "Gran Conjunto" located opposite the Ciudadela in the center of the city (Drewitt, 1967: Fig.2). For the rural population of the Teotihuacan Valley and perhaps for the entire population of the northern Basin of Mexico, Teotihuacan was probably the main source of goods and services. The distance from the southern Basin of Mexico to Teotihuacan, however, is great enough such that frequent repeated trips to the center would not have been feasible. For example, it is roughly a seven to nine hour walk from Portezuelo to Teotihuacan.

As pointed out by Christaller, people will be willing to travel farther for some types of goods and services than for others. For this reason, there should be a hierarchy of central places in a region. Small, local markets, scattered widely and frequently, would offer goods for which people would not be willing to travel long distances to obtain, such as perishable items or bulky goods consumed frequently. On the other hand, evenly spaced throughout a region there should be secondary markets, which offer goods and services not efficiently produced or distributed on a local market basis, for which people are willing to travel somewhat farther. At the level above the secondary centers, there should be central places, to which people throughout a region would make occasional trips to secure goods and services not available at any local center. We can predict that secondary market, administrative, and religious centers would have grown up in the southern Basin of Mexico, located such as to most effectively service local populations. Communities of this type could have prospered even if they were not adjacent to productive agricultural land, since the main activities at these centers would have been exchange, craft specialization, and administrative tasks such as tribute collection, and perhaps religious activities as well.

The locations of the known Early Classic secondary centers in the south seem to fit the predicted pattern, at least in so far as the even spacing between them is concerned. The four sites which I am identifying as secondary centers are Azcapotzalco, based on Sanders (ibid.:178); Xico (Parsons, personal communication); Portezuelo (Tx-EC-32, Ix-EC-7 and 8); and Cerro de la Estrella (Ix-EC-37). Figure 21 shows the distances between these four centers.

Local Organization: For the most part, the Early Classic population of the Ixtapalapa Peninsula Region was a more rural population than was the population of the preceding Tezoyuca-Patlachique phase, and was more rural in nature than were contemporary occupants of the Teotihuacan Valley. This is reflected in Figure 22 in the increase in number of people residing in hamlets and villages as opposed to regional centers, compared to the preceding Tezoyuca-Patlachique phase. In addition, there is relatively little in the way of civic-ceremonial architecture of Early Classic date, even at Ix-EC-37, a regional center. A small pyramid was noted at Ix-EC-7, but it may be Early Toltec in date. A small, isolated, pyramid mound was noted at Ix-EC-15, one small structure was noted at Ix-EC-17, and several small structures were noted at Ix-EC-18, but all of these could pertain to later periods.

In short, Early Classic sites in the area, as in the Texcoco Region, are

generally small, scattered settlements with little evidence of elaborate civic-ceremonial or residential architecture. These sites contrast sharply with T-C-8, a small rural site in the Teotihuacan Valley, partially excavated by Sanders (ibid.:110-14; 1967). In density of population, architectural styles, and artifact assemblage, T-C-8 was much like Teotihuacan. It is likely that the Early Classic population of the Ixtapalapa Region participated much less in the economic, religious, and intellectual life of the city compared to the inhabitants of T-C-8.

One last and perhaps obvious point can be made regarding local organization in the Early Classic Ixtapalapa Peninsula Region and Texcoco Region. The clusters of sites, consisting of "segregated elite districts" plus dependent hamlets and villages, which were apparent during the Tezoyuca-Patlachique phase, were not present in the Early Classic. This undoubtedly reflects the breakdown of locally autonomous socio-political units, and their incorporation into one large socio-political unit centered at Teotihuacan.

LATE CLASSIC (Fig.46)

This period is probably the most difficult to understand in the entire Prehispanic sequence. There are no examples of a density of Late Classic pottery comparable to even the relatively light densities of sherd cover on Early Classic sites, and there are no sites with only Late Classic pottery. For this reason, it will not be possible to offer a useful population estimate for this period. Were the sites with Late Classic pottery occupied for a short time during the Xolalpan phase and then abandoned (there is almost no evidence of the use of Metepec pottery)? Or, were there diminished populations residing on these sites for a longer period of time? Or, was the ceramic sequence in this region divergent from that at Teotihuacan? Although there are no firm answers to any of these questions at the present time, the following provisional explanations will be offered for the relative sparcity of Late Classic pottery types in the Ixtapalapa Peninsula Region:

- 1) There was a population decline in the region. There might have been several reasons for this. Perhaps the congregacion policy which Sanders has documented in the Late Classic Teotihuacan Valley affected regions far outside that valley, such that people were pulled into Teotihuacan. Or, a congregacion might have occurred on a local scale. This would explain the increase in size of the Late Classic Portezuelo site (Tx-LC-18) and the Xico site (Parsons, personal communication). Nothing of the kind seems to have happened, however, at Cerro de la Estrella, another regional center; here Late Classic pottery is rare. If there had been a local congregacion, then, it did not occur at every local center. Other factors could have caused abandonment of some areas and a general population decline, however, such as warfare. The time previous to the collapse of Teotihuacan may have been a stressful one, as centers peripheral to the influence of Teotihuacan such as Tula, Xochicalco, and Cholula began to militarily threaten the Teotihuacan empire. Nucleation of population at Teotihuacan, as suggested by Sanders (ibid.:184), was probably for reasons of defense. Perhaps the southern Basin of Mexico, including the Ixtapalapa Peninsula Region, was a shatter-zone at the unstable political boundary of the Teotihuacan state and the territories of emerging centers to the south, Cholula and Xochicalco.
- 2) An alternative explanation, which will be offered here, does not call for population decline or political boundaries or warfare. Instead, it is possible that the near-absence of Late Classic pottery types reflects the presence of an increasing

differentiation of urban versus rural traditions in the Basin of Mexico at that time. This could have been manifested as a conservatism in pottery-making in rural areas, such that Early Classic types persisted into the Late Classic, while the Xolalpan and Metepec styles were completely adopted only by the population of the Teotihuacan Valley. It has been suggested above that the Classic population of the Ixtapalapa Peninsula Region, and probably the Texcoco Region as well, did not participate intensively in the economic, religious, or intellectual life of the city. If this were the case, it would also be true that these rural groups had been relatively easily influenced in various ways by emerging centers, such as Xochicalco, which were increasingly in competition with Teotihuacan toward the end of the Late Classic.

A combination of the suggested factors may have been in operation during the Late Classic to produce the observed sparsity of Late Classic ceramics in this region. There might have been a decline in occupational density of sites and a decrease in numbers of sites occupied as a result of warfare and population movement to nucleated centers in the Early part of the Late Classic. Later in the Late Classic it is likely that the population of the southern Basin of Mexico came increasingly under the influence of emerging centers to the south, and this influence could be represented as an increase in popularity of pottery types from centers such as Xochicalco and a decrease in popularity of Teotihuacan style pottery. These hypotheses will be considered in more detail in the following chapter.

Chapter 8

Early Toltec

Introduction

The dominant ceramic assemblage of the Early Toltec period is the very distinctive Coyotlatelco. Tozzer (1921) first identified the complex, based on his excavations at Santiago Ahuizotla in the western Basin of Mexico. In the course of excavations at Teotihuacan, Armillas (1950) was the first to establish that Coyotlatelco pottery fits chronologically between the Late Classic and the Late Toltec Mazapan material, a sequence which has been widely accepted. For descriptions of the Coyotlatelco ceramic assemblage, the reader is referred to the following sources: A technical description of pottery of this type, excavated at Cerro Tenayo, north of Tenayuca, has been published by Rattray (1966). Other descriptions of Coyotlatelco pottery can be found in Muller (1967), and in Parsons (MS: Appendix A).

During the course of his excavations at Oxtotipac in the Teotihuacan Valley, Sanders (*ibid.*: 122-3) discovered a ceramic complex that he feels is transitional between the Late Classic Metepec phase and the local variant of Coyotlatelco (which is called Xometla). He named the complex after the type site of Oxtotipac. In addition to displaying transitional features between Late Classic and Xometla, Sanders feels that this new complex shows relationships to the ceramics of Xochicalco, in Morelos. In the site descriptions of Early Toltec sites in the Ixtapalapa Peninsula Region, this ceramic complex will be referred to as the Oxtotipac complex, following Sanders' designation, although it is likely that the local variant of this complex is not exactly like that in the Teotihuacan Valley.

The key problem which will be dealt with in this chapter, as a continuation of the last section of the last chapter, is the Classic-Postclassic transition, specifically the collapse of Teotihuacan. The best new data regarding this problem has come from the recent settlement pattern work of Sanders, Millon, and Parsons, which will be outlined below. Another approach to this problem has been the study of stylistic relationships between Coyotlatelco and Classic period pottery, with the goal of understanding the continuities and discontinuities between the Teotihuacan and Toltec traditions. The various schemes which have been proposed along this line will not be reviewed here because the subject has been discussed recently in some detail by Rattray (*ibid.*).

Comparative Material

Teotihuacan Valley: Following the Metepec phase, which ended around 750 A.D., the population of the Teotihuacan Valley declined considerably, attributable almost exclusively to the drastic decrease in size of Teotihuacan. The Oxtotipac occupation of the Classic city consisted of several small, spatially distinct occupational loci, covering a total area of only about one square kilometer. (Millon, 1967b:77-8; Fig. 10). Millon estimates a total population for this site of between 2000 and 5000. The size of Xometla phase Teotihuacan has not been indicated by Millon, but Sanders

(ibid: 126, 180) feels that it continued as by far the largest center in the Teotihuacan Valley, although it was smaller than the Classic period city. In the rural Teotihuacan Valley (Sanders, ibid.: 123-7; 179-87; Fig. 9) the Early Toltec settlement configuration was significantly different from the Classic period. The Xometla population was focused primarily along the lower edge of the piedmont bordering the Lower Valley alluvial plain and delta. This was the first time in the Prehispanic sequence in which this area was significantly occupied. Three of these sites on the piedmont adjacent to the Lower Valley alluvial plain and delta are large and complex enough to be classified as small towns. In addition, one fairly large site was located at the edge of the Middle Valley alluvial plain. The remainder of the valley, particularly that area east and north of the ancient city, was practically devoid of settlement. Sanders attributes this unequal distribution of settlement in the Teotihuacan Valley to the unwillingness of the Xometla population to utilize any but the most agriculturally productive portions of the valley, at the expense of less productive areas. This selectivity of land use could occur, of course, only if demographic pressure permitted it. This may relate to Parsons' suggestion, noted below, as to immigration into the Texcoco area from Teotihuacan.

Oxtotipac settlement has been noted only at the site of Teotihuacan and at the type site of Oxtotipac, on the piedmont overlooking the Middle Valley. Sanders suggests that the Oxtotipac pottery may represent the remnants of the Classic period population, while the Xometla pottery represents an incursion of new people from Tula, Hidalgo, the center which may have, in part, replaced Teotihuacan as the dominant community in the central highlands.

Texcoco Region: (Figure 37): As was the case in the Teotihuacan Valley, the Early Toltec occupation of the Texcoco Region was divergent from the Late Classic pattern. (Parsons, Ibid.: 298; 341-3; 424-5). Population in the Texcoco Region increased substantially, reversing a trend of population decline which had characterized the Classic (from an estimated 855-2675 for the Late Classic to an estimated 15,820-31,900 for the Early Toltec). Two foci of population emerged during this time, one in the northern sector of the survey area, primarily at Tx-ET-4, 7, and 13, and one at the Portezuelo site in the southern portion of the survey area, at Tx-ET-17 and 18. The large sites which dominated both of these foci were nucleated and contain impressive civic-ceremonial architecture. The central portion of the survey area, except for a modest occupation at Tx-ET-15, was virtually abandoned.

Major sites tend to be located at or near the bases of steeply sloping ground adjacent to gently-sloping, deep-soil plains, near major drainage systems.

Parsons suggests that the population increase in the area was the result of migration of groups from the Teotihuacan Valley into the Texcoco Region, an area which had been largely abandoned during the Late Classic period. Although this influx of people meant that the population increased considerably, Parsons feels that land pressure was not a factor in determining settlement locations, hence, as in the Teotihuacan Valley at that time, only the most productive agricultural areas were settled, while less productive areas were left unoccupied.

The two loci of population in the Texcoco Region, Parsons concludes, were "territorial entities" perhaps comparable to the socio-political units which have been proposed for the Terminal Formative period. Each of these units consisted of one or more dominant centers, plus dependent hamlets and villages. These units were not autonomous, however; rather, they were tied in to the spheres of influence of two dominant Early Toltec regional centers, Tula and Cholula. The open space in the center of the area, Parsons concludes, may be the shatter-zone along the unstable border between these two dominant centers.

Early Toltec Site Descriptions (Fig. 47, Fig. 57)

Ix-ET-1

NATURAL SETTING: Lower Piedmont, on the east slopes of the Cerro Pino massif, at about 2350 meters. The site is on gentle to medium slope overlooking the deep-soil alluvial plain below. Soil in the area is one-half meter or less of light brown loam, moderately eroded in some places.

MODERN UTILIZATION: Grazing, and some nopal and maguey cultivation.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec scattered over an area of three hectares. Other components on the site are Ix-EC-7, Ix-LC-1, Ix-LT-10, and Ix-A-11. Abundant rock rubble is scattered over the site area, and one structure was noted. This is a badly eroded pyramid mound, roughly 25 meters in diameter at the base (it was originally probably square at the base), and is about three meters high. Date of construction and use of this feature could not be determined. Several ancient stone-faced terraces were noted on the slopes southwest of the site, but these could not be dated. The site was probably a small part of the Portezuelo site (Tx-ET-18), which was partially excavated by Brainerd, and Hicks and Nicholson (Hicks and Nicholson, 1964).

CLASSIFICATION: Village, population 30-75.

Ix-ET-2

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2420 meters. Soil here is one meter or more of light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, but including some grains like wheat and barley.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Toltec (including some Oxtotipac), over an area of several hundred square meters. No structures noted but there is some rock rubble on the surface.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-ET-3

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2410 meters. Soil is one-half meter or so of light brown loam, little eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and other grains, probably wheat and barley. Several tezontle quarries are in operation on a small volcanic cone west of the site.

ARCHAEOLOGICAL REMAINS: Very light to light Early Toltec scattered over an area of several hundred square meters. No structure noted, but there is some rock rubble on the surface. The Early Toltec is mixed with Early Classic (Ix-EC-10).

CLASSIFICATION: Isolated residence, population 5-10.

Ix-ET-4

NATURAL SETTING: Cerro Pino Lower Slopes, at the edge of the Lakeshore Plain, at about 2250 meters. Soil is variable in depth, ranging from a maximum of one meter, severely eroded in some places. There is an alluvial fan of a barranca just north of the site.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize and maguey, but mostly grazing.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec, including some Oxtotipac, scattered over an area of 3.5 hectares. Other components on the site include Ix-EC-20, Ix-LT-21, and Ix-A-37. No structures were noted on the site proper. Several ancient stone-faced terraces were noted on the sloping terrain in the east, south, and west portions of the site, but the date of these is uncertain. Outside of the site area, roughly 200 meters to the east, there is an isolated pyramid-platform located directly above the alluvial fan of the barranca. This structure is about 27 meters square at the base, roughly 5 meters high, and oriented north-south. On the sloping ground west and just below the pyramid there are two platforms, each roughly 10 meters wide (east-west) by about 30 meters long, which form broad steps leading up to the pyramid. Some plaster was noted around the top of the structure. One Coyotlatelco sherd was noted eroding out of the fill of the structure, which dates its construction to Early Toltec or later.

CLASSIFICATION: Village, population 35-88.

Ix-ET-5

NATURAL SETTING: Lakeshore Plain at about 2240 meters. Soil is deep, light brown loam. Near the north edge of the site there is a low area of salitre soil typical of the lake-bed of Lake Texcoco. This low area was probably a small bay or inlet of the lake.

MODERN UTILIZATION: The site is on the southeast edge of the modern town of Los Reyes. The old Puebla Highway and the Texcoco Highway, which branches off of the former road in the survey area, run through the southwest portion of the site. Open fields in the site area are used for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light and light Early Toltec, including some Oxtotipac, scattered over an area of 28 hectares. Other components on the site are Ix-EC-18, Ix-LC-3, Ix-LT-22, and Ix-A-38. Three structures were noted, which have been described as part of the description of Ix-EC-18. The date of construction and use of these structures could not be determined.

CLASSIFICATION: Village, population 280-700.

Ix-ET-6

NATURAL SETTING: Lomas and Hoyas, approximately 100 meters from ancient Lake Chalco, at about 2250 meters. Soil is less than one meter of light gray-brown loam, with numerous pumice chunks. No erosion.

MODERN UTILIZATION: Mostly rainfall cultivation of maize, maguey, and nopal. A small tezontle quarry, not now in use, is located on a small hill southeast of the site.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec, including some Oxtotipac, scattered over an area of 2 hectares. Other components on the site are Ix-EC-24 and Ix-LT-28. No structures noted.

CLASSIFICATION: Small hamlet, population 10-20.

Ix-ET-7

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. This was probably on or near the edge of ancient Lake Texcoco. Soil is deep, sandy, light-gray loam, little eroded.

MODERN UTILIZATION: The modern town of Los Reyes obscures most of the site, and the old Puebla Highway runs northwest-southeast through the site. No agriculture was noted in the area.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec, including some Oxtotipac, scattered over an area of 5 hectares. Other components on the site include Ix-LT-24 and Ix-A-41. No structures noted, but some rock rubble is scattered over the surface.

CLASSIFICATION: Hamlet, population 50-125.

Ix-ET-8

NATURAL SETTING: Lakeshore Plain, at about 2240 meters, located on a rocky tongue of land which projects into the lake-bed of Lake Texcoco. Soil is one meter or more of light gray-brown loam with numerous pumice chunks, although in some places bare rock is exposed on the surface.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Early Toltec, including some Oxtotipac, scattered over an area of 5 hectares. The Early Toltec partially covers Ix-EC-26. No structures noted.

CLASSIFICATION: Hamlet, population 50-125.

Ix-ET-9

NATURAL SETTING: Lakeshore Plain at the north edge of the Lomas and Hoyas, at about 2250 meters. Soil is one meter or so of light gray-brown loam, with numerous pumice chunks. No erosion is obvious. The site is located near what was a small bay or inlet of Lake Texcoco. West of the site there is a rocky point of land which formed the western boundary of the inlet.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. A large functioning tezontle quarry is located roughly 200 meters south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light, and in some places light Early Toltec, including some Oxtotipac, over an area of 4 hectares. No structures were noted, but there is some plaster scattered over part of the site. An isolated pyramid-mound which is roughly 30 meters square at the base (oriented north-south) and 4 meters high is located roughly 25 meters south of the site. There is very little pottery on and around the structure, but it probably pertains to the Postclassic. Other components here are: Ix-EF-3, Ix-MF-3, Ix-LF-8, Ix-TF-11, Ix-EC-30, Ix-LC-6, and Ix-LT-33.

CLASSIFICATION: Hamlet, population 20-40.

Ix-ET-10

NATURAL SETTING: Lakeshore Plain at about 2240 meters. Soil is deep, light gray in color, and very little eroded. The site is covered in part with the tough grass associated with very salitre soils.

MODERN UTILIZATION: The site is in the modern town of San Sebastian. A school and several residences cover part of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered moderate pottery, including some Early Toltec utilitarian ware, over an area of several hundred square meters. Other components here are Ix-LT-36 and Ix-A-63. The people who own the lot, on which most of the site is located, said they had encountered many sherds below the ground, while digging a house foundation; the moderate density of sherds on the surface here is apparently the result of that digging. No

structure noted, but there is much rock rubble mixed with the pottery.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-ET-11

NATURAL SETTING: Near the south edge of the Lomas and Hoyas, on gentle slope at about 2250 meters. Soil is one-half meter or so of light gray-brown loam, very rocky. No erosion was noted.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Early Toltec, over an area of 5 hectares. No structures noted. Along the south edge of the site, it overlaps slightly with Ix-LF-6.

CLASSIFICATION: Hamlet, population 50-125.

Ix-ET-12

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is one meter or so of light brown loam, no erosion.

MODERN UTILIZATION: The site is located in the area between Tezonco and Zapotitlan, which is becoming largely covered by modern structures. One small cinder quarry is located in the site area and nearby there are several large quarries of this type. Open fields here are used for rainfall cultivation, mostly of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec scattered over an area of roughly 5 hectares. No structures noted. Other components on the site are Ix-EC-34, Ix-LC-7, Ix-LT-41, and Ix-A-65.

CLASSIFICATION: Hamlet, population 25-50.

Ix-ET-13

NATURAL SETTING: Lower Piedmont and partially on the Lakeshore Plain on the gentle to medium north slope of Cerro de la Estrella. Soil is generally one meter or so of light brown loam, eroded in a few locations. Plate 4 shows the north slopes of Cerro de la Estrella looking southeast. Plate 5 shows the same area looking northwest from the summit of the hill toward Ixtapalapa.

MODERN UTILIZATION: The northern edge of the site is under the Delegacion of Ixtapalapa; hence the north limit of the site could not be accurately determined. Ixtapalapa is now increasingly growing up the side of the hill covering the site. Open fields in the site area are used for rainfall cultivation mostly of maize.

ARCHAEOLOGICAL REMAINS: Evenly scattered light and in some places light to moderate Early Toltec, including some Oxtotipac, over an area of 169 hectares. Within the area of the site are Ix-EC-37, Ix-LC-8, Ix-LT-44, and Ix-A-69a. Much of the north slope of Cerro de la Estrella is covered

with stonefaced terraces which maintain relatively flat, broad spaces. Some of these are in use today as agricultural terraces, but most are badly eroded. Plate 26 shows two of these terraces looking east. The lower terrace remains only as a line of rocks just above the road in the foreground. Further uphill there is another severely eroded line of stones forming an upper terrace. Near the center of the site, on the grounds of a large private house, a series of these terraces have been reconstructed. The owner of the house was an engineer interested in archaeology, and he cleared and reconstructed the terraces as a hobby. Although his reconstruction might not have been accurate, it is obvious from several walls and plaster floors he had uncovered, which I examined, that the terraces are Early Toltec in date. The terraces seem to have been constructed for the purpose of providing flat ground on which to build residences. The terracing is the only obvious architecture on the site. No large mounds were noted. This might not be significant, since the modern occupation of the site area has resulted in much modification of Prehispanic features.

Several pumice, basalt, and tepetate quarries, all probably ancient, are scattered throughout the site area. In addition, several apparently man-made caves were noted which could have been associated with the Early Toltec occupation. These caves are now used as community latrines, which prevented us from doing a detailed examination of them.

CLASSIFICATION: Primary regional center, population 1690-4225.

Ix-ET-14

NATURAL SETTING: Lakeshore Plain at about 2240 meters. The site is located on what appears to have been a low, flat peninsula which projected into Lake Texcoco from Cerro de la Estrella. Soil is deep, light-gray loam. In some places the soil is dark brown below the surface. The tough grass associated with very salitre soil on Aztec salt-mounds grows in many places here.

MODERN UTILIZATION: A main avenue, Calz. Ermita, runs east-west through the site. Along this road many industrial buildings have been recently constructed, badly obscuring parts of the site. The site has been further obscured by construction here of numerous residences. No agriculture is practiced in the area, probably because the soil is too saline.

ARCHAEOLOGICAL REMAINS: Localized and variable Early Toltec, with very little Oxtotipac, ranging in density from very light to light to moderate, in some places, scattered over an area of 22 hectares. Other components on the site are IX-EC-36 and Ix-A-67. Several mounds were noted which are probably salt mounds. An abundant pottery type on the site, a brown ware with rough burnishing, was described as part of the description of Ix-EC-36. This type was most consistently found with Early Toltec pottery. I suggest it was the Early Toltec analogy of Aztec fabric-marked, a ware which has been associated with salt-making. The abundant Early Toltec utilitarian pottery on the site suggests this was a residential site, not just a specialized salt-producing location.

CLASSIFICATION: Village, population 220-550.

Ix-ET-15

NATURAL SETTING: Lakeshore Plain, on a rocky promontory which projects slightly into the lake-bed at about 2240 meters. Soil is one meter or so of light gray-brown loam, containing numerous pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, along with some maguey around field boundaries.

ARCHAEOLOGICAL REMAINS: Light and light to moderate pottery of many periods, including some Early Toltec (with some Oxtotipac), evenly scattered over an area of two hectares. The other components on the site are Ix-EF-2, Ix-MF-2, Ix-LF-5, Ix-EC-23, Ix-LC-4, Ix-LT-45, and Ix-A-57. No structures noted. No good explanation can be offered for the long-term occupation of the site, although it is possible this was a good embarkation point for boats along an otherwise very shallow shore line.

CLASSIFICATION: Hamlet, population 10-20.

Ix-ET-16

NATURAL SETTING: Partially on the Lakeshore Plain and partially on the adjacent gentle slope of the Cerro Pino Lower Slopes, at about 2250 meters. Soil is generally one meter or so of light brown loam.

MODERN UTILIZATION: Rainfall cultivation of maize, tomatoes, and some nopal and maguey. The site is located on the north edge of the alluvial fan of a large barranca. Ix-ET-4 is on the south edge of the same alluvial fan.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec, including some Oxtotipac, scattered over an area of two hectares. No structures noted. Other components here are Ix-LT-21 and Ix-A-37.

CLASSIFICATION: Hamlet, population 10-20.

Ix-ET-17

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: The site is located in an open field adjacent to the old Puebla Highway, just outside the modern town of Tlapizahua. The field is used for rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Very light to light Early Toltec scattered evenly over an area of a few hundred square meters. No structures noted, but there is a light scatter of rock rubble. Other components on the site are Ix-LT-19 and Ix-A-34.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-ET-18

NATURAL SETTING: Lakeshore Plain at the northern edge of the Lomas and Hoyas at about 2250 meters. Soil is deep, light brown loam little eroded.

MODERN UTILIZATION: The site is located in the heavily occupied area between the modern towns of Los Reyes and Santa Marta, just south of the interchange of Calz, Ermita, Calz, Zaragoza and the Mexico-Puebla Autopista. Some open fields in this area are used for rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early Toltec scattered over an area of three hectares. No structures were noted, but there is a light scatter of rock rubble over the area. Other components here are Ix-EC-25 and Ix-A-43.

CLASSIFICATION: Hamlet, population 15-30.

Ix-ET-19

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2270 meters. Soil is one meter or so of light gray-brown loam, very rocky. No erosion noted.

MODERN UTILIZATION: Some rainfall cultivation of maize and maguey. A functioning tezontle quarry is located 200 meters east of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Toltec over an area of three hectares. No structures were noted. Other components on the site are Ix-EC-27, Ix-LC-5, and Ix-LT-32.

CLASSIFICATION: Hamlet, population 15-30.

Ix-ET-20

NATURAL SETTING: Lomas and Hoyas near the Lakeshore Plain, at about 2260 meters. Soil is one meter or so of light gray-brown loam, very rocky. No erosion was noted.

MODERN UTILIZATION: A modern rancho defines the east edge of the site. This area is used for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Early Toltec, evenly scattered over an area of less than one hectare. One structure was noted, a pyramid-mound constructed of pumice chunks and dirt. The mound is roughly circular (originally it was probably square or rectangular at the base), 18 meters in diameter and 3 meters high. Date of the construction and use of this feature could not be determined. Other components on the site are Ix-LT-34 and Ix-A-59.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-ET-21

NATURAL SETTING: Lakeshore Plain at the north edge of the Lomas and Hoyas at about 2250 meters. Soil is deep, light brown loam, little eroded.

MODERN UTILIZATION: The site is located in the heavily occupied area between the modern towns of Los Reyes and Santa Marta, just west of the large interchange of Calz, Ermita, Cals. Zaragoza, and the Mexico-Puebla Autopista.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Early Toltec over an area of a few hundred square meters. No structures were noted. Ix-A-43 covers the site. This could be an extension of Ix-ET-18.

CLASSIFICATION: Isolated residence, population 5-10.

Early Toltec

CONCLUSIONS

Chronology: As mentioned above in the discussion of the Late Classic, it is difficult to determine whether the paucity of known Late Classic pottery types in the Ixtapalapa Peninsula Region (and in part of the Texcoco Region) reflects a population decline, or a regional divergence in the ceramic sequence within the Basin of Mexico, or whether both of these factors operated together. The following two observations might throw some light on the problem: 1) A number of Early Toltec sites have Early Classic components on them (Ix-ET-1, 3, 4, 5, 6, 8, 9, 12, 13, 14, 15, 18, and 19), and several of these have no evidence of an intervening Late Classic occupation (Ix-ET-3, 4, 6, 8, and 14). Were these sites largely or completely abandoned during the Late Classic and then reoccupied in exactly the same locations? This is possible but it seems unlikely. The fact that many of the sites are exactly coextensive suggests continuity of settlement from the Early Classic into the Early Toltec. Excavation will be required to resolve this problem. 2) The Oxtotipac complex, or one very much like it, is apparently more abundantly represented in the Ixtapalapa Region than it is in the Teotihuacan Valley. This complex is represented in small amounts on the following sites: Ix-ET-4, 5, 6, 7, 8, 9, 13, 14, 15, and 16. This complex could be present on many more sites than these, but our brief examination of surface pottery was not always adequate to enable us to distinguish it from the Coyotlatelco complex. In the Teotihuacan Valley the Oxtotipac complex has been identified as post-Metepec and pre-Xometla, and has ties with Xochicalco in Morelos. If it were the case that the Ixtapalapa Peninsula Region was on the periphery of Teotihuacan influence during the Late Classic in the Basin of Mexico, in a region which was territory contested between Teotihuacan and emerging Xochicalco, then it is likely that the influence of Xochicalco would have been present earlier in the Ixtapalapa Peninsula Region than in the Teotihuacan Valley. The Oxtotipac complex in the Ixtapalapa Peninsula Region, therefore, may be Late Classic in date, probably equivalent in time to the Metepec phase, and perhaps even a portion of the Xolalpan. Evidence from excavations in the south-central and western Valley of Mexico suggests this interpretation is correct. At the Portezuelo site, for example, there apparently are no phases exactly equivalent to the Teotihuacan Late Classic phases (Hicks and Nicholson, 1964). Some of the material which is described as Late or Terminal Classic at Portezuelo is much like the Oxtotipac complex (ibid.).

Similarly, the Late or Terminal Classic Ahuitzotla-Amantla phase at Azcapotzalco (Armillas, 1950) is apparently like the Oxtotipac. Unfortunately, there are not as yet any radio-carbon dates from this area, pertaining to this important time period, so the problem cannot be resolved at this time. I suggest that during the Late Classic the area which Teotihuacan was able to control politically and economically included only the Teotihuacan Valley itself and adjacent areas, such as the northern portion of the Texcoco Region. Beyond that sphere of influence communities came increasingly under the influence of emerging centers in competition with Teotihuacan. In the southern and western Basin of Mexico, for example, the population was closely tied to emerging Xochicalco (and perhaps Cholula).

Population and Settlement Locations: Because of the apparent problems of the Late Classic ceramic sequence, as outlined above, it will be of little value to compare the Early Toltec settlement pattern with the observed Late Classic settlement pattern. Instead, it will be of value to compare the Early Toltec pattern with the Early Classic pattern, which will be, in effect, a comparison of the settlement configuration in the region during the time of Teotihuacan hegemony over the area to the settlement configuration after the decline of Teotihuacan hegemony.

The most obvious aspect of the Early Toltec settlement pattern is that there was much continuity from the Early Classic pattern. I earlier pointed out that a number of sites seem to have been occupied continuously from the Early Classic into the Early Toltec. The Cerro de la Estrella site, which had been the largest site in the region during the Early Classic, continued to be the largest during the Early Toltec. The same can be said for the Portezuelo site in the Texcoco Region. In both cases, however, these sites grew substantially in size and apparently became much more architecturally complex during the Early Toltec (and Late Classic?).

The increase in size of the Cerro de la Estrella site accounts for most of the increase in population which occurred during the Early Toltec period (from an estimated 2133-4607 for the Early Classic to an estimated 2540-6283 for the Early Toltec). Also, Early Toltec sites seem to have been more nucleated than Early Classic sites. The impressive growth of Cerro de la Estrella is reflected in Figure 23, which shows that a smaller proportion of the population was residing in villages and hamlets while more were residing in the center, compared to the Early Classic distribution, which is indicated in Figure 22. A similar nucleation of population seems to have occurred in the Texcoco Region, and this might account for the Early Toltec decline in size of the "El Resumidero" site (Ix-ET-1), and the disappearance of Ix-EC-8, which is also adjacent to the Portezuelo site. The increase in size of the Cerro de la Estrella site, located for the most part on the Lower Piedmont, is also reflected in Figure 24, which shows a decreased emphasis during the Early Toltec period, on occupation of the Lakeshore Plain, compared to the Early Classic period.

The most apparent deviation in the Early Toltec settlement configuration from the Early Classic configuration was the abandonment of large areas. The Acuautila Lakeshore Plain and piedmont slopes east of it, the southern half or more of the Cerro Pino massif, and much of the southern half of the Ixtapalapa Peninsula, had little or no settlement. These same areas had little or no evidence of Late Classic pottery, although they were occupied

during Early Classic. The abandonment of the piedmont slopes east of the Acuautila Lakeshore Plain extended south along the east edge of Lake Chalco. The only focus of occupation in the Chalco Region during the Early Toltec was at Xico Island (Parsons, personal communication). This pattern of complete abandonment of large areas is characteristic of the Early Toltec period in the eastern Basin of Mexico. There was little or no settlement east and north of the main site in the Teotihuacan Valley, and the central portion of the Texcoco Region was similarly abandoned. I will return to this problem briefly in the following section.

Local Organization: The increase in size and importance of the local centers of Portezuelo (Tx-ET-18), Cerro de la Estrella (Tx-ET-13), Azcapotzalco, and Xico during the Early Toltec period (a process which probably began during the Late Classic) can probably be explained, at least in part, in terms of one or both of the following variables: 1) During the Late Classic, as suggested above, the south and southwest sectors of the Basin of Mexico were in a shatter zone along the contested boundary between the spheres of influence of Teotihuacan and emerging Xochicalco (and perhaps Cholula). Nucleation of population at Cerro de la Estrella and the other centers may have been adopted as a defensive mechanism. During the Early Toltec period, competition and warfare, not only between major centers such as Xochicalco and Tula, for example, but also between local centers in the Basin of Mexico like Cerro de la Estrella and Xico, etc., would have meant that nucleation continued to be important for defensive purposes.

2) As local centers like Cerro de la Estrella (Ix-ET-13) became increasingly autonomous and disengaged from the influence of Teotihuacan, they would have prospered. I would suggest that Teotihuacan had maintained its position as a powerful center by assuming the position of the only important central place in the Basin of Mexico, usurping most of the central-place functions of local centers, and thereby restricting their growth. As the power and influence of Teotihuacan declined, however, local centers could become more autonomous and could have increased in importance as local market, administrative, and religious centers.

The clustering of Early Toltec settlements in some areas and the complete abandonment of other areas has been explained by Sanders and Parsons as follows: 1) There was a minimum of land pressure during the Early Toltec period, such that there was no reason to occupy agriculturally marginal areas. The locations chosen for settlement were those of most value for agriculture adjacent to deep-soil plains, near major permanent water sources, and/or major drainage systems; 2) Parsons suggested the abandoned space in the center of the Texcoco Region was a shatter-zone along the contested boundary between the emerging centers of Tula and Cholula.

The evidence from the Ixtapalapa Peninsula Region does not completely substantiate either of these arguments. For example, if the presence of prime agricultural land was the most important determiner of settlement location, why was there no occupation in the vicinity of the Acuautila Lakeshore Plain, while there was a substantial string of settlements along the narrow Lakeshore Plain north of the agriculturally marginal Lomas and Hoyas? Similarly, it is doubtful that the area around Cerro de la Estrella has ever been important enough, in terms of agricultural productivity before the introduction of chinampas, to warrant location of a large center there.

The area lacks permanent streams or springs suitable for irrigation, and because the hill is small and low it does not have a major drainage system; the potential of floodwater irrigation on Cerro de la Estrella is limited.

As I suggested above in discussing the Early Classic site at Cerro de la Estrella, the importance of this community was probably related to its central location with respect to a rural population which it served as a market, administrative, and religious center. In addition, the Cerro de la Estrella community would have been located centrally with respect to the entire Basin of Mexico, and could have efficiently served as a point of exchange of products from throughout this large region. It would have been easily accessible by boat from both the fresh and salt-water lakes. Later, several key Aztec centers emerged in this general vicinity, also optimally located as market centers, first Culhuacan and later Tenochtitlan-Tlatelolco. In addition to its optimal location as a local and regional market center, Cerro de la Estrella was probably one of the most important centers for the production of salt in the Basin of Mexico, judging from the size of Ix-ET-14. In short, the presence of agriculturally optimal land was probably not the only factor which determined the location of Early Toltec centers, particularly in the case of Cerro de la Estrella.

Similarly, the abandonment of large areas during the Early Toltec period probably does not reflect only their marginality in terms of agricultural productivity. I would suggest that these open areas represent contested land between competing autonomous political units in the Basin of Mexico. Parsons' suggestion that the abandoned area in the center of the Texcoco Region was the contested boundary between Tula and Cholula now needs to be revised, because it does not account for the similarly abandoned area south of the Portezuelo site. As suggested by Parsons, following the decline of Teotihuacan, several distinct political entities appeared in the Basin of Mexico, analogous to those which existed during the Terminal Formative. I would suggest that these autonomous political units, exemplified by Portezuelo, Xico, Cerro de la Estrella, Azcapotzalco, etc., were in competition between themselves (and perhaps with centers outside the Basin of Mexico such as Tula, Xochicalco, and Cholula), and that each was surrounded by an abandoned area of contested land.

Chapter 9

Late Toltec

Introduction

The dominant ceramic complex of the Late Toltec period is the Mazapan complex. Vaillant (1938) was the first to realize the approximate chronological position of Mazapan pottery, which he felt was previous to Aztec II and, in part, contemporaneous with Coyotlatelco. Until recently the exact chronological relationship between Mazapan and Coyotlatelco was not clear. For example, Tolstoy (1958) felt that the two complexes were not distinct. The excavations at Tula, Hidalgo, (Acosta, 1956-7) however, along with the excavation of Oxtotipac, which was described above, and at the Maquixco-Mazapan site (Koehler, 1962) in the Teotihuacan Valley have demonstrated that the Coyotlatelco and Mazapan complexes are distinct and that Mazapan was the later of the two. For descriptions of the Mazapan complex, the reader is referred to Koehler (*ibid.*), Muller (1967) and Parsons (*ibid.*: Appendix A).

Comparative Material

Teotihuacan Valley: Late Toltec occupation of the Teotihuacan Valley was distinct in a number of ways from the preceeding Xometla phase occupation (Sanders, *ibid.*: 127-31; 179-87; Figure 10). The overriding impression of Mazapan settlement is one of ruralization and population decline. No quantitative estimates of the size of Teotihuacan have been published, but it apparently decreased in size substantially compared with the Xometla phase, and according to Sanders, contained only about 10 percent of the total Teotihuacan Valley population. The remainder of sites in the valley are small, scattered hamlets, villages, and small towns. Sanders noted twelve discrete clusters of Late Toltec sites, each of which consists of a small town plus associated dependent hamlets and villages. The small towns which dominate each cluster of settlements have civic-ceremonial architecture, but on a very small scale.

The area of the Teotihuacan Valley which was the focus of occupation continued to be the Lower-Valley and Delta; and here there was marked continuity of settlement from the preceeding Xometla phase. There was also continuous, but light settlement in the Upper and Middle Valleys, in the North Tributary Valleys, and on the Cerro Gordo North Slopes.

The Late Toltec occupation of the Teotihuacan Valley, to conclude, represented a continuation of the processes which had been in operation here since the decline of Teotihuacan, including decentralization of power, ruralization, and population decline.

Texcoco Region (Figure 38): The Late Toltec occupation of this area exhibited the identical features of population decline, ruralization, and population dispersal which characterized this period in the Teotihuacan Valley (Parsons, *ibid.*: 299; 344-51). Only two sites in the region are large enough to be classified as regional centers. These are Tx-LT-12,

in the vicinity of the northern Early Toltec population cluster, and the Portezuelo site (Tx-LT-53), which had also been an important Early Toltec center. Both of these sites, however, were substantially smaller during the Late Toltec period compared to their previous sizes. The remainder of communities in the Texcoco Region were small, scattered hamlets and villages without civic-ceremonial architecture. There are no clusters of sites in the Texcoco Region comparable to those noted by Sanders in the Teotihuacan Valley.

The central zone of the Texcoco Region, which had been nearly devoid of settlement during the Early Toltec period was again occupied during the Late Toltec period, although not substantially. The environmental zones which were preferred for settlement during the Early Toltec period, continued to be favored during the Late Toltec, i.e., sites tended to be located adjacent to deep-soil plains and steeper piedmont slopes, but a wider range of environmental zones was occupied. This included occupation of the Lower Piedmont of the central section of the survey area, the Lake-shore Plain, and the shoreline zone. The occupation of this latter niche, Parsons suggests, was by groups engaged in exploitation of lacustrine resources.

Parsons hypothesized that during the Late Toltec period the Basin of Mexico continued to be a transitional zone, on the border between the spheres of influence of the two dominant centers in the Central Highlands at that time, Tula and Cholula. During the Late Toltec period, he suggests, the presence of these spheres of influence created a dichotomy of cultural tradition in the Basin of Mexico. This dichotomy is reflected in the presence of the Mazapan complex in the north, and the Culhuacan Aztec I complex in the south. He further compares this dichotomy with the dichotomy of cultural tradition which is depicted in an ethnohistoric document pertaining to this area, the Codex Xolotl (Dibble, 1951). In this codex there is reference to a "Chichimec" tradition in the north and central Basin of Mexico, and a "Toltec" tradition in the south. Parsons equates the Chichimecs with Mazapan pottery and Toltecs with the Culhuacan Aztec I pottery.

Late Toltec Site Descriptions (Figure 48, Figure 58).

Ix-LT-1

NATURAL SETTING: Lower Piedmont at about 2500 meters, on gentle slope. Southeast of the site there is a major barranca roughly ten meters deep. Soil on the site is severely eroded, and tepetate is exposed in some places. Soil remnants in this area are a meter or more high.

MODERN UTILIZATION: West and north of the site there is an area of deep soil which is used for rainfall cultivation of maize and wheat and/or barley. The site area proper is too eroded for agricultural use.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec scattered over an area of slightly more than one hectare. Two possible residential structures were noted in soil remnants, but both are badly damaged. Ix-LF-1 covers the site.

CLASSIFICATION: Hamlet, population 5-20.

Ix-LT-2

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2400 meters. Soil is severely eroded and remains only as scattered remnants one meter or more high. Less than 50 meters south of the site there is a barranca three meters or more in depth.

MODERN UTILIZATION: Some nopal and maguey cultivation.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate, scattered over an area of 2.5 hectares. No structures remain. Ix-A-2 covers the site.

CLASSIFICATION: Hamlet, population 10-25.

Ix-LT-3

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2360 meters. This is a low ridge between two barrancas, on which there is deep, light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation of wheat. In the north edge of the site there is what appears to be a small jaguey connected to a barranca to the north by a ditch.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light and very light to light Late Toltec over an area of less than one hectare. Ix-A-10 covers the site. One mound was noted, constructed of pumice chunks and dirt. This was probably a pyramid platform. Dimensions of the structure are: 18 meters northwest-southeast by 10 meters northeast-southwest by 1.5 meters high. Date of construction and use of the structure could not be determined.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-4

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2350 meters. The immediate site area is severely eroded. Soil remains only in remnants which are 50 to 60 centimeters deep. The site is directly south of a large barranca.

MODERN UTILIZATION: There is no modern use of the immediate site area because of the severe erosion; but flatter areas adjacent to the site are used for rainfall cultivation of maize and wheat and/or barley.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate in some places, scattered over an area of 6.5 hectares. The other component on the site is Ix-EC-6. Several wall fragments were noted in soil remnants.

CLASSIFICATION: Hamlet, population 30-65.

Ix-LT-5

NATURAL SETTING: Lower Piedmont, at about 2400 meters, on gentle slope adjacent to a barranca. Soil here is severely eroded.

MODERN UTILIZATION: None, because of the erosion.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate, scattered over an area of several hundred square meters. No structure noted.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-6

NATURAL SETTING: Lakeshore Plain on very gentle slope at about 2270 meters. Soil is deep, light brown loam, not eroded. There are two small barrancas near the site, one to the north and one west, which are probably eroded colonial canals. They both lead to the vicinity of the abandoned Hacienda Carmen.

MODERN UTILIZATION: Mostly rainfall cultivation of maize and maguey. Southwest of the site, on flatter ground, there are alfalfa fields irrigated with water pumped electrically.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and in some places light Late Toltec scattered over an area of 14 hectares. Several tlatels were noted, the remains of residences. The other component on the site is Ix-EC-2.

CLASSIFICATION: Hamlet, population 30-80.

Ix-LT-7

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2350 meters. Soil is one meter or so of light brown loam, little eroded. The site is located on a small hill just south of a small barranca.

MODERN UTILIZATION: Rainfall cultivation of wheat, maize, and maguey. A large colonial dam is located adjacent to the southwest corner of the site. This dam is now silted up, and does not function.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light and in some places light Late Toltec over an area of 14 hectares. One structure was noted, which was probably a high status residence, described in Ix-EC-1. Ix-EC-1 is roughly coextensive with the Late Toltec site.

CLASSIFICATION: Hamlet, population 50-100.

Ix-LT-8

NATURAL SETTING: Lower piedmont, on gentle slope at about 2300 meters. Three barrancas run east-west through the site, but the remaining site area is little eroded and is covered with one meter or so of light brown loam.

MODERN UTILIZATION: Rainfall cultivation of wheat, maize, maguey, and some tomatoes.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate, not continuously scattered, over an area of 11 hectares. No structures noted.

CLASSIFICATION: Hamlet, population 25-50.

Ix-LT-9

NATURAL SETTING: Lower Piedmont, on gentle slopes at about 2300 meters. Two major barrancas and several minor ones run through the site, but over the remaining area there is one meter or so of light brown loam.

MODERN UTILIZATION: Rainfall cultivation of maize, wheat and/or barley, maguey, and nopal. A small tezontle quarry, not now in use, is within the site area.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate, scattered over an area of 29 hectares. Several tlatels were noted; probably the remains of residences. Ix-A-12 covers the site in part.

CLASSIFICATION: Village, population 75-150.

Ix-LT-10

NATURAL SETTING: Lower Piedmont, on gentle to medium slopes near the base of the Cerro Pino massif. Soil is one meter or less of light brown loam, severely eroded in some places.

MODERN UTILIZATION: Only some rainfall cultivation of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light and in some places light Late Toltec scattered over an area of 2.5 hectares. One mound was noted, a pyramid-platform, which has been described in the description of Ix-EC-7. Other components on the site are Ix-LC-1, Ix-ET-1, and Ix-A-11.

CLASSIFICATION: Hamlet, population 10-30.

Ix-LT-11

NATURAL SETTING: Lower Piedmont on gentle slope at about 2420 meters. The site is located on a small, flat plateau overlooking steeper slopes below in all directions except west. Soil is less than one meter of light brown loam, eroded in some places.

MODERN UTILIZATION: The plateau is used for rainfall cultivation mostly of maize and wheat and/or barley.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec scattered over an area of 2 hectares. No structures noted. The other component on the site is Ix-EC-8.

CLASSIFICATION: Hamlet, population 10-20.

Ix-LT-12

NATURAL SETTING: Lakeshore Plain at about 2260 meters. The site is largely covered by sandy soil which was apparently recently deposited by a small seasonal stream. This small stream runs from a canal which was built to collect water from the drainage system which runs through Ix-LT-8 and 9. Part of this canal has stone and concrete walls, indicating it was used, and possibly constructed, during colonial or recent times. This floodwater irrigation system is not now in use.

MODERN UTILIZATION: Rainfall cultivation of maize and maguey. Fields adjacent to this one on the south are used for irrigated alfalfa, using water supplied by electric pumps. This land is owned by the dairy farm "Jesus Maria".

ARCHAEOLOGICAL REMAINS: Evenly scattered very light Late Toltec over an area of 3.5 hectares. No structures noted.

CLASSIFICATION: Hamlet, population 15-30.

Ix-LT-13

NATURAL SETTING: Lower Piedmont, on gentle at about 2400 meters. The site is directly adjacent to a barranca roughly 5 meters deep. Soil in the area is one meter or so of light brown loam, little eroded.

MODERN UTILIZATION: Mostly rainfall cultivation of wheat and/or barley.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec over an area of a few hundred square meters. No structures noted.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-14

NATURAL SETTING: Lakeshore Plain, on gentle slope at about 2260 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: A modern graveyard and a small rancho define the south and east edges of the site and probably cover some of it. This area is used primarily for irrigated cultivation of alfalfa. The fields in the area have been artificially flattened to make irrigation more effective, and this has modified the site somewhat.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and in some places light Late Toltec scattered over an area of 2.5 hectares. No structures noted, but there is much rock rubble. The other component on the site is Ix-EC-12.

CLASSIFICATION: Hamlet, population 10-25.

Ix-LT-15

NATURAL SETTING: Lakeshore Plain, on very gentle slope at about 2250 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and maguey. Adjacent to the site on the east is a temporary community of brickmakers who move around from one area to another, setting up little communities where they live while making bricks out of the light brown loam (such as that which is abundant in this area).

CLASSIFICATION: Hamlet, population 20-40.

Ix-LT-16

NATURAL SETTING: Lakeshore Plain at about 2250 meters. The site is located on the edge of the alluvial fan of a major barranca. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize. The Seagram's Distillery is adjacent to the site but does not appear to cover any of it. Several structures pertaining to the modern town of Ayotla are in the site area.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec over an area of less than one hectare. The site is in the area of Ix-TF-2. No structures were noted, but there is rock rubble scattered over the site.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-17

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is mostly deep, light brown loam, not eroded, while in some areas of the site there are rock outcrops where there is no soil. The site is adjacent to the alluvial fan of a barranca.

MODERN UTILIZATION: The site is on the southeast edge of the modern town of Ayotla and is mostly obscured by roads and buildings.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec scattered over an area of about 4 hectares. No structures noted. The other components on the site are Ix-EC-14 and Ix-TF-3.

CLASSIFICATION: Hamlet, population 20-40.

Ix-LT-18

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is deep, light brown loam, not eroded. The site is adjacent to the alluvial fan of a major barranca.

MODERN UTILIZATION: Mostly rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Very light to light Late Toltec and very light rock rubble, scattered over an area of several hundred square meters.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-19

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light brown loam, not eroded. The site is adjacent to the alluvial fan of a barranca.

MODERN UTILIZATION: The site is located in a field adjacent to the old Puebla Highway on the southeast outskirts of the modern town of Tlapizahua. The field is used for rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Toltec, ranging in density from very light to moderate in some places, over an area of three hectares. No structures noted, but rock rubble is scattered over the site area. Other components here are Ix-EC-16, Ix-ET-17, and Ix-A-34.

CLASSIFICATION: Hamlet, population 15-30.

Ix-LT-20

NATURAL SETTING: Lakeshore Plain at about 2250 meters. In part the site is on a rocky volcanic flow, an extension of the Lomas and Hoyas. In the volcanic area the soil is one meter or so of light gray-brown loam, with numerous pumice chunks. Otherwise, the soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: A government agricultural school and the hacienda San Isidro cover part of the site. Some of the fields around the agricultural school are irrigated using water pumped electrically. Otherwise, the site area is used for rainfall cultivation, mostly of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec scattered over an area of 18 hectares. The site is covered by Ix-A-36 and partially overlaps Ix-EC-17. No structures were noted.

CLASSIFICATION: Village, population 90-180.

Ix-LT-21

NATURAL SETTING: Lakeshore Plain at about 2250 meters, near the alluvial fan of a barranca. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec over an area of 4 hectares. No structures noted but there is much rock rubble on the surface. Ancient terraces were noted on the slopes

east of the site, whose date of construction and use could not be determined. Other components are Ix-ET-16 and Ix-A-37.

CLASSIFICATION: Hamlet, population 20-40.

Ix-LT-22

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep light brown loam, not eroded. The north edge of the site is defined by a low area of salitre soil typical of the Lake-Bed of Lake Texcoco. This low area appears to have been a small bay or inlet of Lake Texcoco.

MODERN UTILIZATION: The site is on the southeast edge of the modern town of Los Reyes, and is partially covered by houses. Open fields in the site area are used for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec, scattered over an area of 9 hectares. Other components on the site are Ix-ET-5, Ix-EC-18, and Ix-LC-3. Several tlatels were noted, including at least one pyramid-mound. These have been described as part of the Early Classic site report.

CLASSIFICATION: Hamlet, population 45-90.

Ix-LT-23

NATURAL SETTING: Lakeshore Plain, on gentle slope at about 2260 meters. Soil is one meter or so of light brown loam, little erosion.

MODERN UTILIZATION: The site is on the southern outskirts of the modern town of Los Reyes. No agriculture is practiced in the site area.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec scattered over an area of less than one hectare. No structures noted, but there is some rock rubble here.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-24

NATURAL SETTING: Lakeshore Plain, at about 2250 meters, on gentle slope. Soil is deep, light brown, sandy loam, somewhat eroded.

MODERN UTILIZATION: The site is in the modern town of Los Reyes, and is, therefore, mostly covered with buildings and roads.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec, scattered over an area of 1.5 hectares. No structures noted, but there is light rock rubble over the site. Ix-A-41 covers the site.

CLASSIFICATION: Hamlet, population 10-20.

Ix-LT-25

NATURAL SETTING: Lakeshore Plain, on what was a small, low island in Lake Texcoco, several hundred meters north of the Lakeshore. Soil is deep, grayish sandy clay and loam, somewhat eroded and salitre.

MODERN UTILIZATION: None.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of several hundred square meters.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-26

NATURAL SETTING: Lomas and Hoyas on gentle slope at about 2280 meters. Soil is one meter or so of light gray-brown loam, little eroded, with numerous pumice chunks.

MODERN UTILIZATION: Rainfall cultivation of maize and some maguey and nopal.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Isolated residences, population 5-10.

Ix-LT-27

NATURAL SETTING: Lomas and Hoyas, at about 2250 meters. The Lake Chalco beach was probably less than 50 meters south of the site. Soil is one-half meter of light gray-brown loam containing numerous pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation of maize and some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of several hundred square meters. No structures noted. The Late Toltec covers Ix-EC-22.

CLASSIFICATION: Isolated residence, population, 5-10.

Ix-LT-28

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2250 meters. Soil is less than one meter of light gray-brown loam with numerous pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. Several small pumice quarries were noted on a hill adjacent to the site which are not now in use.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of about one hectare. Other components on the site are Ix-EC-24, and Ix-ET-6. No structures noted.

CLASSIFICATION: Hamlet, population 7-15.

Ix-LT-29

NATURAL SETTING: Lomas and Hoyas on gentle slope at about 2250 meters. Soil is one-half meter or so of light gray-brown loam, little eroded, with numerous pumice chunks. The Lake Chalco beach was probably within 100 meters of the site.

MODERN UTILIZATION: The site is on the northern outskirts of the modern town of Tlaltenco. Open fields here are used mostly for rainfall cultivation of maize and some maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec, over an area of two hectares. No structures noted.

CLASSIFICATION: Hamlet, population 10-20.

Ix-LT-30

NATURAL SETTING: Lomas and Hoyas, at about 2270 meters, on gentle slope. Soil is one-half meter or so of light gray-brown loam, with numerous pumice chunks. No erosion.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, beans, squash, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec over an area of several hundred square meters. No structures noted. Ix-A-49, covers the site.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-31

NATURAL SETTING: Lomas and Hoyas, at about 2280 meters, on gentle slope. Soil is one meter or so of light gray-brown loam with numerous pumice chunks. No erosion.

MODERN UTILIZATION: Mostly rainfall cultivation of maize and tomatoes, nopal, and maguey. Several modern tezontle quarries are in the vicinity of the site.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec, over an area of 5 hectares. No structures noted. The site covers Ix-LF-9.

CLASSIFICATION: Hamlet, population 25-50.

Ix-LT-32

NATURAL SETTING: Lomas and Hoyas on gentle slope at about 2280 meters. Soil is one meter or so of light gray-brown loam, with numerous pumice chunks, not eroded.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey. Several functioning tezontle quarries are in the vicinity of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec, over an area of several hundred square meters. No structures noted. Other components here are Ix-EC-27, Ix-LC-5, Ix-ET-19, and Ix-A-58. There are ancient terraces located on steep slopes east of the site, but these could not be dated.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-33

NATURAL SETTING: Lakeshore Plain, at the north edge of the Lomas and Hoyas at about 2250 meters. Soil is one meter or so of light gray-brown loam, with numerous pumice chunks. No erosion noted. The site is located near what was probably a small bay or inlet of Lake Texcoco. West of the site is a rocky point of land which formed the western boundary of the inlet.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec over an area of 6 hectares. No structures were noted, but plaster is scattered over part of the site. An isolated pyramid-mound, located roughly 50 meters south of the site, probably pertains to the Postclassic, but could not be accurately dated based on surface evidence. Other components on this site are Ix-EF-3, Ix-MF-3, Ix-LF-8, Ix-TF-11, Ix-EC-30, Ix-LC-6, and Ix-ET-9. There is no obvious reason for the long-term occupation of the site.

CLASSIFICATION: Hamlet, population 30-60.

Ix-LT-34

NATURAL SETTING: Lomas and Hoyas, near the Lakeshore Plain, at about 2260 meters. Soil is one meter or so of light gray-brown loam, very rocky. No erosion.

MODERN UTILIZATION: A modern rancho defines the east edge of the site. This area is used for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of 6 hectares. One structure was noted, a pyramid-mound constructed of pumice and dirt. The mound is now roughly circular in plain view (originally it was probably square or rectangular), 18 meters in diameter, and 3 meters high. Date of construction and use of this

feature could not be determined from surface evidence. Other components on the site are Ix-ET-20 and Ix-A-59.

CLASSIFICATION: Hamlet, population 30-60.

Ix-LT-35

NATURAL SETTING: Lakeshore Plain, on gentle slope at about 2250 meters. Soil is one meter or so of light gray-brown; not eroded.

MODERN UTILIZATION: The site is in an open field on the outskirts of the modern town of San Sebastian. The field is used mostly for rainfall cultivation of maize. There are several large functioning tezontle quarries near the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light and light Late Toltec, over slightly more than one hectare. No structures noted. The site overlaps slightly with Ix-A-62.

CLASSIFICATION: Hamlet, population 7-15.

Ix-LT-36

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light gray loam, little eroded. The site is covered in part with the tough grass which grows on very salitre soils.

MODERN UTILIZATION: This is in the modern town of San Sebastian. A school and several residences cover part of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered moderate pottery, which includes some Late Toltec, over an area of several hundred square meters. Other components on the site are Ix-ET-10 and Ix-A-63. The people who own the lot, on which most of the site is located, said that they encountered many sherds below the surface here, while digging a house foundation; the moderate density of sherd cover on the surface here is apparently the result of that digging. No structures noted, but there is much rock rubble mixed with the pottery.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-37

NATURAL SETTING: Lakeshore Plain, on gentle slope at about 2250 meters. Soil is one-half meter or less of light brown loam, severely eroded in some places.

MODERN UTILIZATION: The site is in the modern town of Astahuacan. Sherds are visible here in several open fields, but for the most part the site has been covered by modern occupation.

ARCHAEOLOGICAL REMAINS: Localized and variable light Late Toltec, scattered over an area of several hundred square meters. No structures noted. Other components here are Ix-EC-31 and Ix-A-61.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-LT-38

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2250 meters. Soil is one meter or less of light gray-brown loam with numerous pumice chunks. No erosion was noted.

MODERN UTILIZATION: The site is in the northern outskirts of the modern town of Tlaltenco. Open fields here are used mostly for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of 4.5 hectares. No structures noted. The site overlaps Ix-MF-4 in part, and covers part of Ix-LF-6.

CLASSIFICATION: Hamlet, population 23-45.

Ix-LT-39

NATURAL SETTING: Lomas and Hoyas, at about 2250 meters, on gentle slope. Soil is one meter or so of light gray-brown loam, very rocky. No erosion noted.

MODERN UTILIZATION: A recent volcanic sand quarry defines the northwest edge of the site. This quarry has probably destroyed part of the site, but at most, less than one-half hectare or so. Otherwise this area is used for rainfall cultivation of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Toltec, over an area of roughly 5 hectares. No structures were noted.

CLASSIFICATION: Hamlet, population 25-50.

Ix-LT-40

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of 1.5 hectares. No structures were noted.

CLASSIFICATION: Hamlet, population 7-15.

Ix-LT-41

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: The site is located adjacent to the industrial area between the modern towns of Tezonco and Zapotitlan. Open fields here are used for rainfall cultivation, mostly of maize, along with some tomatoes and maguey. There are functioning cinder and tezontle quarries in the area of the site.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Toltec, over an area of 6 hectares. No structures were noted. Other components here are Ix-EC-34, Ix-LC-7, and Ix-ET-12.

CLASSIFICATION: Hamlet, population 30-60.

Ix-LT-42

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. Soil is deep, light gray-brown loam, not eroded. West of the site is an area of light gray soil which appears to have been lake bed.

MODERN UTILIZATION: Rainfall cultivation of maize, beans, and tomatoes.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of about 4.5 hectares. No structures noted.

CLASSIFICATION: Hamlet, population 23-45.

Ix-LT-43

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. The site is located on what appears to have been a low, flat peninsula which projected into Lake Texcoco from Cerro de la Estrella. Soil is light gray loam, very deep, and probably salitre. In some places the soil is dark brown in color below the surface. The tough grass associated with Aztec salt mounds grows in some places here.

MODERN UTILIZATION: The site is located north of a main avenue, Calz, Ermita. The area of the site is now a low-cost housing development, under construction at the time the site was visited.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of 2.5 hectares. No structures noted. Other components here are Ix-EC-36 and Ix-A-67. This was apparently an important Aztec salt-making site, and possibly functioned in the same manner during earlier periods. There would have been little other reason for occupying the site, because the soil is so salty agriculture is apparently not possible.

CLASSIFICATION: Hamlet, population 13-25.

Ix-LT-44

NATURAL SETTING: Lower Piedmont, at about 2260 meters, on the gentle slope of Cerro de la Estrella. Soil is one meter or so of light gray-brown loam, eroded in some places.

MODERN UTILIZATION: The site is on the southern outskirts of the modern Delegacion of Ixtapalapa, and is partially covered by modern residences and garbage. Open fields here are used for rainfall cultivation of maize.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of 11.5 hectares. No structures noted, but a series of ancient terraces cover the slopes of the hill, including some in the vicinity of the Late Toltec site, which are probably part of the Early Toltec site here (Ix-ET-13). Fragments of plaster were noted in one part of the site, but again, this could be associated with the Early Toltec site. Other components, in addition to the Early Toltec site, are Ix-EC-37, Ix-LC-8, and Ix-A-69a.

CLASSIFICATION: Hamlet, population 60-120.

Ix-LT-45

NATURAL SETTING: Lakeshore Plain, on a rocky promontory which projects slightly into the lake-bed of Lake Chalco, at about 2240 meters. Soil is one meter or more of light gray-brown loam containing numerous pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation, mostly of maize, along with some maguey around the borders of fields.

ARCHAEOLOGICAL REMAINS: Light and light to moderate pottery of many periods, including some Late Toltec, scattered evenly over an area of about 2 hectares. No structures noted. Other components on the site are Ix-EF-2, Ix-MF-2, Ix-LF-5, Ix-EC-23, Ix-LC-4, Ix-ET-15, and Ix-A-57.

CLASSIFICATION: Hamlet, population 10-20.

Ix-LT-46

NATURAL SETTING: Cerro Pino Upper Slopes, on the summit of Cerro Tejolote. Soil is less than one-half meter of light brown loam, moderately eroded.

MODERN UTILIZATION: None.

ARCHAEOLOGICAL REMAINS: A few Late Toltec sherds and figurines scattered on and around a mound of rocks 10 meters east-west by 15 meters north-south at the base, and about 1.5 meters high. Most of the pottery on the site is Aztec (Ix-A-13), and assorted crude pottery which was probably ceremonial ware. This latter material could be Late Toltec or Aztec.

CLASSIFICATION: Isolated hilltop civic-ceremonial site, with no permanent population.

Ix-LT-47

NATURAL SETTING: Lakeshore Plain, at about 2240 meters. Soil is deep, light brown loam, not eroded.

MODERN UTILIZATION: The site is located adjacent to the industrial area between the modern towns of Tezonco and Zapotitlan. Open fields here are used for rainfall cultivation of maize, along with some tomatoes and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec over an area of about 2 hectares. No structures noted. Other components on the site are Ix-EC-34, Ix-LC-7, and Ix-A-65.

CLASSIFICATION: Hamlet, population 10-20.

Ix-LT-48

NATURAL SETTING: Lomas and Hoyas, at about 2260 meters. Soil is one-half meter or so of light gray-brown loam containing numerous pumice chunks. No erosion noted.

MODERN UTILIZATION: Rainfall cultivation of maize and some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Toltec, over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Isolated residence, population 5-10.

Late Toltec

CONCLUSIONS

Population and settlement locations: Late Toltec occupation in the Ixtapalapa Peninsula Region exhibits the same characteristics of ruralization, population dispersal, and population decline which characterized this period in the Teotihuacan Valley and the Texcoco Region. The total estimated population is 870-1795, down from the estimated 2540-6283 for the Early Toltec period. Although there are many more Late Toltec sites than Early Toltec (48 compared to 21), all are small, dispersed hamlets, villages, and isolated residences (Fig. 25), with the exception of one hilltop civic-ceremonial center (Ix-LT-46). The Late Toltec population decline in the region can be attributed primarily to the decline of the Early Toltec center at Cerro de la Estrella (Ix-ET-13).

The bulk of the Late Toltec sites in the Ixtapalapa Peninsula Region are in agriculturally optimal locations. Most of the sites on the piedmont slopes east of the Acuatla Lakeshore Plain are located adjacent to shallow barrancas, apparently in order to practice small-scale floodwater irrigation. Three sites are on the Acuatla Lakeshore Plain (Ix-LT-6, 12, and 14), a productive agricultural zone. With the exception of Ix-LT-10, all Late Toltec sites along the slopes of the Cerro Pino massif are located adjacent to barrancas or the alluvial fans of barrancas, also optimally

located in order to practice small-scale floodwater irrigation. Similarly, Ix-LT-44, on the Lower Piedmont and Lakeshore Plain of Cerro de la Estrella is located adjacent to a barranca and its alluvial fan. The remainder of the peninsular sites are scattered along the Lakeshore Plain or are on the lower slopes of the Lomas and Hoyas, close to the Lakeshore Plain and the lakes. The locations of these peninsula sites suggest an orientation to agriculturally optimal land, in situations where there is deep soil and perhaps the possibility of practicing high-water table irrigation. Lacustrine resources would have been an added attraction of the area close to the lakes. Only two sites do not conform to the pattern of Late Toltec site locations. Ix-LT-43 and Ix-LT-25 are both located in salitre areas which cannot be considered optimal in terms of cultivation. These two communities were probably engaged in full-time exploitation of lacustrine resources, perhaps in particular, salt-making.

The distribution of Late Toltec sites in the Ixtapalapa Peninsula Region, as in the Texcoco Region, suggests that the majority of the population was composed of subsistence agriculturalists who were practicing extensive agriculture, along with some flood-water irrigation on a small scale, and perhaps high water-table irrigation along the edges of the lakes. The relatively even spacing of these sites and their small size suggests each community was surrounded by sufficient land to meet its immediate needs.

The similarities between the Late Toltec and the Early Classic occupations of the Ixtapalapa Peninsula Region, in terms of settlement configuration and population density, are striking, with the important caveat that there was no large Late Toltec center comparable to Ix-EC-37. The communities of both periods are predominantly scattered small villages and hamlets, lacking significant civic-ceremonial architecture. Preferred site locations were so similar during both periods that many Late Toltec sites are in exactly the same locations as Early Classic sites. The following Late Toltec sites have Early Classic components: Ix-LT-4, 6, 7, 10, 11, 14, 17, 19, 20, 22, 27, 28, 32, 33, 37, 41, 43, 44, 45, and 47. In a number of cases of sites on the piedmont east of the Acuautila Lakeshore Plain, and in some cases along the base of the Cerro Pino massif, where there was little or no Early Toltec occupation, Early Classic and Late Toltec sites are so nearly coextensive it appears they were occupied continuously from the Early Classic into the Late Toltec, rather than having been abandoned during the intervening Late Classic and Early Toltec periods! Where there were small, rural Early Toltec sites there was considerable continuity of settlement into the Late Toltec from the Early Toltec. The following Late Toltec sites have an Early Toltec component: Ix-LT-10, 19, 21, 22, 28, 32, 33, 34, 36, 41, 44, and 45.

Local Organization and Relations with the Remainder of the Basin of Mexico and the Central Highlands: The pattern of clusters of sites which Sanders observed in the Late Toltec period in the Teotihuacan Valley is not present in the Ixtapalapa Peninsula Region. None of the sites in the region seems dominant with respect to the others, comparable to the small towns in the Teotihuacan Valley or Tx-LT-12 and Tx-LT-53 in the Texcoco Region. Several Late Toltec sites in the Ixtapalapa Peninsula Region have small-scale civic-ceremonial architecture (Ix-LT-3, 7, 10, 22, 34, 33, 46 and 47), but in no case is it possible to definitely attribute the

construction of these features to the Late Toltec population. This rural pattern of the Late Toltec period contrasts sharply with the Early Toltec period when the region was dominated by a large community, at Cerro de la Estrella, comparable in size to several other large centers in the Basin of Mexico. It is likely that the autonomous social units of the Early Toltec period, each headed by a center like Cerro de la Estrella, were subdued and were integrated into one large state or empire, centered at Tula, Hidalgo. A very similar situation obtained here when the area came under the domination of Teotihuacan. Again, as during the Classic period, the Ixtapalapa Peninsula Region became an area inhabited by a rural population controlled by a large center some distance to the north.

The close parallels between the settlement configurations of the Early Classic period and the Late Toltec period suggest that the influence of both Teotihuacan and Tula on rural outlying populations was much the same. During the Classic and Late Toltec periods, when the population of the Ixtapalapa Peninsula Region was incorporated into large states or empires, population decline occurred compared to previous periods. The previous periods in both cases were characterized by the presence of local autonomous or semi-autonomous socio-political units dominated by large centers. In both cases, during the time the local population was incorporated into larger social units, nucleated sites disappeared and the settlement pattern was one of scattered small communities. As local autonomous social units became incorporated into large states, local centers were much reduced in size and importance, probably as the emerging main centers usurped most or all of the central-place functions of these local centers, i.e. local centers lost their importance as administrative, religious, or market centers. Perhaps the decline of local centers was accomplished in part by actually moving craft specialists and other specialists from local centers into main centers. The result of this suggested process was increasing ruralization of populations in areas such as the Ixtapalapa Peninsula Region. The Early Classic and Late Toltec populations of this region, too distant from the main centers to participate actively in the economic, religious, or intellectual life of the city reverted to a rural pattern, residing in scattered small communities, and probably practicing subsistence agriculture.

As was outlined above, Parsons visualized the central portions of the Texcoco Region as a shatter-zone along the unstable boundaries of the spheres of influence of Tula to the north and Cholula to the south. I earlier pointed out that this scheme might not be applicable to the Early Toltec period because the shatter zone in the Texcoco Region was only one of the several similar zones in the Basin of Mexico at that time, which were probably contested areas between local autonomous socio-political units. Parsons also suggested that the spheres of influence of Tula and Cholula were represented during the Late Toltec period as the dichotomy between Mazapan sites in the northern Basin of Mexico and Culhuacan Aztec I sites in the south. This hypothesis needs revision also, because sites with Mazapan or Mazapan-related ceramics are abundantly represented in the southern Basin of Mexico, not only in the Ixtapalapa Peninsula Region, but also in the Chalco Region (Parsons, personal communication). It is still possible there was a dichotomy between "Toltecs" and "Chichimecs" during the Late Toltec period, however, but apparently the situation was more

complex than Parsons originally visualized. As will be pointed out below in the discussion of Early Aztec settlement patterns, it is possible that the Aztec I component of Culhuacan was contemporaneous with the Mazapan sites. This would mean that during the Late Toltec period there were two distinct cultural groups existing interdigitated in the southern Basin of Mexico, the "Toltecs", who were residing in large urban communities (of which two are known, Culhuacan in the Ixtapalapa Peninsula Region, and Chalco, which Parsons recently mapped), and who were probably practicing intensive agriculture in the form of chinampas, and the "Chichimecs," residing in the dispersed, rural communities we have identified as Mazapan. If this situation did obtain, it presents many interesting problems for the archaeologist. Why did two distinct cultures exist side by side? What, if any, were the relationships between the two groups? There are ethnographic examples of culturally dissimilar groups maintaining symbiotic, economic, and other kinds of relationships, for example the Shan and Kachin in highland Burma (Leach, 1954). Perhaps an analogous situation obtained during the Late Toltec period.

Chapter 10

Aztec Period

INTRODUCTION

A large body of documentary data, some of which has been published, pertains to this period. For this reason it will be possible to do a much more detailed analysis of the observed settlement patterns. For this study, the most useful portion of the documentary material consists of various descriptions of the area made by the Spaniards, particularly the Conquistadors and representatives of the Crown. There are also published aboriginal documents, the codices, and several histories of the Aztec state written by Hispanicized Aztec nobility. The value of the aboriginal data is highly questionable. As has been pointed out by several people, interpretation of this material is problematic. It consists for the most part of state histories, presented as migration legends, which probably have little relation to actual events.

In addition to the codices, histories, and early colonial documents which pertain to the Aztecs, there have been numerous scholarly books and articles written about Aztec culture. This body of material is so large it will not be possible here to consider all of it. Instead, a brief description of those aspects of Aztec culture which can serve as a background for interpretation of settlement pattern data will be presented. For the most part this brief description will rely on a series of recent syntheses of Aztec culture which have been written by Sanders and Price (1968: 147-148; 151-161), Wolf (1959: 130-151), Gibson (1964: 1-31), and Parsons (MS: 404-411).

In 1519 much of northern Mesoamerica was influenced militarily and economically by the Aztecs, who resided in the Basin of Mexico. Aztec political domination extended west from the Basin to the Tarascan frontier, south into Morelos and northern Oaxaca, and extended east to the Gulf Coast (except for the area which is now the state of Tlaxcala) (Barlow, 1949). Most of the tribute extracted from these areas went to the three main Aztec centers, Tenochtitlan, Texcoco, and Tlacopan. The populations dominated by the Aztecs were not really part of a well-integrated "empire". Tribute could only be extracted by the Aztecs by threat of military reprisal for non-payment.

The Basin of Mexico in 1519 had an estimated total population of about 15 million (Sanders, 1966). Tenochtitlan, the largest and most influential of the three ruling centers, had a population of 60,000 to 120,000 or more (Sanders and Price, 1968: 151). Texcoco, second to Tenochtitlan in power and influence, had an estimated population of between 12,000 and 25,000 (Parsons, MS: 242). The population of the Basin was divided into 50 to 60 semiautonomous states, each with a central nucleated center with population in the thousands, plus a series of smaller dependent towns, villages, hamlets, and isolated residences. According to Sanders and Price (ibid.: 151-152) most of these states had a population of 12,000 - 15,000 and had an average territory of approximately 130 square kilometers. These small states were the largest stable socio-political units in the Basin.

To support the large population residing in the Basin of Mexico in 1519, a series of intensive agricultural techniques were employed. These techniques included terracing of slopes to preserve water and soil, flood-water irrigation, permanent irrigation, fertilizing of soil (including use of human refuse), chinampas, and probably reclamation of swampy lake-bed areas for agriculture by means of large-

scale drainage (Sanders, 1965: 60-64; Palerm, 1961; West and Armillas, 1950; Parsons, MS: 428). Chinampa cultivation, as far as we know, was the most productive of these techniques. In 1519 an estimated 125 square kilometers or more of the lake-bed area was devoted to chinampas (Armillas, 1971). Each hectare, when planted in maize, would yield 3,000 to 4,000 kilograms a year (Sanders and Price, 1968: 148).

An outstanding characteristic of Aztec society was the highly developed local exchange and specialization. If not completely politically integrated, the Basin of Mexico was certainly an economic unit; intensive market exchange cross-cut political boundaries. Large daily markets in Tenochtitlan and near-by Tlatelolco were described in some detail by the Conquistadors (Cortes, 1963: 72-73; Diaz del Castillo, 1910, vol. II: 70-75). The kinds of products available in these markets, including tools of production, raw materials, and basic foodstuffs reflect the high degree of occupational specialization which characterized Aztec society (Sanders, 1952). Presumably the other large centers, such as Texcoco, also had daily markets. These large centers also had local barrio markets, and smaller centers had periodic markets held at longer intervals. In the absence of suitable domestic animals or wheeled vehicles to carry the goods and products in and out of the markets, water-transportation on the lakes was favored.

Below the state level of organization, the basic social units of Aztec society were the calpulli, the "barrio pequeno", the household, and the nuclear family. Little is known of the nature or function of this last-named unit; the only thing close to a description of the household is Carrasco's study of a part of early colonial Tepoztlan (Carrasco, 1964). Here, utilizing census data from 1530-1540 for a ward called Tlacateopan, Carrasco arrived at the conclusion that "the basic social unit is the house (calli), or the people of one house (cencaltin). It is the residential, landholding, and tribute-paying unit" (p. 187). A further discussion of Carrasco's data will be presented below, when it will be possible to compare it with archaeological data from the Ixtapalapa Peninsula Region.

A large body of anthropological literature is devoted to analysis of the calpulli (cf. Moreno, 1962; Sanders, 1965: 64-66; Katz, 1966). The basic features of this unit, as outlined by Sanders (ibid.: 64) are the following:

- 1) It was a communal land-holding unit.
- 2) Membership was by birth.
- 3) In most cases it was the local community.
- 4) In larger communities, such as towns, it comprised a ward division.

The calpultin were ranked internally and with respect to each other, apparently along the lines of the conical clan (Kirchoff, 1959). The members of the highest ranking lineages in each calpulli had traditional authority and access to the labor and services of fellow calpulli members. In the smallest and most simply structured states authority was vested in the highest-ranking members of the highest-ranking calpulli. In the large states the entire ruling class represented a single calpultin. Other functions of the calpultin have been suggested by Sanders (ibid.: 65):

- 1) They were communal work-gangs for construction and maintenance of local irrigation and terrace systems.

- 2) They were units of taxation vis-a-vis the rulers of states, both for payment of labor and produce.
- 3) They were units of part-time specialization.
- 4) Each calpulli was a military regiment; the members fought as a group for the rulers of the states.
- 5) Each was a religious unit, with a patron deity who was worshipped at a local pyramid-temple.
- 6) Each had a young-men's school (telpochalli) for its members.

Below the level of organization of the calpulli was the poorly understood "barrio pequeno". These were apparently territorial, tax-paying units within the calpultin. A discussion of these units will be postponed until the concluding section on local organization.

Archaeological Data Pertaining to the Aztec Period in the Basin of Mexico:

Most of what we know about Aztec culture has come from the ethnohistoric and colonial documents. Archaeological work pertaining to this period has been scanty and consists mostly of a few stratigraphic excavations done for the purpose of ceramic description, and excavations of pyramid-mounds and related kinds of features. Significant published material includes descriptions of the excavations at Tenayuca (Noguera, 1935); Vaillant's work at Chiconautla (Vaillant, 1941); Tolstoy's surface survey of the northern Basin of Mexico (Tolstoy, 1958); the excavations at Tlatelolco, reported in a series of articles in Tlatelolco a Traves de los Tiempos; O'Neill's (1963) excavations at Chalco; and Grove's excavations at Ixtapaluca (Grove, 1963; Grove and Nicholson, 1965). For my purposes, the most valuable previous work is the settlement pattern data from the Teotihuacan and Texcoco regions, which will be summarized below. Also of great value is Armillas' recent study of Aztec chinampas (Armillas, 1971).

The ceramic sequence and period designations which we utilized were suggested by Vaillant (1941). He utilized roman numerals to indicate the four basic periods (I, II, III, IV). This periodization corresponds to the sequence outlined by Griffin and Espejo (1947, 1950), which utilizes site names to designate the periods: Culhuacan (the earliest), Tenayuca, Tenochtitlan, and Tlatelolco. This basic four-period sequence was defined primarily in terms of design motifs on black/orange pottery. A description of the other categories of Aztec pottery and their general chronological relationships to the black/orange sequence has been done by Parsons (1966, MS: Appendix A).

Comparative Material

Teotihuacan Valley: During the course of the Teotihuacan Valley Project, Sanders and his crew located 200 Aztec sites, and intensively mapped 120 of these (Sanders, 1965: 76-90; 160-162; 187-192; Fig. 11). In his preliminary report, Sanders does not distinguish Early from Late Aztec settlement patterns; he does suggest, however, that there was general stability of settlement patterns, combined with a steady increase in population from the Early to the Late period. Culhuacan (Aztec I) pottery is very scarce in the Teotihuacan Valley. Instead, Sanders suggests there may be an equivalent phase (tentatively called Hueoctoc) with a distinctive ceramic assemblage. (Editors note: It now seems probable that the ceramics

referred to as Hueixtoci in the preliminary report are actually Post-Conquest 16th Century. The Teotihuacan equivalent of Aztec I is probably the Atlatongo complex, a late manifestation of Mazapan.)

Compared to the Late Toltec period, Aztec occupation of the Teotihuacan Valley was characterized by rapid population growth to levels as high as the Classic period, increasing urbanization, and filling-in of all the agriculturally usable areas of the Valley.

On the basis of the early colonial documents pertaining to the Teotihuacan Valley, six Aztec urban centers were identified prior to the survey. Of the six, four were intensively mapped (Chiconautla, Acolman, Tepexpan, Otumba) and one other was partially mapped (Teotihuacan). Each of the urban centers was characterized by a central core of densely packed settlement which exhibited formal planning, with abundant civic-ceremonial architecture and elaborate residences. Estimated populations of these core areas range from 1,000 to 10,000. Scattered around the central core in each case was a band of less dense, unplanned settlement. Two factors seemed to be basic in determining the locations of these urban centers:

- 1) Most important was direct access to productive agricultural land, namely the main alluvial plains and particularly the irrigated plain. These areas were reserved exclusively for cultivation; the sites themselves were located on gently-sloping piedmont directly adjacent to, but not on, the prized agricultural land. Only one urban site (Otumba) was located in the agriculturally marginal Upper Valley.

- 2) Location near or on Lake Texcoco was favored. Two of the towns surveyed (Chiconautla and Tepexpan) plus one other (Tezoyuca) were located in the delta adjacent to the lake. Sanders suggests that this emphasis on access to the lake reflects the economic importance of lake-borne trade; in particular, he feels that Chiconautla may have been a professional transportation community.

The amount of rural settlement is impressive. In addition to the bands of relatively dispersed, unplanned settlement around the nuclear cores of towns, along the edge of the main alluvial plain, there were nearly continuous bands of this kind of settlement throughout the area, on gentle piedmont slopes adjacent to steeper slopes, encircling hills along their flanks, and between barrancas in the piedmont. This extensive strip settlement, as Sanders calls it, is in some places so continuous as to make site delimitation difficult. Sanders suggests this pattern of relatively dispersed, continuous settlement on gentle slopes was an efficient adaptation in terms of soil maintenance. Each residence was presumably located on or very near its own system of terraces. Living close to the terraces facilitated terrace maintenance. In addition, living virtually on the agricultural fields meant that household refuse could be used to maintain soil fertility in the fashion described by Palerm as "calmil" cultivation (Palerm, 1955: 29-30). This terrace and "calmil" pattern probably allowed nearly continuous cultivation.

Within the strip settlements, Sanders noted more-or-less discrete clusters of 10-60 residences. Only some of these have substantial civic-ceremonial architecture. The author suggests that each of these clusters represents the "barrio pequeno" unit, and that individual calpulli could be defined as being comprised of several of these clusters. Each calpulli would have one of these clusters with civic-ceremonial architecture present.

Above the calpulli level the Teotihuacan Valley was organized into a series of socio-political units, probably like city-states, each with an urban center. The towns which were the urban centers of city-states in 1519 were Chiconautla, Tepexpan, Tezoyuca, Acolman, Teotihuacan, and Otumba. The whole Valley was, in turn, under the political control of Texcoco, where the ruler of the Acolhua domain resided.

Direct evidence of local trade and specialization in the Teotihuacan Valley was not abundant, but Sanders feels that the following kinds of exchange and specialization may have been important:

- 1) A high degree of symbiosis obtained between the large urban centers, which controlled the prime agricultural land, and the rural settlements which were partly specialized in exploitation of products particularly suited to the agriculturally marginal portions of the Valley (e.g. forest products, maguey, and nopal).
- 2) Chiconautla, as mentioned above, may have been a professional transportation community. Other lakeshore communities could have been specialized in the production of salt and other lake products. A number of salt making sites were identified in the survey. In addition, some communities in the delta region could have specialized in the production of clay for ceramics.
- 3) Surface collections at Otumba revealed that clay figurines and figurine molds were much more abundant on one part of the site than is normal. Sanders feels that this could be evidence of barrio specialization in figurine production. He suggests that other investigations of this type, involving surface collecting, could be fruitful in showing the extent and nature of local specialization. This has been borne out in part by a recent study done by Mary Parsons (in Parsons, MS). Her analysis of surface-collected spindle-whorls from the Teotihuacan Valley shows that spinning of both maguey and cotton were important activities during Aztec times. Cotton must have been imported for spinning since it will not grow in the Valley. Further investigations, involving intensive surface collections of spindle-whorls, should enable us to determine if spinning was the specialized activity of certain social units such as the calpulli, "barrio pequeno", or perhaps whole towns.
- 4) One of the Aztec sites is located near a major obsidian quarry and workshop up from Otumba.

Texcoco Region (Fig. 39, Fig. 40): Parsons and his crew mapped and described a total of 110 Aztec sites in the Texcoco region (Parsons, MS: 404-52). Like the Teotihuacan Valley Aztec period, Aztec settlement in the Texcoco region was characterized by high population density compared to the antecedent Late Toltec; rapid urbanization; and a filling-in of

all agriculturally useful environmental zones. Much of the Aztec population of the region resided in or near several large urban centers, first at Huexotla (Tx-A-87), and Coatlinchan (Tx-A-8) during the Early Aztec period, and later, during the Late Aztec period, at Texcoco (Tx-A-56), also. These large urban centers were located in the central part of the survey area, at the juncture of the Lakeshore Plain and the Lower Piedmont. This represented the first large-scale occupation of this particular niche. Texcoco and Huexotla had large "suburbs" of more dispersed settlement stretching eastward up into the piedmont along major barranca systems.

Coatlinchan (Tx-A-88), Coatepec (Tx-A-99), and Chimalhuacan (Tx-A-109) were also large nucleated centers, located in the southern edge of the survey area. These centers lacked the "suburban" occupation around them which characterized Texcoco and Huexotla. Rural settlement as a whole was less dense in the southern portion of the survey area in comparison with the central and northern portions.

There were two other zones of relatively dense settlement: one in the Upper Piedmont east of Texcoco; the other in the northern zone around and including Aztec Tepetlaoxtoc (Tx-A-24). In this northern area, most of the population was located on the lower piedmont slopes around the margins of the alluvial floodplain of the Rio Papalotla. Both the Upper Piedmont sites east of Texcoco and the sites of the northern zone, while representing large populations, are dispersed, in contrast to the densely settled urban centers of the central and south zones. Tepetlaoxtoc, in addition to being a much more dispersed site than the other important centers in the Texcoco area, also lacked a definite civic-ceremonial zone.

Parsons suggests the following factors to explain the observed Aztec settlement patterns in the Texcoco Region:

- 1) The population of the north zone was engaged in intensive cultivation of the Lower Piedmont using rain-fall runoff from the nearby steep slopes. This would have been similar to the "strip settlements" in the Teotihuacan Valley. In addition, the north zone population was engaged in canal irrigation of the plain on a modest scale. Presumably the principal water source for this irrigation was the Rio Papalotla, the only permanent stream in the Texcoco Region.

- 2) The dense occupation of the juncture of the Lower Piedmont and the Lakeshore Plain, in the central part of the survey area represents the first time in the Prehispanic period in which the agricultural potential of the Lakeshore plain was tapped, based on a program of reclamation of swampy areas by drainage. This reclamation probably also included construction of large canals to carry off surplus water in the rainy season, which is also the growing season. Drainage and flood-control here would have allowed a form of high water-table cultivation analogous to chinampa cultivation and possibly just as productive.

- 3) All of the large, nucleated centers in the central area were located where the Lakeshore Plain was narrowest. Thus, they would have ready access to the trade network which was so important in the Basin of Mexico during Aztec times. In fact, there was apparently a large transport

canal between the town and the lake (Palerm 1955). Texcoco, the largest Late Aztec center in the Texcoco region, in addition to its close proximity to the lake, was also situated at the south edge of the largest expanse of Lakeshore Plain. When reclaimed, this latter zone would have been the largest area of intensively cultivated land in the eastern Basin of Mexico. These two factors working together probably help to explain the rise of Texcoco to its dominant position in the Acolhua domain. Tepetlaoxtoc can be contrasted in terms of these factors with the large urban centers of the central area. It did not have direct access to the lake, nor to a large expanse of reclaimable Lakeshore Plain. Perhaps this would help explain the relatively dispersed settlement and the apparent lack of impressive civic-ceremonial architecture.

4) Occupation of the agriculturally marginal Upper Piedmont zone was probably based on two factors: First, the construction of extensive terrace systems to preserve the water and soil. Second, specialized production of nopal and maguey, which are well-adapted to the Upper Piedmont environment, along with the exploitation of forest products from the nearby Sierra. This would imply a symbiotic relationship between the Upper Piedmont population and the nuclear centers which controlled large-scale intensive agriculture on the Lakeshore Plain.

5) In the south zone of the survey area there was relatively less population than the rest of the region; the Upper Piedmont was not extensively occupied, and the nuclear centers lacked "suburban" outliers. Parsons suggests this may reflect the presence here of a political boundary between the Acolhua domain, with its capital at Texcoco; and the Chalco area to the south. The observed settlement configuration may represent a defensive posture. Hydrographically, it is also an agriculturally poorer area, since it lacks permanent or flood water irrigation resources.

6) A series of scattered small sites on or near the Lake Texcoco shore were probably specialized in the exploitation of lacustrine products. Some of these sites have a high percentage of fabric-marked pottery and mounds which are usually associated with Aztec salt-making. The latter mounds are usually referred to as "salt tlatsils". These are mounds of saline earth which apparently accumulated as a result of salt production during the Aztec period (Charlton, 1969). Aztec fabric-marked pottery is almost always abundant on these salt mounds, so it is assumed to be functionally related to Aztec salt-making (Tolstoy, 1958: 53-4; Mayer Oaks, 1959; Charlton, *ibid.*; Parsons, MS).

Aztec Site Descriptions (Figs. 49, 50, Figs. 59, 60):

Ix-A-1

NATURAL SETTING: The site sits on the top of a small, steep-sided, cone-shaped hill which projects 100 meters or so from the surrounding plain. Elevation of the site is about 2460 meters. The hill is rocky and has little or no soil.

MODERN UTILIZATION: The area is used today for some growing of maguey and nopal around the site area itself, and on simple terraces on the slopes below the site, along with some grazing. No modern settlement is located here. Several concrete slabs on the main platform appear to be the remnants of the foundation of a tower of some kind, which is no longer here.

ARCHAEOLOGICAL REMAINS: Very few artifacts were noted on the surface. The few decorated sherds were Aztec III and IV. The site consists of a large platform 1-3 meters in elevation, and about 45 meters on a side, with steep sides (Fig. 27). The platform is located on the very top of the hill. On this large platform there are several smaller ones, 1/2 to 1 meter in elevation, which were probably foundations for nondurable structures (Fig. 27). Large holes are located near the southwest and southeast corners of the main platform; these were probably quarries. A few meters south of the main platform is an apparently natural cave with 2 entrances, one on the east, the natural entrance, and one near the west end of the cave which goes straight down from the ground surface to the cave, a distance of about 4 meters. This entrance is man-made; it is rectangular in plain view, with dimensions 1 meter north-south by 2 meters east-west. This entrance to the cave has been made accessible from the main platform by way of a ramp (Fig. 27). Another cave, not definitely related to the site, is located 108 meters south and a little west of the center of the main platform. The entrances to this cave appear to be natural (i.e., not man-made), but this is difficult to tell.

Near the outer edge of the platform, erosion reveals that the platform was built up of tezontle and mud. Fragments of plaster floors or walls were noted scattered on the platform. Only Aztec pottery was noted. **CLASSIFICATION:** The hypothesis that the site was a fortress seems to be plausible in the absence of direct evidence for function. Pottery types often found on Aztec ceremonial sites are not present. The hill-top location, where cultivation is not practical, and the high, steep sides of the main platform suggest that defense was an important consideration in the location and construction of the site. This interpretation is perhaps further strengthened by the presence of the cave, directly accessible from the platform, which could have served as shelter or for the storage of food and water while under siege. The paucity of artifacts on the site suggests that it was not permanently occupied. Evidence from the ethnohistoric record lends further support to the hypothesis that this was a fortress; this area was apparently a shatter zone between the Acolhua and Chalco domains (see Page 136, below).

Ix-A-2

NATURAL SETTING: Located in the Lower Piedmont at about 2400 meters, on gently sloping terrain. The site sits in a wash and has been severely eroded, and tepetate is exposed in many places. Several soil remnants stick up 2 to 3 meters above the tepetate.
MODERN UTILIZATION: Not used today except for growing of maguey and nopal.
ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, almost all Late, with some Aztec II, scattered over an area of 8 hectares. Four tlatels were noted, all probably residential. All of these had some wall fragments visible on the surface, but were badly damaged by erosion. Other structures have probably been completely destroyed. Near the south edge of the site is a badly eroded wall in a wash 30 meters in length north-east-southwest, and 3 to 4 meters wide, which appears to have functioned to catch or divert water from the wash. Near the north edge of the site is a small remnant of a terrace. Both of these features are possibly associated with the Aztec occupation of the site. Other components on the

site are Ix-EC-5 and Ix-LT-2.

CLASSIFICATION: Hamlet, Early Aztec population 10-20, Late Aztec population 25-80.

Ix-A-3

NATURAL SETTING: Located at the lower edge of the Upper Piedmont at about 2530 meters. Slope is gentle; soil depth, where it is not eroded to tepetate, ranges downward from a maximum of 2 meters.

MODERN UTILIZATION: Some maguey and nopal are grown here, and the area is used for grazing.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light pottery scattered over an area of 2.2 hectares. Early and Late Aztec noted. Aztec pottery is scattered over a large area here so that delimitation of the site was difficult. Erosion has probably destroyed some of the site also. Only one tlatel was recorded, probably residential.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-4

NATURAL SETTING: Located in the Lower Piedmont, at about 2450 meters. The site sits on a flattish ridge between two barrancas; soil on top of this ridge is not eroded and is more than 1 meter deep, but along the edges of the ridge, near the barrancas, erosion is severe and tepetate is exposed in some places.

MODERN UTILIZATION: Maize and wheat are rainfall cultivated on the flattish ridge top, while along the edges only nopal and maguey are grown.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse-moderate Late Aztec noted over an area of 18 hectares. Only two tlatels could be identified (probably residences), but the extensive rubble and artifact cover probably indicates other structures were present at one time.

CLASSIFICATION: Village, population 90-180.

Ix-A-5

NATURAL SETTING: Lower Piedmont, at about 2450 meters. Located on gently sloping ground adjacent to a small barranca. Erosion is severe in some places. Soil depth ranges from 1 meter to no soil where it is eroded to tepetate.

MODERN UTILIZATION: Only some grazing.

ARCHAEOLOGICAL REMAINS: Sparse to light Late Aztec scattered over an area of .2 of a hectare. Remains of one structure were noted, which include the foundation-stones of a room probably 1.5 by 2 meters, and a small fragment of a wall of an adjoining room.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-6

NATURAL SETTING: Lower Piedmont, at about 2450 meters. Located on the north slope of a barranca on fairly steep slope. Site is on a soil remnant 2-3 meters high, surrounded by exposed tepetate.

MODERN UTILIZATION: No modern utilization. Just north of the site are the remains of a tile conduit running east-west, which is not in use today. This conduit ends in an olive orchard near a bridge crossing a large barranca. The bridge is labeled "El Olivar". This was probably the name of an old nearby hacienda, and the conduit probably dates to the hacienda period. Size of the conduit could not be accurately determined, but it was most likely 20 by 20 centimeters in cross-section. The conduit possibly tapped a water source somewhere in the upper slopes to the east, but we were unable to determine its exact origin.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec II and III noted over an area of a few hundred square meters. No structural remains.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-7

NATURAL SETTING: Lower Piedmont, at about 2400 meters. Slope is fairly steep, grading down to a barranca 100 meters or so to the south. Erosion is severe, and tepetate is exposed in many places. Maximum soil depth is about 1 meter.

MODERN UTILIZATION: The immediate area of the site is not utilized except for some grazing.

ARCHAEOLOGICAL REMAINS: Localized and variable, sparse to light Late Aztec, and a trace of Early Aztec, over an area of less than one hectare. Three structures were noted, each only a few meters distant from the others, arranged along a straight line east to west. The pottery scattered around and on one of the mounds is for the most part undecorated utilitarian ware, possibly indicating that this structure was functionally distinct from the other two.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-8

NATURAL SETTING: Lower edge of the Upper Piedmont, at about 2550 meters, on gentle slope. Soil is 1 meter or so deep, and there is a little erosion in the site area.

MODERN UTILIZATION: Some rainfall cultivation of maize, maguey, and nopal, but wheat is the dominant crop. A ditch runs east-west through the site, and ends in two magueys just west of the site. East of the site on steeper slopes some remains of terraces were noted which are not in use today, and which could be associated with the site.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec noted over an area of 13 hectares. Only two structures were intact enough to be described as tlatels; both were probably residential. Other structures have apparently been destroyed by plowing.

My visual impression of the surface artifacts on this site and this portion of the survey area is that obsidian keel-scrapers occur in relatively high density compared to other areas. These scrapers are flat-bottomed thick flakes, mostly 2 to 3 inches in length and 1/2 to 1 inch thick and wide. The relatively high percentage of these tools may indicate some specialized activity at this site.

CLASSIFICATION: Hamlet, population 65-130.

Ix-A-9

NATURAL SETTING: Lower Piedmont. The site has been divided into 2 parts, although there is a light scatter of artifacts between them. One part of the site is located at 2400 meters; the other a little (several hundred meters) upslope, to the east, at about 2450 meters. The gentle slope here is not eroded. Soil is 1 meter or more deep.

MODERN UTILIZATION: Rainfall cultivation of maize, maguey, and wheat.

A jaguey is located just west of the site. A dirt road passes generally north to south through the site area, built on a high dike which is in some places 2-3 meters high. An ancient road bed runs east to west through the site, parallel for the most part to the Puebla Highway.

ARCHAEOLOGICAL REMAINS: Localized and variable Aztec II, III, and IV pottery, ranging in density from sparse, to light, to moderate, scattered over an area of about 11 hectares; though the limits of the site are unusually difficult to determine. The extent of Aztec II was probably 1 hectare or less. One tlatel was noted. This is a relatively large structure, 20 meters north-south, by 10 meters east-west, and about 50 centimeters in elevation. Some square-cut pumice stones were noted, probably from walls. Remnants of plaster floors and/or walls were noted, one piece of which was painted red. Presence of plaster and the large size of the structure suggest this was a high status residence. All other structures on the site have apparently been destroyed by plowing.

CLASSIFICATION: Hamlet, population in Early Aztec 10-20, Late Aztec 55-110.

Ix-A-10

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2360 meters. Soil little eroded, depth 1 meter or more.

MODERN UTILIZATION: Rainfall cultivation of maguey, maize, and wheat.

ARCHAEOLOGICAL REMAINS: Sparse to light Late Aztec scattered over an area of several hundred square meters. One structure noted, a mound, 18 meters northwest-southeast by 10 meters and 1.5 meters, in elevation. Function is not obvious. Most of the pottery on the site is Late Toltec (Ix-LT-3).

CLASSIFICATION: Although the mound is an odd size and shape for a residence, the pottery present is the usual type associated with residential structures. Thus, I will consider it an isolated residence, population 5-10.

Ix-A-11

NATURAL SETTING: Lower Piedmont, on gentle slope at about 2350 meters. Soil is .5 to 1 meter deep; although it has in many places eroded down to tepetate.

MODERN UTILIZATION: The immediate area of the site is used today only for grazing and some nopal and maguey cultivation because of the steepness of the slope and the severe erosion.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Early and Late Aztec over an area of about 10 hectares. One tlatel noted which is definitely Aztec in date. Several wall fragments remain, along with remnants of plaster floors. The extent of these wall fragments indicates a minimum floor space for the structure of about 110 square meters; the rest of the structure has been destroyed by erosion. Other components here are Ix-EC-7, Ix-LC-1, Ix-ET-1, and Ix-LT-10. Remnants of terraces, not in use today, cover a portion of the steep slopes west of the site. Their date is uncertain.

CLASSIFICATION: Hamlet, population 25-100.

Ix-A-12

NATURAL SETTING: Lower Piedmont, at about 2300 meters, on gentle slopes. Soil is 1 meter deep, generally, except for the west part of the site, which has been eroded by a barranca.

MODERN UTILIZATION: Rainfall cultivation of wheat and maize. Remains of two raised canals run northeast-southwest through the east part of the site. Apparently these originally tied into a system of canals and dams east of the site and north of San Francisco Acuatla which is not in use today and which is probably colonial in date. A small tezontle quarry is located in the east half of the site, which appears to be old. The date cannot be determined, however.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, probably all Late, scattered over an area of 5.6 hectares. No tlatels were noted, but rubble is evenly scattered over the site. Remains of terraces, not now in use, are located on the fairly steep and eroded slopes to the north, northwest, and west of the site. Very light and light Late Toltec also covers the site area (Ix-LT-9).

CLASSIFICATION: Hamlet, population 28-56.

Ix-A-13

NATURAL SETTING: Top of Cerro Tejolote at 2718 meters. Shallow soil, less than 1 meter deep, is moderately eroded. Adjacent slopes of the volcano are steep.

MODERN UTILIZATION: None. A rock wall, which may be a hacienda boundary marker, runs south-southeast/north-northwest a few meters south of the tlatel over the top of the mountain.

ARCHAEOLOGICAL REMAINS: Sparse to light Aztec (no diagnostic black on orange) over the top of the mountain and around a mound of rocks. The mound is 15 meters north-south by 10 meters east-west, and is about 1.5 meters high. The pottery includes some Late Toltec (Ix-LT-46). Most of the collection consists of pottery that is probably ceremonial, and includes a ladle censor handle fragment, 4 fragments of pottery in the form of maize cobs, and 42 fragments of very crude, poorly fired ware which is like pottery noted from other probable Aztec ceremonial sites in the Basin of Mexico.

CLASSIFICATION: Isolated ceremonial precinct; with no population.

Ix-A-14

NATURAL SETTING: Located on the top of a small hill in the Cerro Pino upper slopes region, south and a little east of Cerro Tejolote, at about 2600 meters. Soil is 1 meter or so deep.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: The site consists of a tlatel 8 meters in diameter and 1 meter high, now mostly destroyed by erosion. Very light Aztec is scattered over and around the mound although no diagnostic black on orange was noted. Several fragments of plaster floor and/or wall were noted. A ditch, which may be a hacienda boundary line, cuts through the mound north to south.

CLASSIFICATION: Pottery seems too sparse to be the remains of a permanent occupation, although it is not the obvious ceremonial ware such as that found on the Cerro Tejolote site (Ix-A-13). The sparsity of artifact cover, the hill-top location, plus the pyramidal-shape of the structure suggests that it was an isolated ceremonial center with no permanent population.

Ix-A-15

NATURAL SETTING: Located on a ridge in the saddle between Cerro Pino and Cerro Tejolote, on gently sloping ground at about 2560 meters.

MODERN UTILIZATION: None noted.

ARCHAEOLOGICAL REMAINS: The site consists of an isolated pyramid platform, 8 meters on a side at the base and 4 meters at the top. Orientation was not recorded, and height was not recorded. Very little artifact cover was noted (only one Aztec sherd seen) so dating is dubious.

CLASSIFICATION: Probably an isolated civic or ceremonial platform with no permanent population.

Ix-A-16

NATURAL SETTING: Located in the Lower Piedmont at about 2400 meters, on gentle slope. Soil is 1 meter or so in depth; not too eroded.

MODERN UTILIZATION: Rainfall cultivation of nopal and maguey, as well as maize and wheat.

ARCHAEOLOGICAL REMAINS: Sparse to light Aztec noted over an area of only a few hundred square meters. No diagnostic black on orange was noted but the assemblage is probably late. Two tlatels described, which consist of stone foundation fragments only. Remains of terraces were noted on the steep slopes north of the site, which are not in use today.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-17

NATURAL SETTING: Ridgetop, above the Cerro Pino Upper Slopes, at about 2700 meters.

MODERN UTILIZATION: None.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse Aztec pottery. Some Aztec III black on orange was noted. The site consists of an irregular rock enclosure. The Aztec ceremonial center atop Mt. Tlaloc seems to be an analogous structure (Wicke and Horcasitas, 1957: 83-96; Parsons, MS: 308-310). Some of the pottery is the crude type often seen on Aztec hill-top ceremonial centers.

CLASSIFICATION: Isolated ceremonial center, no population.

Ix-A-18

NATURAL SETTING: Cerro Pino Upper Slopes at about 2510 meters. Slope is gentle, soil 1 meter or more deep.

MODERN UTILIZATION: Only grazing, and some rainfall cultivation of maize and wheat or barley.

ARCHAEOLOGICAL REMAINS: Evenly scattered construction rubble and sparse to light Aztec II and III noted over an area about 40 meters in diameter. A structure was noted, 20-30 meters in diameter and about 30-40 centimeters in elevation, which has been severely damaged by erosion and plowing.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-19

NATURAL SETTING: Cerro Pino Upper Slopes, at about 2560 meters, located on gentle slope on a ridge top; soil is 1 meter or more deep.

MODERN UTILIZATION: Some nopal and maguey grown in the area.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec over an area of several hundred square meters. No definite tlatels were noted, but rubble scatter suggests that there were probably at least three distinct structures.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-20

NATURAL SETTING: Lower Piedmont, at about 2440 meters. Located on the tip of a promontory jutting out between 2 large barrancas. Soil is less than 1 meter deep and partially eroded away.

MODERN UTILIZATION: None.

ARCHAEOLOGICAL REMAINS: Site consists of a rubble mound 10 meters in diameter and 1.5 meters in elevation. Very light Aztec II and III scattered on and around the mound.

CLASSIFICATION: Isolated civic-ceremonial structure, with no permanent population.

Ix-A-21

NATURAL SETTING: Upper edge of the Cerro Pino Lower Slopes at 2550 meters, on gentle to fairly steep slopes, in a severely eroded area. Soil remnants are 1 meter or less deep.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec II and III noted over an area of less than one hectare. Several remains of structures were noted, all apparently residential. Northwest and south-east of the site, within several hundred meters on the slopes of adjacent barrancas remnants of terraces were noted. These could not be securely dated.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-22

NATURAL SETTING: Cerro Pino Lower Slopes, at about 2470 meters. Gentle slope. Soil is largely eroded to tepetate.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Site is an erosional remnant only a few square meters in area, with sparse Late Aztec pottery, and the remains of a structure which is 7 meters north-south by 4 meters east-west.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-23

NATURAL SETTING: Cerro Pino Lower Slopes, at about 2440 meters, located on gentle slopes which are severely eroded.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec; no diagnostic Black on Orange noted but the assemblage is probably Late. Area of the site is only a few hundred square meters, and this is badly eroded. Remnants of one structure noted, apparently a residence. A large earth terrace system located a few meters southwest of the site is discussed as part of Ix-TF-1.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-24

NATURAL SETTING: Cerro Pino Lower Slopes at about 2280 meters, on gentle slopes which have been severely eroded.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse Late Aztec over an area of several hundred square meters. Remains of one structure were noted. The structure has been mostly destroyed by erosion.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-25

NATURAL SETTING: Cerro Pino Lower Slopes, on gentle slopes at about 2390 meters. Soil is eroded away to tepetate in much of this area.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Sparse Late Aztec over an area of a few hundred square meters. A small erosional remnant has several wall fragments remaining. Otherwise the site has been mostly destroyed by erosion. 400 meters southeast of the site several terrace remnants were noted which have Aztec pottery on them.

CLASSIFICATION: Isolated residence, population 5-10.

Ixtapaluca Viejo

Ix-A-26

NATURAL SETTING: The site consists of two distinct parts separated by a distance of several hundred meters. Both are in the Lower Piedmont overlooking the Lakeshore Plain around San Francisco Acuautla and the Lake Chalco area. The west portion of the site (part A) is located on a ridge-top between 2350 and 2450 meters. At its low edge, this part is located 50 meters or so above the Lakeshore Plain. Part A covers most of the flat ridge-top and extends north to the fairly steep slopes just below the Cerro Pino Upper Slopes. Some residences are also located on the fairly steep slopes on both sides of the ridge. Soil on the ridge-top is 1 meter or more in depth and little eroded; the slopes of the ridge have more pronounced erosion. Here soil is 1/2 meter or less in depth, eroded in places to tepetate. The other portion of the site, east of part A (part B), is located on the lower edge of the Lower Piedmont at about 2300 to 2400 meters. Most of this portion of the site is on gently sloping ground, little eroded, with soil 1 meter or more in depth. The edges of this part of the site, to the south-east and west are located on steeper, more eroded slopes; here soil is 1/2 meter or less deep, eroded in places to tepetate.

MODERN UTILIZATION: Part A has been extensively used for rainfall cultivation over only its northeast section. The remainder of the site has suffered little damage from plowing. Except for the northeast portion, the site area is now used only for grazing and some growing of nopal and maguey. A stone wall and a small reservoir have been constructed recently east of the civic-ceremonial portion of the site.

Part B has been utilized much more for rainfall cultivation, and plowing has caused considerable damage to structures here. Now, however, the site is mostly grass and weed-covered, and is utilized only for some growing of nopal and maguey. At the east edge of this portion of the site is the "Jesus Maria", a dairy farm. Both parts of the site are now the property of the "Jesus Maria".

ARCHAEOLOGICAL REMAINS: Part A: Light and light to moderate evenly scattered Early Aztec over an area of 15 hectares, and Late Aztec scattered over an area of about 50 hectares. 105 structures were described. 19 of these, which are pyramid-mounds, or which lack utilitarian pottery, have been categorized as civic-ceremonial in function. The remainder are probably residential. Preservation of the site is very good because there is

no modern population here; and because, except for the northeast portion, plowing has not damaged many structures. Drawings were made of the floor plans of 56 residential structures. An analysis of the data obtained from the size and distribution of the residences will be presented below. The civic-ceremonial structures include a templo mayor, 11.2 meters in elevation, located on a large platform (Plates 27, 28), 2 smaller pyramid mounds, and a ball court, in addition to other less prominent structures. The three large pyramid mounds have been extensively potted, and many smaller pot-holes have been sunk into the other civic-ceremonial structures and residences. Numerous ancient terraces cover the slopes of the ridge in the site area. In many cases, residences have been constructed directly on these. No attempt was made to map these terraces, since they are so extensive.

In 1962, as part of the Cerro Portezuelo Project, H.B. Nicholson and Frederick Hicks examined this part of the site, which they called "Ixtapaluca Viejo". In 1963, under the general supervision of Nicholson, David Grove directed an excavation of the ball-court (Nicholson and Grove, 1964; Grove, 1963; and Grove and Nicholson, 1965). According to these authors, this ball-court is the only one now known in the Basin of Mexico. In order to delineate its general character, 5 pits and six trenches were dug into the ball-court. Three construction stages were defined (Grove, *ibid.*:8). The details of the history of construction and reconstruction of the feature will not be described here. At the last stage of construction the ball-court was 35.5 meters in length, roughly 8 meters wide, and 1.86 meters high. The walls of the court were plastered, but the floor was packed adobe. No rings were noted and Grove suggests that they have been taken by pot-hunters. A serpent head carved in lava and numerous massive ceramic pieces were found scattered around the ball-court area. Grove suggests that these had been decorative pieces of the type described in ball-courts by Motolinia and Duran (Stern, 1950: 56). Grove concludes that the configuration of the Ixtapaluca Viejo ball-court was much like those described by colonial period writers who observed them first-hand; particularly Pomar, who was describing courts in the Texcoco area, with which Ixtapaluca was closely allied.

Along with the ball-court excavations, a pit was dug into the "ceramic dump site" 100 meters or so northeast of the Templo Mayor. Roughly 70% of Grove's total ceramic sample was obtained from this pit. Although the sherd counts and percentages of types from all of the excavations were not available for study, some of this information has been described by Parsons (1966: 377). The following chart gives the total count and percentages, using only those units containing over 75 sherds; for black/orange (only this type is of interest here, since black on orange is the most sensitive chronological indicator):

Tenochtitlan	(Aztec III)	277 sherds	52% of b/o
Tenayuca	(Aztec II)	233 sherds	44% of b/o
Culhuacan	(Aztec I)	19 sherds	4% of b/o

Based on this, Grove feels that this was a "one period site", occupied for a short period of time prior to the conquest.

Nine surface collections of about 100 sherds each were collected from this portion of the site as part of our work here. The total of black on orange collected was 131 sherds. The percentages of black on orange types collected are as follows:

Tlatelolco	(Aztec IV)	0.7%
Tenochtitlan	(Aztec III)	76%
Tenayuca	(Aztec II)	21.5%
Culhuacan	(Aztec I)	1.5%

This agrees with Grove's percentages in a general way, i.e., very little Aztec I, some II, and a dominance of III. Grove only noted one Aztec IV sherd while he was there, a surface find.

In addition to the surface collections made at the site, an attempt was made to visually assess the periods represented by black on orange pottery on each of the tlatels. By plotting the distribution of Early and Late Aztec pottery, based on the surface collections and the visual assessments of tlatels, it has been possible to plot the extent of the site during Early and Late times (Fig. 64). Apparently, Aztec I occupation here was very sparse or brief compared to later periods. The area of the site in the vicinity of the templo mayor grew to 15 hectares during Aztec II times. Later, during the Late Aztec period, the site achieved its full extent. The site was apparently abandoned soon after the conquest, as evidenced by the near absence on the site of obvious colonial-period pottery. It is likely that after the Spanish pacified the area there was no reason to maintain the site on the high ridge, a location which had probably been selected originally for defensive purposes.

Part B: Localized and variable light Aztec, almost all Late, scattered over an area of 40 hectares. A total of 33 structures were described, two of which were classified as civic-ceremonial. The remainder were probably residential. Plowing has destroyed much of the site. Only four of these 31 residences have substantial wall fragments preserved. An estimated 10-20 more structures have been completely destroyed by plowing, or were too far gone to be adequately described. In addition, a modern terrace system in the southwest portion of the site was built over the Aztec occupation. A portion of the north edge of the site is defined by an earth bank, more or less "U" shaped with the open end uphill. East to west the "U" is about 300 meters in length; north to south the "U" is about 150 meters. Average elevation of the feature is 1-2 meters, the higher end downhill. No Aztec structures were noted in the "U", although some pottery and rubble were noted. The function of the bank seems to have been as a jaguey, although it is currently not holding any water. No date could be ascribed to the feature.

Three surface collections were made in part B. The total number of black/orange sherds collected was 108. The percentages by period are the following:

Aztec IV	3.6%
Aztec III	89%
Aztec II	7.4%
Aztec I	0%

The results of this collection, plus my impression of the surface pottery over the whole site suggests that part B was founded later than part A.

A further discussion of the organization of the site as a whole will be postponed until the concluding section of this chapter.

ETHNOHISTORIC AND COLONIAL REFERENCES: At the time of the conquest Ixtapaluca was part of the Acolhua domain (Gibson, 1956). Ixtlilxochitl, a Hispanicized descendant of the Acolhua nobility, mentions Ixtapaluca several times in his history of the Acolhua domain (Ixtlilxochitl, 1952). The earliest such reference refers to the early part of the 15th century, during the period of Tepanec expansion in the Basin of Mexico. Tezozomoc, ruler of the Tepanecs, ordered Ixtlilxochitl, ruler of the Acolhua (and first of that name) to have some raw cotton worked into cloth for him. Ixtlilxochitl accepted the cotton and farmed it out to some of his vassals to be woven; Ixtapaluca was one of these vassal communities (Ixtlilxochitl, 1952, vol. I: 147). This could imply that weaving of cotton was an important craft activity at Ixtapaluca. Shortly after this incident, Tezozomoc sent a large army to attack Ixtapaluca (ibid.: 149, 301; vol. II: 86). The Tepanecs gained no territory as a result of this battle, and were only able to capture a few people. Ixtlilxochitl of Texcoco then put Ixcontzin, ruler of Ixtapaluca, in charge of guarding the southern frontier of the domain, which at that time included Chalco (ibid., vol. I: 151). Later Chalco rebelled against the Acolhua, and Ixtapaluca and Coatepec were put in charge of the Chalco frontier (ibid., vol. I: 158). In another reference to this same period, Ixtlilxochitl (ibid., vol. I: 303) says that Ixtapaluca and Coatepec also rebelled against the Acolhua. In approximately 1418 the Tepanecs defeated the Acolhua. At this time the people of Ixtapaluca supposedly fled to Tlaxcala (Dibble, 1951: 97; Ixtlilxochitl, ibid., vol. I: 171). Following the Acolhua defeat of the Tepanecs (1426-27), Nezahualcoyotl, then ruler of the Acolhua, placed calpixque (tribute collectors) in a series of towns, including Ixtapaluca (Ixtlilxochitl, ibid., vol. I: 234). In another reference to this however, he states that tribute was collected from Ixtapaluca and Coatepec at Tetitlan (ibid., vol. II: 169). Whichever is true, this seems to imply that Ixtapaluca was demoted in status from the center of a semiautonomous state to a town under direct control of Texcoco. The exact nature and amount of tribute flowing from Ixtapaluca to Texcoco is unclear, but part of it consisted of supplying labor to help maintain the pleasure gardens and palaces of Nezahualcoyotl, along with 13 other towns (ibid., vol. II: 210).

Published early colonial documents referring to Ixtapaluca are not too illuminating for the most part. Ixtapaluca is listed as one of the towns visited by Diego Ramirez, a representative of the Crown, in 1551 and 1552 (Paso y Troncoso, 1939-42, vol. 6: 172-3). The document which Ramirez submitted, however, is missing (ibid.: 124).

The following is a list of counts of tributaries pertaining to Ixtapaluca:

1) Relacion de las tasaciones de los pueblos de yndios... que estan encomendados en personas particulares, 1560., (Paso y Troncoso, ibid., vol. 9: 14). This is Cook and Simpson's document B (Cook and Simpson, 1948: 4-6). Here, Ixtapaluca was assessed at 370 pesos (each family was assessed 1 peso). Cook and Simpson use this figure to arrive at a population estimate by multiplying the number of pesos times 4; this gives a figure of 1480.

2) Lista de los pueblos de indios encomendados en personas particulares. 1565-1570., (Relacion de los Obispos de Tlaxcala, Michoacan, Oaxaca y Otros Lugares), Garcia Pimentel, ed., 1904: 153-188). This source gives a figure for Ixtapaluca of 640 tributarios (Cook and Simpson, on pages 52-53, list this figure for Ixtapalapa instead, a clerical error). Since tributario apparently refers to heads of families only, Cook and Simpson multiplied the figure times four to arrive at a population estimate of 2560; this is significantly higher than the 1560 estimate given above. Perhaps tributarios should be translated as all adults. In this case, it would be appropriate to multiply by 2 rather than 4, which gives a population estimate of 1280, closer to the 1560 estimate.

3) Informacion recibida en la Real Audiencia de Mexico... 17 de abril de 1597. Included in this document is a list of tributaries submitted by Martin de Agurto (Paso y Troncoso, 1939-42, vol. 13: 34-46). Here Ixtapaluca has 251 1/2 tributaries (ibid.: 37). Half tributaries refer to widowers, etc., where the family is not complete. Multiplying this by 4 (assuming each tributary represents one family), we get a population estimate of 1006.

If the figures of 1480 (for 1560), 1280 (for 1565-70), and 1006 (for 1597) are correct, then this conforms to, or is somewhat less than, the known population declines which occurred in Central Mexico during the 16th and 17th centuries (Gibson, 1964: 136-143; Sanders, 1965: 40; Cook and Simpson, 1948: 17-48).

Due to the relatively good preservation of the site, an attempt will be made to estimate the Late Aztec population on the basis of the number of observed residences. For the sake of simplicity, we will assume that all of the structures were occupied contemporaneously. The number of residences is the following:

Part A	86
definite residences.....	7
probable residences (but which are poorly reserved).....	10-15
estimated number of residences destroyed by plowing.....	103-108

Part B	31
definite residences.....	12
probable residences (but which are poorly reserved).....	8-12
estimated number of residences destroyed by plowing.....	51-55

total residences 154-163

Two useful estimates of the number of people per household which are probably applicable here have been independently derived:

1) Carrasco (1964) studied documentary data for Tlacateopan, a barrio of Tepoztlan, Morelos for the period of about 1530-1540. On the basis of this evidence, he arrived at a figure of 5.6 per household. Using this figure for the total number of residences at Ixtapaluca, we get a population of 862-913.

2) Sanders (1965: 134) suggests a figure of 10 per household, based on 16th century documentary data from the Basin of Mexico. Using this figure, we get a total estimated population for Ixtapaluca of 1540 to 1630.

Combining these gives a range of 862-1630. This agrees favorably with the 1560 estimate of 1480 people from the tribute list. Using this range in estimated population to calculate the density of occupation of the site gives figures of 9.6 to 18.1 persons per hectare. This is an interesting test of our methodology because, based on the surface density of pottery, 10-25 persons per hectare would have been the appropriate density estimate for the site.

CLASSIFICATION: Secondary regional center, Early population 150-375; Late population 862-1630.

Ix-A-27

NATURAL SETTING: Lower Piedmont at about 2360 meters, on gentle slope. Soil 1 meter or more deep, little eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and wheat.

ARCHAEOLOGICAL REMAINS: Light Aztec III scattered over an area of about 3 hectares. Construction rubble is scattered over the area but no tlatels remain because of plowing.

CLASSIFICATION: Hamlet, population 15-30.

Ix-A-28

NATURAL SETTING: Lower Piedmont, at about 2310 meters, on gentle slope at the east end of a flattish ridge. The drop from the site to the Lakeshore Plain is steep. The location of this site could have been defensive. Soil here is 1/2 meter or so in depth, very rocky, and partially eroded.

MODERN UTILIZATION: Some grazing. A small stone quarry, of unknown date, is located south of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of several hundred square meters. Only one structure was noted, probably a residence. The structure consists of a platform 10 meters north-south by 17 meters east-west, and about 1 meter high. Extending north from the northeast corner of this mound is a wall, 30 meters long and about 1 meter high, which turns east to define a partially enclosed area, 25 meters north-south by 10 meters east-west. Several pot holes have been dug into the platform, exposing plaster floors and/or walls, some painted red. Utilitarian pottery here suggests this was a residence.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-29

NATURAL SETTING: Lakeshore Plain, at about 2270 meters, on flat ground. Soil here is several meters deep, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize, wheat, alfalfa and some maguey. At the time the site was visited irrigated alfalfa, covered a portion of the site area. The site is located on the outskirts of modern Ixtapaluca. A cemetery and a small rancho define the southwest section of

the site, and may obscure part of it.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, probably all Late, over an area of about 2.5 hectares. Construction rubble is scattered over the area, but no structures remain. Plowing and leveling of the ground to make it suitable for irrigation have probably destroyed all structures. In the irrigated fields northeast of the site, scattered Black/Red Aztec pottery was noted. The significance of finding only B/R is not understood. Perhaps this was a B/R pottery producing area. The Aztec is mixed with Ix-EC-12, and Ix-LT-14.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-30

NATURAL SETTING: Cerro Pino Upper Slopes at about 2460 meters. Located at the southeast edge of a ridge, at the edge of steep slopes overlooking Ixtapaluca Viejo (Ix-A-26) and the Lake Chalco area. Soil is 1 meter or so deep, very rocky, and somewhat eroded.

MODERN UTILIZATION: Some growing of nopal and some grazing.

ARCHAEOLOGICAL REMAINS: Very sparse pottery, which seems to be Aztec, over an area of several hundred square meters. Possible remains of structures were noted. These consist of a series of straight lines of large stones arranged in lines 40-70 centimeters wide, which may have been foundations of perishable structures. They were probably not agricultural terraces, since some of the lines of stones run parallel to each other up and down the slope.

CLASSIFICATION: Probably an isolated civic-ceremonial site with no permanent population.

Ix-A-31

NATURAL SETTING: Flattish gentle slopes on top of the volcano which forms Tlapacoya Island, at about 2400 meters. Soil is 1 meter or less in depth, eroded in some places.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Sparse to light Late Aztec scattered over an area of several hundred square meters. One structure was noted, which consists of a square room defined by preserved wall remnants, roughly 5 meters square, oriented north to south. An old pot-hole was noted near the center of the structure. 10 meters southwest of the structure, with the same orientation as the structure, is an apparent terrace remnant, 25 meters in length.

Several other, possibly Prehispanic, features were noted on and around the top of the Tlapacoya volcano. Portions of the gentle steep slopes here are covered with ancient terrace remnants of unknown date (Plate 6). Scattered along the flattish top of the volcano are 7 roughly constructed rock enclosures, all of unknown date and function. These range in size and complexity from a simple rectangle 10 meters on a side to one rock enclosure which consists of a series of walls which define at least 7 room-like areas. The dimensions of this feature are 140 meters by 60 meters; the long axis is oriented 20 degrees east of north. Very little or no pottery was noted in association with these enclosures.

On the Lakeshore Plain, at the base of the slopes of the Tlapacoya volcano, there are some severely damaged remains of possible Aztec settlements, one located on the east slope and one at the northwest tip. Recent earth-moving, possibly in conjunction with the construction of the Puebla-Mexico Autopista, has almost completely destroyed these archaeological deposits. No evaluation of the nature of these sites can be made.
 CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-32

NATURAL SETTING: Lower edge of the Cerro Pino Lower Slopes on gentle slope at about 2450 meters. Soil is 1/2 meter deep or less, and is eroded to tepetate in some places.
 MODERN UTILIZATION: Some growing of maguey and grazing; near the site and in the site area are several small basalt quarries not now in use.
 ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Early and Late Aztec over an area of about 1 hectare. Three residential structures were described, and others have probably been destroyed by a recent road which cuts through the site. Terrace remnants, some of which have residences built on them, cover the site.
 CLASSIFICATION: Hamlet, population 15-20.

Ix-A-33

NATURAL SETTING: Cerro Pino Lower Slopes, on a small ridge between 2 barrancas, at about 2300 meters. Soil is one-half meter or less in depth, severely eroded near the bottoms of the barrancas.
 MODERN UTILIZATION: Some growing of nopal and maguey.
 ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Early and Late Aztec, over an area of several hundred square meters. One small residence was noted on the ridge top with apparently associated terraces on the slopes below it. South of the residence, on a small hill about 50 meters away, is a rock enclosure about 3 meters on a side, oriented north-south; a rough rock wall connects the residence and the rock enclosure. Function of the rock wall and the rock enclosure could not be determined.
 CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-34

NATURAL SETTING: Lakeshore Plain at about 2240 meters. Soil is more than 1 meter deep, not eroded. A barranca reaches the plain at this point and has eroded the north portion of the site.
 MODERN UTILIZATION: Rainfall maize cultivation and some growing of nopal and maguey. Some residences of the modern town of Tlapizahua cover a portion of the site.
 ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, probably all Late, covering an area of about 4 hectares. Very light to light rubble is scattered over the site, but no tlatels were noted. Classic, Early Toltec and Late Toltec were also noted (Ix-EC-16, Ix-ET-17, Ix-LT-19).
 CLASSIFICATION: Hamlet, population 20-40.

Ix-A-35

NATURAL SETTING: Lower Piedmont; on fairly steep slope at about 2260 meters. Soil is one-half meter or less in depth and is severely eroded in some places.

MODERN UTILIZATION: Some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: The site consists of a pyramid-platform. The pyramid is roughly circular in plan-view, 22 meters in diameter and 6 meters in elevation. The pyramid sits on a platform with two levels. The lower level is approximately 60 meters square, oriented north-south, and 4 meters high. The upper platform is about 45 meters square and is also 4 meters high. A staircase is still evident on the western face of the pyramid. The whole feature is probably, in part, a modified natural rock outcrop. Early and Late sparse Aztec sherds are scattered on and around the feature.

CLASSIFICATION: Isolated civic-ceremonial structure, with no permanent population.

Ix-A-36

NATURAL SETTING: Located partially on the Lakeshore Plain and partially, in the north section of the site, in the Lomas and Hoyas, where a small volcanic flow has pushed out onto the plain. Soil in the Lomas and Hoyas portion of the site is rocky; otherwise the site sits on the deep alluvial soil of the Lakeshore Plain. Located at about 2250 meters.

MODERN UTILIZATION: The south edge of the site is bordered, and probably partially covered, by a small agricultural college. The Lomas and Hoyas portion of the site is not currently under cultivation, but around the college there is rainfall cultivation of maize and some irrigated gardens and alfalfa. The water for the irrigated crops comes from an electric-powered well.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec sherds over an area of about 10 hectares. No tlatels were noted. The site overlaps Ix-LT-20.

CLASSIFICATION: Hamlet; population 50-100.

Ix-A-37

NATURAL SETTING: Mostly on the Lakeshore Plain, but the east portion of the site covers some of the lower edge of the Cerro Pino Lower Slopes. Elevation roughly 2250 meters. Soil is 1 meter or more deep on the Lakeshore Plain, but considerably shallower and more eroded on the slopes. A barranca reaches the Lakeshore Plain at this location, and flows south-east-northwest through the site, and is approximately 1 meter deep.

MODERN UTILIZATION: Most of the area is used for rainfall cultivation of maize and some tomatoes. The slopes to the east are utilized mostly for growing maguey. The modern town of Tecamachalco covers part of the site, and the Mexico-Texcoco Highway runs through the middle of it.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, apparently all Late, over an area of 24 hectares. Light to moderate rubble was noted over most of the site, but no tlatels were noted except for one pyramid-mound on the eroded slopes. The mound is badly eroded; it is roughly circular, 27 meters in diameter, and 5 meters in elevation. Eroded

remnants of two platforms below the pyramid were noted; each 2 meters in elevation and about 10 meters wide by 30 meters north to south. The lower platform projects out slightly more than the upper. Other components here are Ix-EC-20, Ix-ET-4 and 16, and Ix-LT-21.
 CLASSIFICATION: Village; population 120-480.

Ix-A-38

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. Soil is 1 meter or more in depth, not eroded.
 MODERN UTILIZATION: Some rainfall cultivation of maize, but most of the area is covered by industrial buildings. In addition, the site is located at the intersection of the Mexico-Texcoco and Puebla Highways.
 ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, almost all of which is Late, scattered over an area of about 2 hectares. Rock rubble scattered over the site ranges in density from light to moderate but no Aztec structures were noted. Mixed with the Aztec here are Early Toltec, Terminal Formative, and some Late Toltec, (Ix-TF-7, Ix-EC-18, Ix-LC-3, Ix-ET-5, Ix-LT-22).
 CLASSIFICATION: Hamlet; population 10-20.

Ix-A-39

NATURAL SETTING: Lomas and Hoyas; at about 2300 meters, on gentle slope. Soil is 1/2 meter or less in depth, not eroded.
 MODERN UTILIZATION: Rainfall cultivation of maize and probably some beans and squash, along with nopal and maguey.
 ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec, over an area of several hundred square meters. No structure was noted.
 CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-40

NATURAL SETTING: Lomas and Hoyas, at about 2300 meters in rough, very rocky terrain. Soil is 1/2 meter or less in depth, not eroded.
 MODERN UTILIZATION: The immediate area of the site is so rough that no cultivation is done at all today except for some nopal and maguey. Evidence of field preparation (some areas have been partially cleared of rocks) indicates the area has been utilized for cultivation more extensively than today, although it is impossible to say exactly when.
 ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec over an area of several hundred square meters. No structures noted.
 CLASSIFICATION: Isolated residence, population 5-10

Ix-A-41

NATURAL SETTING: Lakeshore Plain, at about 2250 meters. Soil is generally 1 meter or more in depth, sandy in some places. Little or no erosion was noted.

MODERN UTILIZATION: The site is located on the western part of the modern town of Los Reyes and is largely obscured by buildings and roads. Between buildings some rainfall cultivation of maize and maguey is done; one field of maize is irrigated with water from an electric-powered well.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Aztec, mostly Late (some Early was noted) over an area of 2 hectares. The Late Aztec is scattered over an area of about 18 hectares. The exact extent and nature of the site was difficult to determine because of the extensive modern occupation. One Prehispanic structure was noted, a large pyramid mound. The mound is about 35 meters in diameter at the base and is about 6 meters high. The mound is located 100 meters or so south of the site area proper, in an area which has a sherd cover consisting of very light Aztec, Late Toltec, and Classic. The date of construction and use of the mound could not be determined, but Aztec seems to be the dominant type of pottery on and around it. Other components here are Ix-ET-7 and Ix-LT-24.

CLASSIFICATION: Village; population Early, 10-50; Late, 100-450.

Ix-A-42

NATURAL SETTING: Lakeshore Plain, at the edge of Aztec Lake Texcoco, at about 2240 meters. Soil is 1 meter or more deep and consists of light gray sandy loam. The area is covered with the prickly, sharp grass often seen on salt tlatels.

MODERN UTILIZATION: The site is located on the outskirts of the modern town of Los Reyes and is covered by a garbage dump and a railroad bed which runs east to west through the site. No agricultural use of the area was noted.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to moderate Late Aztec, over an area of 4.6 hectares. Three mounds were noted which are salt tlatels, and a high density of fabric-marked pottery is present. This area apparently has had a long tradition of salt-making; Apenes (1944: 36) lists Los Reyes as a location of industrial salt-making in 1944. Some construction in rubble was noted, but no actual structures.

CLASSIFICATION: Village, population 25-115.

Ix-A-43

NATURAL SETTING: Lakeshore Plain, at about 2240 meters, on the edge of Aztec Lake Texcoco. Soil is 1 meter or more deep; consisting of light gray loam. No erosion.

MODERN UTILIZATION: The site is located in the area of the interchange of the Puebla-Mexico Autopista, Calzada Ermita, and Calzada Zaragoza. Very likely, a large part of the site has been covered by this interchange; in addition, modern buildings cover part of the site area. It is possible that this site was once a part of Ix-A-42, which is located east of this site on the other side of the interchange.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec, scattered over an area of several hundred square meters. Fabric-marked pottery dominates the ceramic assemblage, suggesting that this was a salt-making site. Some construction rubble was noted, but no structures or mounds. Other components here are Ix-EC-25; and Ix-ET-18.

CLASSIFICATION: Since much of the site has probably been destroyed by the recent road-building, it will be impossible to make an accurate population estimate; for the exposed area only, the site is the size of an isolated residence, with a population of 5-10.

Ix-A-44

NATURAL SETTING: Lomas and Hoyas, at about 2280 meters. Soil is 1 meter or more deep, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and beans and some maguey. A small basalt quarry is located in the northwest corner of the site.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Early and Late Aztec, scattered over an area of 3.6 hectares. One mound was noted, probably a residence, which has remnants of an organ-pipe cactus fence similar to those around modern residences. A few Late Toltec sherds were noted in the area of the site.

CLASSIFICATION: Hamlet, population 18-50.

Ix-A-45

NATURAL SETTING: Lomas and Hoyas at about 2380 meters. Soil is 1/2 meter or so deep, not eroded. The site is located on a small hill overlooking several fields below it.

MODERN UTILIZATION: Rainfall cultivation of maize, beans, and squash, and some nopal and maguey. A modern rock guard-house is located on the site. In and around this modern feature, the artifact cover was light, and consisted of some green on orange glazed pottery and a pencil.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec over an area of several hundred square meters. Two badly destroyed terrace remnants, not now in use, were noted in the site area and are probably Aztec in date.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-46

NATURAL SETTING: Lomas and Hoyas, at about 2420 meters, on a small loma overlooking the surrounding prepared fields. Soil is 1/2 meter or so deep, not eroded.

MODERN UTILIZATION: The immediate area of the site (i.e. the loma) is not cultivated, but the fields around it are used for rainfall cultivation of maize, beans, squash, and nopal and maguey.

ARCHAEOLOGICAL REMAINS: Very light to light Late Aztec evenly scattered over an area of several hundred square meters. One structure, probably a residence, was noted which has several preserved wall fragments; it consists of a room 5 meters north-south by 7 1/2 meters east-west, with two small rooms at the east and west ends, each of which is about 2 meters by 5 meters.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-47

NATURAL SETTING: Lomas and Hoyas, at about 2350 meters, located on a small ridge overlooking several fields below. Soil is 1/2 meter or so deep, somewhat eroded.

MODERN UTILIZATION: The immediate area of the site is used only for growing nopal and maguey, but the fields below the site are used for rainfall cultivation of maize, beans, and squash.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec (1 sherd of Aztec II was noted) over an area of several hundred square meters. Several terrace remnants were noted in the site area, on the slopes of the ridge, which are badly eroded and not in use today. These are probably associated with the Aztec site.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-48

NATURAL SETTING: Lomas and Hoyas at about 2490 meters; the site is located on what appears to be a relatively recent lava-flow which formed what is now a rugged, rocky ridge, with almost no soil. The immediate area of the site is not used for cultivation today. The site overlooks cultivated fields located in less rugged ground below the ridge.

MODERN UTILIZATION: Only some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Aztec scattered over an area of several hundred square meters. Three remnants of structures were noted, probably residential.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-49

NATURAL SETTING: Lomas and Hoyas at 2270 meters. Soil is 1/2 meter or so deep, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize, beans, squash, nopal, and maguey.

ARCHAEOLOGICAL REMAINS: Light Late Aztec (one sherd of Aztec II was noted), scattered over an area of several hundred square meters. The site also has a Late Toltec component (Ix-LT-30).

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-50

NATURAL SETTING: Lomas and Hoyas at about 2400 meters, on fairly steep slopes. Soil is 1/2 meter or so deep, somewhat eroded.

MODERN UTILIZATION: Because of rough terrain, only nopal and maguey are grown.

ARCHAEOLOGICAL REMAINS: Localized and variable Late Aztec (one sherd of Aztec II noted) over an area of 2 hectares, ranging in density from sparse to moderate concentration. One tlatel noted, which has a small wall remnant visible. Several other probable tlatels were noted which have been badly destroyed.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-51

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2350 meters. Soil is 1/2 meter or so in depth, not eroded.

MODERN UTILIZATION: The immediate area of the site is not now cultivated except for some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered sparse to light Early and Late Aztec over an area of several hundred square meters. Wall remnants were noted on a small rectangular structure of enclosure, with dimensions of 20 meters roughly east-west by 8 meters roughly north-south.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-52

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2280 meters. Soil is about 1/2 meter or so in depth, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize, beans, and squash in the fields below the loma on which the site sits; along with nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of several hundred square meters. Several wall remnants are visible, of what was probably a small residence.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-53

NATURAL SETTING: Mostly on the Lakeshore Plain at about 2250 meters. The north and west portions of the site extend into a rocky Lomas and Hoyas area. For the most part, soil over the area is 1 meter or more of light brown loam, not eroded.

MODERN UTILIZATION: Two small modern residences and the Mexico-Puebla Autopista define the east and northeast edges of the site. An unused railroad bed runs north-south through the west portion of the site. The remainder of the area is used for rainfall cultivation of maize and some beans and squash, and some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec over an area of about 29 hectares. The site has been extensively damaged by plowing and only one tlatel was noted. This structure is badly damaged, but was probably a small residence. Another feature, also badly damaged, should perhaps be considered a tlatel. This is a mounded area 25 meters in diameter and 1/2 meter in elevation. Fragments of plaster were noted here, but no walls. The southern half or so of the site has Classic and Late Formative ceramics mixed with the Aztec (Ix-LF-3, Ix-EC-19).

ETHNOHISTORIC AND DOCUMENTARY REFERENCES: Since no evidence of Aztec settlement was noted in the area of the modern village of Santa Catarina, it seems likely that Ix-A-53 represents the location of the Aztec Santa Catarina, which was called Ouauhtli-itlacuayan (Olivera Sedano, 1954-55: 299; Herrera y Perez, 1873: 294-303). Santa Catarina Ouauhtli-itlacuayan was part of the domain of Cuiclahuac in the Late Prehispanic and Early Colonial periods (Olivera Sedano, *ibid.*: 299; Gibson, 1964: map. 2, p. 14, which is partially reproduced as Fig. 62).

CLASSIFICATION: Village, population 290-725.

Ix-A-54

NATURAL SETTING: Lomas and Hoyas at about 2260 meters. Soil is 1/2 meter or so deep, not eroded.

MODERN UTILIZATION: The immediate area of the site is used only for some cultivation of nopal and maguey, primarily because the site is located on a small loma. In the flatter fields below the site, some rainfall cultivation of maize, beans, and squash is done.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-55

NATURAL SETTING: Lomas and Hoyas at about 2270 meters, in a very hilly and rugged area. Soil is 1/2 meter or less deep, eroded in some places.

MODERN UTILIZATION: The site area is used only for some growing of nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered sparse to light Late Aztec over an area of several hundred square meters. Several wall fragments were noted, which are probably the remains of a small residence. A slope just a few meters north of the structure is covered by 6 ancient terraces, each about 4 meters wide and 20 meters or more in length. These appear to be associated with the Aztec settlement.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-56

NATURAL SETTING: A rocky promontory on what was the shore of Lake Chalco, on Lakeshore Plain, at about 2240 meters. Soil is 1/2 meter or so deep and very rocky. No erosion noted.

MODERN UTILIZATION: Some rainfall cultivation of maize, but the very rocky soil probably makes this difficult. Some maguey and nopal also.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec over an area of slightly less than 1 hectare. No structures noted. Early Classic pottery also noted on the site (Ix-EC-21).

CLASSIFICATION: Hamlet, population 10-15.

Ix-A-57

NATURAL SETTING: Lakeshore Plain at about 2240 meters, on a rocky promontory which is an extension of the Lomas and Hoyas. Soil is 1 meter or so deep, very rocky. No erosion noted.

MODERN UTILIZATION: Some rainfall cultivation of maize, and some nopal and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of about 3 hectares. No structures noted. This site has pottery from many periods mixed with the Aztec, including Early, Middle, and Late Formative, Early and some Late Classic, Early Toltec and Late Toltec (Ix-EF-2, MF-2, LF-5, EC-23, LC-4, ET-15, LT-45).

CLASSIFICATION: Hamlet, population 15-30.

Ix-A-58

NATURAL SETTING: Lomas and Hoyas, on gentle slope at about 2270 meters. Soil is 1 meter or so deep, not eroded.

MODERN UTILIZATION: Some rainfall cultivation, mostly of maize, and some nopal and maguey. Several modern tezontle quarries are located in this area.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of several hundred square meters. No structures noted. Several ancient terraces were noted south-east of the site; the date of these is uncertain. Classic, Early Toltec, and Late Toltec are mixed with the Late Aztec (Ix-EC-27, LC-5, ET-19, LT-32).

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-59

NATURAL SETTING: North edge of the Lomas and Hoyas, on gentle slope at about 2250 meters. Soil is 1 meter or more deep, not eroded.

MODERN UTILIZATION: Rainfall cultivation of maize and nopal and maguey. A modern ranchito defines the east edge of the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered light Late Aztec over an area slightly less than one hectare. One structure noted, which was probably a pyramid-platform. The structure is 18 meters in diameter and about 3 meters high. It is constructed of pumice chunks and earth. No floors, stairs, etc. remain. Another mound located several meters north of this mound is probably a natural rock knob, although it too may have been cultural feature. Early and Late Toltec (Ix-ET-20, and Ix-LT-34), are mixed with the Aztec here. Because of this, date of construction and use of the pyramid-platform cannot be determined.

CLASSIFICATION: Hamlet, population 10-20.

Ix-A-60

NATURAL SETTING: Lakeshore Plain, probably at the edge of the Aztec Lake Texcoco, at about 2240 meters. The site is located on what appears to be a small point of land which projected out into the lake. Soil here is more than 1 meter deep, of light gray loam, not eroded.

MODERN UTILIZATION: Most of the site is covered by the west half or so of the modern town of Santa Maria Astahuacan. Several open fields here, however, are used for rainfall cultivation, mostly of maize.

ARCHAEOLOGICAL REMAINS: Localized and variable very light and light Late Aztec, over an area of about 4.4 hectares. No structures remain, but pumice construction rubble was noted.

CLASSIFICATION: Village, population 44-110.

Ix-A-61

NATURAL SETTING: Lakeshore Plain on gentle slopes just above the edge of the Aztec Lake Texcoco, at about 2240 meters. Soil is severely eroded, and is about 1/2 meter deep generally.

MODERN UTILIZATION: The north part of Santa Maria Astahuacan covers most of the site area. No agriculture was noted here.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec over an area of about 1 hectare. The site has been severely damaged by erosion and recent construction. No structures were noted. Somewhere in this area (in the north part of Astahuacan) several exposed burials near a spring were noted and reported to the INAH by George O'Neill; later these were excavated by Arturo Romano (1955). Three burials were excavated. They were all located in a strata of dark brown soil with some pumice mixed, about 1.3 meters below the surface. Two of the burials were together, one over the other; both were young adults. Another individual was excavated several meters from the first two. The bones of this individual were completely disarticulated and scattered. Associated with this burial were obsidian projectile points and fragments of projectile points, and chips of obsidian and basalt. In addition, 5 sherds were noted; one of them was identified by Antonieta Espejo as Coyotlatelco, and one was Aztec IV. Romano feels that because of the depth of the strata where the bones were found these 3 individuals could be late Pleistocene in date. Also, the bones display an advanced state of mineralization, which Romano feels is evidence for considerable antiquity. The associated sherds could be a problem for dating the burials as late Pleistocene; Romano acknowledges, but he suggests they may be intrusive. Heizer and Cook (1959) analyzed the Astahuacan bones and came to the conclusion that they may be as old as the Tepexpan Man on the basis of the presence of high fluorine and low nitrogen content.

It seems likely that these burials were intrusive into the deep strata. The presence of an Aztec IV sherd suggests they may be associated with one of the Aztec sites in this area.

CLASSIFICATION: Hamlet, population 10-25.

Ix-A-62

NATURAL SETTING: Lakeshore Plain at the edge of Aztec Lake Texcoco at about 2240 meters. Soil is deep light-gray loam, not eroded.

MODERN UTILIZATION: The site is located in the south of the modern town of San Sebastian and is partially obscured by modern roads and buildings. Less than 100 meters east of the site is a large tezontle quarry not now in use.

ARCHAEOLOGICAL REMAINS: Localized and variable sparse to light Late Aztec over an area of 1.2 hectares. A high percentage of fabric-marked pottery was noted. One salt-tlatel was noted, 10 meters in diameter, and 1 1/2 meters high. Another possible salt-mound was noted under a modern house, severely damaged. Just a few meters north of the first-mentioned salt-tlatel (and toward the lake) is an earth bank, roughly 1 meter high and 1 meter wide at the base, which runs parallel to the lakeshore for about 20 meters. Fabric-marked sherds were noted eroding from this bank. A feature of this type could have been built to create an artificial evaporation pond for the production of salt. Apenes (1944: 37) describes one method of salt production in Lake Texcoco which might be similar:

"The most simple native form of making use of the saline substances [of Lake Texcoco] is to break up the cakes formed in ponds during the dry season. The material is sold for domestic use or to chemical factories. The tequezugite is seen in the markets in Mexico City and the towns around the lake. Sometimes special pools are dug, in which the agua salada is allowed to evaporate under the sun."

Some Late Toltec (Ix-LT-37) is mixed with the Aztec.
CLASSIFICATION: Hamlet, population 10-25.

Ix-A-63

NATURAL SETTING: Lakeshore Plain at the edge of Aztec Lake Texcoco at about 2240 meters. Soil is deep, light-gray loam, not eroded.
MODERN UTILIZATION: Located near the east edge of the modern town of San Sebastian. The west edge of the site is defined by a school. Residences cover most of the site area.
ARCHAEOLOGICAL REMAINS: Light to moderate pottery, including Early Toltec, (Ix-ET-10), Late Toltec (Ix-LT-36), and Late Aztec, scattered over an area of several hundred square meters. Much tezontle construction rubble was also noted. Local people who have dug in this area for house foundations told us that the dense sherd concentration continues for a meter or so below the surface.
CLASSIFICATION: Hamlet, population 5-15.

Ix-A-64

NATURAL SETTING: Lakeshore Plain, at the approximate edge of Aztec Lake Texcoco, at about 2240 meters. The site extends from the edge of the old lake east to the gentle slopes of the mainland.
MODERN UTILIZATION: The east part of the modern town of San Sebastian covers most of the site. Several open fields in this part of town are used for rainfall cultivation, mostly of maize.
ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Aztec over an area of 6.8 hectares. The sherd cover over the site is not continuous, probably because of recent construction and garbage-dumping. Some of the sherds in the area of the old lakeshore are water-worn.
CLASSIFICATION: Village, population 50-150.

Ix-A-65

NATURAL SETTING: Lakeshore Plain at about 2240 meters. Soil is 1 meter or more deep, not eroded.
MODERN UTILIZATION: Some rainfall cultivation of maize and tomatoes in the general area of the site. The Tulyehualco Highway passes just north of the site, and a series of industrial buildings along this road cover a portion of the site.
ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of about 2 hectares. A continuous scatter of Aztec was also noted north of the site area, coextensive with Ix-EC-34, LC-7, and Ix-LT-47, but the density was not considered sufficient to increase the area of the site. No structures noted.

CLASSIFICATION: Hamlet, population 15-45.

Ix-A-66

NATURAL SETTING: Lakeshore Plain at about 2240 meters. Soil is deep, light-gray loam, somewhat sandy in places. The site was probably on or very near the Aztec period lakeshore.

MODERN UTILIZATION: The site area is used for rainfall cultivation of maize and tomatoes.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec over an area of several hundred square meters.

CLASSIFICATION: Isolated residences, population 5-10.

Ix-A-67

NATURAL SETTING: Lakeshore Plain on what appears to have been a low point or peninsula which projected into Lake Texcoco from the Cerro de la Estrella Lower Piedmont, at about 2240 meters. Soil is deep, light-gray loam, not eroded. This small peninsula, is elevated roughly 1-2 meters above the bed of old Lake Texcoco which surrounds it on three sides. The short, tough grass usually found on Aztec salt-making sites was noted in some areas on the site.

MODERN UTILIZATION: Calzada Ermita Ixtapalapa, a main highway, runs generally east-west through the site. Along this road are a series of commercial buildings and factories which obscure much of the site. In addition, there are numerous residences over the site area. No agriculture was noted here.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Aztec and, in some places light to moderate, scattered over an area of about 38 hectares. A relatively high proportion of Aztec fabric-marked pottery was noted which probably indicates this was a salt-making site. In addition, much Aztec utilitarian ware and decorated ware was noted, probably indicating that the site had a permanent residential population. No obvious residential structures were noted, however. Six salt-mounds were noted which have an Aztec component. Many others were noted in fragmentary form, mostly destroyed by modern construction. Early Toltec (Ix-ET-14), Late Toltec (Ix-LT-43), and some Classic (Ix-EC-36) are mixed with the Aztec here.

CLASSIFICATION: Village; because of the extensive damage of the site it is difficult to make an accurate estimate of the density of occupation here. Population estimate: 193-963.

Ix-A-68

NATURAL SETTING: Probably lake-bed, at about 2240 meters. Soil is deep, light gray-brown loam, not eroded.

MODERN UTILIZATION: The site is located in a residential section of the modern town of Ixtapalapa. The only agriculture in the area consists of small kitchen gardens associated with individual residences; in these some rainfall cultivation of maize and vegetables is done. The modern occupation has partially obscured the site.

ARCHAEOLOGICAL REMAINS: Very light Aztec, apparently all Late, over an area of about 1.7 hectares. My decision to consider this a site was based on the presence here of four mounds which appear to be Prehispanic. Each of these is about 25 meters on a side, roughly square, and about 2 meters high. The four are located within 50 meters of each other. On one of the mounds some plaster flooring and some tezontle construction rubble was noted. Another of the mounds had a remnant of a rock-rubble floor. Some fabric-marked pottery was noted, but not in unusually great abundance. The paucity of pottery here is difficult to explain. The mounds are like several other features noted in the area north of Ixtapalapa, which were apparently Aztec chinampa residences. Only two other sites of this type were recorded by me (Ix-A-71, and Ix-A-75) in old Chinampa areas.

The site is located 100 meters or so south and west of what appears to have been the edge of an old chinampa area, beyond which was apparently open lake. The supposed chinampa area can be distinguished from the remains of open lake on the basis of soil color and vegetation; most plants and trees will not grow in the unmodified bed of old Lake Texcoco, probably because of the salinity of the lake-bed soils. Figure 63 shows that there were chinampas in this area in 1942.

CLASSIFICATION: Hamlet, population 17-30. This site was probably associated with Aztec Ixtapalapa (see the following site report).

Ix-A-69 Ixtapalapa

This site is located under the modern town of Ixtapalapa, which is now a delegacion of Mexico City. Because of the dense modern occupation here it has been impossible to determine the extent and configuration of the Aztec town. Several ditches and road-cuts in the modern town reveal at least 1-2 meters of recent debris over the Aztec; most of this consists, apparently, of accumulated mud-brick. Three distinct areas of Aztec remains were noted, which have been designated A, B, and C (Fig. 50). Presumably these three areas represent the only remaining parts of what was once a single large Aztec town. Separate descriptions of the three sections follow:

Part A

NATURAL SETTING: Lakeshore Plain at about 2250 meters. Soil is 1 meter or more deep, not eroded.

MODERN UTILIZATION: Located in an industrial and residential part of Ixtapalapa. No agriculture noted.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Late Aztec over an area of about 8 hectares. Scattered construction rubble was noted, but no structures. This portion of Aztec Ixtapalapa remains exposed today probably because expansion of modern settlement into this particular area seems to have been relatively recent, probably within 20 years.

Part B

NATURAL SETTING: Probably Lakeshore Plain at about 2240 meters. In this part of the site it is difficult to distinguish Lakeshore Plain from the

area of the old lake-bed. Soil is deep, light gray-brown loam, not eroded.
 MODERN UTILIZATION: Located in completely built-up residential-commercial area just southeast of the corner of Calzada Ermita and Sur 129. The Aztec material was found exposed in the foundation trenches of a building under construction.

ARCHAEOLOGICAL REMAINS: The lot which is the site of the new construction is about 50 meters on a side. Light Late Aztec pottery, along with a ground-stone mano and some human bones, were coming out of the sides of several of the trenches, and out of the associated back-dirt pile. The trenches were 1 meter deep and a meter or so wide. The Aztec material was coming out of the lower half of each trench. In the 1/2 meter above the Aztec deposit modern trash was noted. Total depth of the Aztec deposit was indeterminable.

Part C

NATURAL SETTING: Probably lake-bed at about 2240 meters. Soil is deep, light gray-brown loam, not eroded.

MODERN UTILIZATION: Located under the center of the modern town of Ixtapalapa. Less than 100 meters north of this portion of the site is an area of old chinampas (Plate 26, Fig. 63). This area is still an important agricultural area; maize, vegetables, and sugar-beets are the most important crops. Cultivation of these crops is intensive and involves: 1) irrigation utilizing agua negro (untreated sewage) from the Rio Churubusco to the north; 2) irrigation using water pumped from shallow wells by portable gasoline-powered pumps (water table was 1 meter or less below the surface when we visited the area in April); and 3) some of the plots (which are long rectangles of typical chinampa shape and size) have water standing around them. The high water-table here probably supplies enough moisture for intensive cultivation without the use of water from shallow wells or agua negro.

ARCHAEOLOGICAL REMAINS: In the chinampa area, which was not included in the survey, several flat-topped mounds 1-2 meters in elevation were briefly visited which are similar to Ix-A-68, 71, and 75. Aztec and Posthispanic pottery were noted on these. Like A-68, 71, and 75 these mounds were isolated chinampa residences.

For the site area proper, the archaeological remains consist of localized and variable sparse and light Late Aztec pottery. The sherd cover is not continuous over the entire site area but is much more dense at part C than over the remainder of modern Ixtapalapa. This part of the site covers an area of 20 hectares. Delimitation of this part of the site was based primarily on the distribution of several large mounds, or remnants of mounds which were probably civic-ceremonial structures. One of these features, located just a few meters west of the zocalo of Ixtapalapa, was recently exposed as a result of excavations for a new building. This excavation exposed a portion of what appears to be fill of an Aztec pyramid-platform. In the cross-section of the pyramid fill which was exposed, at least four separate construction phases were noted. Construction of each phase was of mud-brick and pumice chunks. In each of the construction phases, shaped blocks of pumice were put into place over the mud-brick core and plaster was put over this. Each of the construction phases involved an expansion of the structure. Late Aztec sherds were noted in the fill of the first construction phase, as well as the others. Based on the badly-damaged remnant of the mound which has survived, it is

impossible to estimate the original size of the feature; however, it was at least 50 meters north-south, and was at least 2 meters high. A family now living in the area of the mound said that a staircase and many plaster floors and walls had been exposed during the recent excavation.

Roughly 1/2 kilometer west of this structure a series of low mounds were noted. Only one, which is located in an open field, could be definitely described as an Aztec structure. This mound is built of pumice chunks and mud-bricks, and is 1 1/2 meters in elevation and 12 meters north-south by 10 meters east-west. A human burial was noted eroding out of the east side of the mound. This mound was probably the mud-brick core of a civic-ceremonial structure.

Slightly more than 1/2 kilometer west of this last-described mound, a group of larger mounds were found. Like the previous feature, these are mud-brick mounds with very little stone on them. They probably represent the mud-brick cores of large civic-ceremonial structures which originally had been covered with stone and plaster. Many shaped pumice and basalt blocks, panels, and other stone objects were noted in use in modern residences for lintels, foundation stones, and floors throughout Ixtapalapa. If these stone objects have been looted from the Aztec structures that would explain why only the dirt cores of the pyramids remain. The dimensions and orientation of each of the mounds is the following: (and see Fig. 78)

1. 25 meters east-west by 50 meters north-south; 2 meters high.
2. 17 meters in diameter; 3 meters high (plus lower attached platform)
3. 12 meters in diameter; 2 1/2 meters high (plus lower attached platform)
4. 20 meters north-south by 10 meters east-west; 2 1/2 meters high.

A light scatter of Early Toltec is mixed with the Aztec at the eastern-most extremity of this part of the site (Ix-ET-13).
 ETHNOHISTORIC AND COLONIAL DOCUMENTS: During the late Prehispanic period Ixtapalapa was politically tied to Culhuacan, Mexicaltzingo; and Huitzilopochco (now Churubusco). These four towns are referred to in Aztec histories and early colonial documents as the "cuatro senores" (cf. Ixtlilxochitl 1952, vol. I: 141; Duran, 1967, vol. II: 352; Paso y Troncoso, 1905-48, vol. 6: 195). In a similar kind of reference, Duran (ibid.: 329) described the Aztec army as having components from Texcoco, the Tepanec area, Chalco, the Xochimilca, and the "cuatro cabeceras y senores de Ixtapalapa, Mexicaltzingo, Culhuacan, y Huitzilopochco". Culhuacan was the most important of these four communities during the Early Aztec period, but by the time of the Spanish conquest Ixtapalapa had become politically very influential. When Cortes arrived in the Basin of Mexico the ruler of Ixtapalapa was Cuitlahuatzin, brother of Montezuma, who succeeded Montezuma as ruler of Tenochtitlan in 1520 (Cortes, 1963: 112,125).

Cortes (ibid: 56-7) spent a night in Ixtapalapa on his first approach to Tenochtitlan. According to his description, Ixtapalapa was a town of 12 to 15 thousand inhabitants, located on the shore of a salt lake. The town was constructed half in the water of the lake and half on dry land. The group of conquistadores spent the night in the palace of Cuitlahuatzin. Cortes describes the palace as being large and well-made, with much

elaborate stone and wood-work in evidence. The palace had a series of gardens, each with trees and odorous flowers, along with ponds of fresh water which contained fish and water fowl. One garden was particularly impressive. It had a high surrounding wall and a large pool in the center. The length of this garden was 400 paces, and in circumference it was 1600 paces.

The parallel passage written by Bernal Diaz (1908-16, vol. II: 38-9) is also a useful description of Aztec Ixtapalapa:

"And when we entered the city of Ixtapalapa, the appearance of the palaces in which they lodged us! How spacious and well built they were, of beautiful stone work and cedar wood, and the wood of other sweet scented trees, with great rooms and courts, wonderful to behold, covered with awnings of cotton cloth.

"When we had looked well at all of this we went to the orchard and garden, which was such a wonderful thing to see and walk in, that I was never tired of looking at the diversity of the trees, and noting the scent which each one had, and the paths full of roses and flowers, and the many fruit trees and native roses, and the pond of fresh water. There was another thing to observe, that great canoes were able to pass into the garden from the lake through an opening that had been made so that there was no need for the occupants to land. And all was cemented and very splendid with many kinds of stone [monuments] with pictures on them, which gave much to think about. Then the birds of many kinds and breeds which came into the pond. I say again that I stood looking at it and thought that never in the world would there be discovered other lands such as these, for at that time there was no Peru, nor any thought of it. [Of all these wonders that I then beheld] today all is overthrown and lost, nothing left standing...

"I must state that at that time this was a very large town, half of the houses being on land and the other half in the water, and now at this time it is all dry land and they plant corn where it was formerly lake, and it is so changed in other ways that if one had not seen it, one would not say that it is possible that what are now fields planted with maize could at one time have been covered with water."

This last section is most certainly a description of chinampas, possibly the same ones that survive north of the town today. From these two descriptions, it is obvious that in part Ixtapalapa was constructed on chinampas, and was partly in the lake. In a later description of Ixtapalapa, in connection with a raid made on that town, Cortes again describes it as a town of about 10,000; half or two-thirds of it, he says was built in the water (Cortes, *ibid.*: 125-6).

No complete early colonial descriptions of Ixtapalapa were available for my use. There are several counts of tributaries; however, which I was able to refer to, from which a population estimate can be derived. Cook and Simpson (1948: 52-3) list a population estimate for Ixtapalapa based on their document L (Lista de los pueblos...1565-70, in Relacion de los obispos de Tlaxcala, Michoacan, Oaxaca, y otros lugares, Garcia Pimentel ed., 1904: 153-188). As I have noted above, this figure of 640 tributaries

refers to Ixtapaluca, not Ixtapalapa. In the same publication, Cook and Simpson utilize one other source to derive a population estimate for Ixtapalapa, their document N (Geografia y descripción universal de las Indias; by Juan Lopez de Velasco. 1571). Edited by Justo Zaragoza, Madrid, 1894). This source indicates a tribute value of Ixtapalapa of 700 tributaries. From this figure, Cook and Simpson derive a population estimate of 2800 for 1571 (Cook and Simpson combined this with the mistaken figure of 640 tributaries to calculate their final figure of 2680 which I will not utilize here for obvious reasons).

In the absence of better data, I cannot evaluate the correctness of the population estimate of 2800 for 1571. If it is correct, then the population of 1519 could have been higher, considering the population decline which occurred subsequent to the conquest. On the other hand, if the congregacion policy was in effect by that time, the population could have actually increased in some of the large centers like Ixtapalapa. In addition, the figure of 2800 probably pertained also to the rural population scattered around the town (probably including a series of associated chinampa residences) which owed tribute and services to Ixtapalapa. However, in the absence of better data, I can only use the 2800 figure as a rough indicator of the population of the community.

CLASSIFICATION: Primary regional center, population 2800.

Ix-A-70 Mexicaltzingo

NATURAL SETTING: Lakeshore Plain at about 2240 meters on what appears to have been a low natural peninsula which projected west from the Ixtapalapa area. South of the site the ground dips down several meters. Soil is deep, light gray-brown loam, not eroded.

MODERN UTILIZATION: The site is located in the Delegacion of Ixtapalapa, on the south side of Calzada Ermita-Ixtapalapa, just east of Calzada Vega (which was once the main transportation artery from Lakes Chalco-Xochimilco into Tenochtitlan). Most of this area is covered with modern structures and roads, but the south part of the site is in an open field.

ARCHAEOLOGICAL REMAINS: The site consists of a very-light to light scatter of Aztec II and III sherds in the open field, and a remnant of a platform in the yard of a church. Excavation, apparently as part of a construction program at the church (called San Marcos Mexicaltzingo), exposed the Pre-hispanic feature. The feature is located near the northeast corner of the church. The feature consists now of a sloping, plaster-covered wall, 1.2 meters high and about 3 meters long, oriented north-south; behind the wall to the west is an area of rock rubble about 5 meters by 7 meters, which was probably part of the fill of the structure. Traces of red paint were noted on the plaster. We were directed to this feature by Eduardo Matos Moctezuma, who has written a brief description of it, along with a useful review of the ethnohistoric and early colonial references to the town of Mexicaltzingo (Matos M., 1967).

No other structures were noted anywhere in the site area, undoubtedly because of the extensive modern occupation here. The area of the site as far as we were able to record it is about 2.5 hectares; this probably represents only a small portion of the Aztec town.

ETHNOHISTORIC AND COLONIAL DESCRIPTIONS: Mexicaltzingo was one of the "cuatro senores" with Culhuacan, Ixtapalapa and Huitzilopochco. At the time of the conquest it was probably the smallest and least influential of the four, even though, as the evidence will show, it was one of the largest Aztec communities in the Ixtapalapa Peninsula Region. There are few references to Mexicaltzingo in the ethnohistoric materials probably because it did not have an important part to play in the history of the Basin of Mexico.

On his initial entry into the Basin of Mexico, Cortes passed through Mexicaltzingo after having spent the previously described night in Ixtapalapa. From Ixtapalapa the group of Spaniards were led west onto a causeway which was one of the important routes to Tenochtitlan. The following is a translation of Cortes' description of this:

"The first city of these three cities [which he encountered along the causeway], and the one of them called Misicalcingo [sic.] is for the most part built in the lake... The first of these cities should have a population of about 3000 people... and in all of them are good buildings, houses, and towers, especially the houses of the senores and important persons, and their mosques and oratories where they have their idols. In these towns there is much salt-making which they make from the lake-water, and from the surface of the ground washed by the lake, which they boil in a certain manner, and they make loaves of salt, for sale to these people and people outside the area" (Cortes, 1963: 57).

This description indicates that, like Ixtapalapa, Mexicaltzingo was, in part, built into the lake.

Two published early colonial documents represent a very useful body of data for understanding the nature of Mexicaltzingo before it was so severely modified by modern occupation:

1) Averiguacion que hizo el contador Hortuno de Ibarra de los tributos que guto Diego Ramirez en los pueblos que visito de los que estaban en la real corona-Mexico, 21 de enero de 1558 (Paso y Troncoso, 1939-42, vol 8: 146-149). This letter includes a list of tribute goods and services collected from Mexicaltzingo for the period about 1546-1550. This tribute consisted of, besides a set quantity of maize and gold; every day, 4 cargas (12 bushels) of fire-wood, 4 medidas (4 bushels ?) of fodder, 20 granos (?) of chili-peppers, 1/2 loaf of salt, a bunch of torch-pine, a chicken, and a turkey; on the days of lent, 20 fish, 20 eggs, and six indians to work; and repair the house of the corregidor when it was necessary.

The fodder, chili-peppers, salt, and fish are products which could have been grown in the chinampas or collected from the lake; it is surprising, however, that included as tribute goods are fire-wood, and torch-pine, which presumably would not have been readily obtainable by a community located on or near the lake in a heavily populated area.

2) Relacion de Mexicaltzingo, made in 1580 by Gonzalo Gallegos (Paso y Troncoso, 1905-48, vol. 6: 193-198). The relacion is organized into

numbered paragraphs; translations of the most interesting parts of some of these follows:

- 1) ...Mexitcatzingo means the "little Mexico"...
- 3) ...Mexicatzingo has the same climate as Mexico City and has abundant lake water around it, especially a large canal through which flows the large lake [this is probably the above-mentioned canal which is now Calz. Viga]. The canal is like a flowing river through which comes the products of the whole area; in three or four thousand canoes a day, going to the city of Mexico; and near the town is a fast-flowing spring and some small springs of fresh water...
- 4) ...the town is on flat land, artificially built-up, and around it is all lake, and in these lakes are many chinampas [camellones] where they grow corn, guilites [edible grains, including several kinds of amaranth and chenopodium (from Robelo, Diccionario de Azteguismos: 236-7)], chili-peppers, and other vegetables to help in their subsistence because they do not grow enough food and they must bring in some from other places to sustain themselves; and it is a town of so few people that there are no more than 200 tributaries more-or-less; the total of men, women, and children and old number about 550; and in the past there were more than now, and the cause of this diminution has been the plagues...especially the one which occurred 35 years ago, and the one presently which has lasted four years, and other frequent sicknesses that affect the population; and they are very polite people; and the reason for this is the frequent communications they have with the Spaniards in their commercial relations, because of the proximity to the city of Mexico; and their sale there of fodder, and from their crops; and they grow chickens, and their language is mexicana.
- 11) ...the cabecera of Huichulupuzco has under its jurisdiction the towns of Mexicatzingo, Culhuacan, and Ixtapalapa...
- 12) ...Mexicatzingo was under the jurisdiction of Montezuma, and they were men of war, and they did not do any other thing than serving in military positions, and for this reason they were exempt from tax and tribute; presently they pay tribute to your majesty in money and maize...and the people adored idols made of stone and wood; and the customs they had were the same as others in this district...
- 19) ...one quarter of a league away is a small river which joins the main canal that passes through the town and which crosses the main road and calzada that goes to Mexico City...
- 20) ...the lake of the city of Mexico is bounded by Mexicatzingo because it is enclosed here with many chinampas...
- 22) ...the said town is sterile of trees and fruit, although in some gardens there are some trees from Spain, and the edges of the lakes and ponds have some willows of aboriginal type...
- 27) ...In the lake near this town there are found from October until March, geese, ducks, heron, cormorants, and some birds of prey...
- 31) ...The form of their houses is low and humble, made of adobes... and the foundations are made of heavy stones which they carry from other places by canoe...and they also get building stone from the ancient structures of their ancestors...
- 34) ...this town sits in the middle of the main road from Mexico City to Puebla, Veracruz, Oaxaca, and other places.

Cook and Simpson (ibid.: 52-53) have used several sources to derive a population estimate for Aztec Mexicaltzingo (not including the figure of 550 mentioned in the relacion translated above):

1) Relacion de los pueblos de yndios... que estan encomendados en personas particulares, 1560 (Paso y Troncoso, 1939-42, vol. 9: 2-48) and the related Relacion de las tasaciones de las pueblos de yndios... que estan en la Real Corona, 1560, MS. Archivo General de Indias, Seville. This is their document B. From this source, they calculated a population of 1200, based on an assessment of 300 pesos.

2) Relacion de las tasaciones que se han hecho en los pueblos que estan en la Corona Real en esta Nueva Espana, 1571, MS Archivo General de Indias, Seville. This is their document C. Here an assessment of 277 pesos was used to derive a population of 1108.

3) Document E: Relacion de los pueblos que estan en la Corona Real..., c.a. 1570, MS; This source duplicates the assessment of 277 pesos in document C, and gives a population estimate of 1108.

From these sources, Cook and Simpson derive an estimated population for Mexicaltzingo of 1108 for the period 1560-1571. The estimate of 550 for 1580, quoted above in the Relacion de Mexicaltzingo suggests that Cook and Simpson's estimate may be too high.

As pointed out above, using these documents to derive Prehispanic population levels is problematic. Because the site is so severely damaged today, however, the 1108 estimate will be utilized for the Aztec period population level because of the absence of better information.

CLASSIFICATION: Secondary regional center, population 1108.

Ix-A-71

NATURAL SETTING: Probably lake-bed, in what appears to be an old chinampa area, at about 2240 meters. Soil is deep, dark gray-brown loam, not eroded.

MODERN UTILIZATION: That this is an old chinampa area as evidenced by the presence here of rectangular plots of earth ringed with ahuejote trees; many of these plots have recently been plowed up; and the remaining ones are used only for rainfall cultivation, probably because the water-table has dropped since the chinampas were built. This area is now becoming a residential area. One modern residence has been constructed directly on top of one of the mounds which comprises the site.

ARCHAEOLOGICAL REMAINS: Evenly scattered very light to light Late Aztec pottery over an area of several hundred square meters. The pottery is scattered on and around two low flat mounds of earth, which are separated from one another by only a meter or so. The north mound is 30 meters north-south by 15 meters east-west, and is 1 meter high. The south mound is 30 meters square and about 1 1/2 meters high. Several pumice chunks were exposed on the south mound, which probably represent the remains of a wall. The mounds were probably chinampa residences of the type noted in the vicinity of Ixtapalapa (see Ix-A-68).

CLASSIFICATION: Isolated residence, population 10-20.

Ix-A-72

Culhuacan

NATURAL SETTING: lake-bed, at about 2240 meters. Soil is deep, light gray-brown loam, not eroded.

MODERN UTILIZATION: The site sits under the modern town of San Francisco Culhuacan and is for the most part covered by roads and residences. A large sewage canal called the Canal Nacional runs roughly north-south between the site and the mainland of the Ixtapalapa Peninsula. This sewage canal was apparently the old Aztec canal which was the main route of canoe transportation between lakes Chalco and Xochimilco and Tenochtitlan (Gibson, 1964: 361-5). This same canal is now Calz. Viga, further to the north, as has been mentioned above. Much of the modern town of Culhuacan is east of the site area on the lower slopes of Cerro de la Estrella. No Aztec settlement was noted under this part of the modern town; it is possible that as the town grew in the centuries following the conquest it spread up the slopes of the hill. The Upsalla Map of 1550 (Linne, 1948), which is partially reproduced (see Plate 35), shows Culhuacan as yet an island community at that time. Presumably the town was partially or completely moved to the mainland sometime after 1550. East of the site, in the area between the site and the mainland, there is what appears to be an old chinampa area (see Ix-A-71, and Ix-A-75). Some evidence of old chinampa beds was noted west and north of the site, but most of that area is now covered with new structures, so the extent of the suggested chinampas could not be determined.

ARCHAEOLOGICAL REMAINS: Localized and variable light and light to moderate Aztec, most of which is Aztec I and II, but including Aztec III and IV, over an area of 65 hectares. The extent of distribution of Early and Late Aztec seem to be roughly the same. The site is, as an average, 1 to 2 meters higher than the surrounding land, most of which was probably open lake and/or chinampa beds. Examination of road cuts, ditches, and other recent excavations in the area of the site indicated to me that most or all of the elevation of the site is a result of accumulation of cultural debris, in particular, dissolved mud-bricks. In other words, the site is not located on what was once a natural island.

Excavations were undertaken on the site in 1911-12 under the direction of Franz Boas, then director of the International School of Archaeology and Ethnology (Boas, 1913: 178-9; Brenner, 1931). Previous to the work at Culhuacan, Boas had divided Aztec black on orange pottery into three sub-groups, based mostly on fineness of execution of the designs. Since all three of his types were known to occur on the surface at Culhuacan, Boas decided to excavate there to determine the chronological sequence of the types. The excavations, undertaken by Miss Ramirez Castenada, showed that the crudest type, which is equivalent to Aztec I, occurred primarily in the lower levels. This type, she found "...occurs in very great profusion at the level of the water table" (Boas, *ibid.*: 179). Below the water table, the amount of pottery dropped off considerably and was described by Boas (*ibid.*) as being "...the type of Teotihuacan". He mentioned also that ceramics were noted as far as three meters below the water table, along with preserved wood.

This description of the excavations at Culhuacan provides a reasonable test of the hypothesis that Culhuacan was built intentionally in the lake. The profusion of Aztec I pottery above and at the water table suggests that this lake-bed construction of the site was done during Aztec I times. The presence of "Teotihuacan" ceramic objects below the Aztec I pottery in considerably less abundance probably represents pottery mixed in the fill used to construct the site rather than an actual "Teotihuacan" occupation here. An occupation would presumably have resulted in a much greater density of artifact deposit than was noted. The source of these "Teotihuacan" sherds in the fill used to construct an island-town was very likely the large Classic and Early Toltec site (Ix-EC-37, Ix-LC-8, Ix-Et-13), on the slopes of Cerro de la Estrella. This site extends to the area adjacent to Culhuacan, where fill was probably obtained for construction of the Aztec I town.

Only two remnants of Aztec structures were noted at Culhuacan, one, now badly destroyed, has been exposed in a recent roadcut. All that is exposed is a portion of a stone wall and a plaster floor. The other structure was apparently a small pyramid-platform, roughly 25 meters north-south by 20 meters east-west, and 1 1/2 meters in elevation. A modern church sits directly on the platform (Plate 30). Several large pieces of shaped basalt were noted on and around the church. These were probably part of the Aztec structure since they serve no obvious purpose on the church. In addition, a shaped rectangular slab of basalt was noted, which now is included in a wall which surrounds the back yard of the church. The slab is 40 centimeters high and 50 centimeters wide, and has a carved design on the face. The design is almost eroded to nothing; all that remains is a non-descript curvilinear design and six dots.

ETHNOHISTORIC AND EARLY COLONIAL REFERENCES: Culhuacan played an important part in Aztec history in the Basin of Mexico. No attempt will be made here to write a complete history of Culhuacan based on the ethnohistoric materials, for two reasons: First, it is a very complex problem which would involve more time than I can now devote to it. Also, the utility of ethnohistoric material for the kind of analysis I am doing here is highly questionable. My discussion will follow, generally, the previous work of several authors (cf. Vaillant, 1941: 50-107; Jimenez Moreno, 1954-5; Gibson, 1964: 9-31).

At the time of the conquest, Culhuacan had one of the longest and most illustrious "Toltec" lineages in the Basin of Mexico (Ixtililxochitl, 1952, vol. I: 59; vol. II: 38). According to legend, following the collapse of Tula in the twelfth century, the "Toltecs" dispersed from that city and some wandered south; one of these groups founded Culhuacan (Velazquez, 1945, 15; Ixtililxochitl, 1952, vol. I: 67, 70; vol. II: 37). Culhuacan then became the most important community in the Basin of Mexico. According to the Codex Xolotl, a history of the Chichimecs who founded the Acolhua domain, Culhuacan was the largest and most important community when Xolotl and his followers migrated into the Basin (Dibble, 1951 "Plancha I"; this plate is reproduced in Plate 32). Although these migration legends are probably apocryphal, they do reflect what is very clear archaeologically-Culhuacan was a large, probably influential center in the Early Aztec period, and was perhaps the largest community in the Basin of Mexico at that time.

Within a century after the Chichimecs under Xolotl arrived in the Basin of Mexico (which was probably during the 13th century), however, Culhuacan began to lose power and influence. Culhuacan was first defeated in battle by Xolotl's Chichimecs (Ixtililxochitl, 1952, vol. I: 98; vol. II: 38-9), and later, Culhuacan was again defeated, this time by the expansionist Tepanec (Velazques, 1945: 29; Ixtililxochitl, 1952, vol. II: 78). Following this defeat Culhuacan was supposedly abandoned for a short period of time; some of the Culhua migrated to Chichimec communities, including Azcatpotzalco, Coatlinchan, Huexotla, Cuauhtitlan, and Texcoco (Velazques, *ibid.*: 30-1). In so doing, they introduced elements of their culture to the backward "Chichimecs", supposedly including language, elements of supernatural beliefs, and perhaps some agricultural and craft techniques. Again, this particular migration episode may be only legend, but the widespread use of Aztec pottery in the Basin of Mexico started probably in the 13th and 14th centuries. Previous to this, significant quantities of Aztec Black/Orange pottery had been restricted to several large communities such as Culhuacan, in the southern part of the Basin.

Culhuacan was the source of the royal lineage of the Mexica, the founders of Tenochtitlan-hence their name Culhua Mexica. According to legend, the Mexica were originally under the domain of Culhuacan, but began to marry into the Culhua royal lineage (Ixtililxochitl, 1952, vol. I: 114; Duran, 1962, vol. II: 39-41, 55-6). By the early 15th century the Mexica had become a powerful group, and defeated Culhuacan along with other Basin of Mexico states.

Originally Culhuacan was the most influential of the cuatro senores. The exact socio-political relationships between these four centers could not be determined, however. As mentioned above, Ixtapalapa seems to have surpassed Culhuacan in influence by the time of the conquest, since Ixtapalapa was ruled by the brother of Montezuma at that time.

The ethnohistoric sources which I reviewed have very little information about the physical nature of Culhuacan; or other data useful for settlement analysis. Ixtililxochitl states that Achitometl, a ruler of Culhuacan, "les dio en dote a sus dos hijas unas tierras de riego y huertas, con muchos vasallos renteros, junto a la ciudad de Culhuacan..." (1952 vol. I: 100). These "tierras de riego y huertas" were possibly chinampas, although it is not possible to determine this definitely. Ixtililxochitl provides us with another possible reference to chinampas at Culhuacan: "...aunque en Cuauhtepec junto a Itzucan, el senor de alli, llamado Xiuhennahuacatzin, habia mas de cincuenta y dos anos que sembraban en tierras de riego y cogia con abundancia; y lo mismo Achitometl rey de Culhuacan habia hecho, aunque no tanto y con abundancia como el de Itzucan" (1952, vol. I: 118).

The Conquistadors mention Culhuacan briefly. On the approach to Ixtapalapa, Cortes encountered the ruler of Culhuacan (Cortes, 1963: 56). Bernal Diaz del Castillo also briefly mentions this encounter with the ruler of Culhuacan (1908-16, vol. II: 38). Peter Martyr, who interviewed the Conquistadors in Spain, gives us another description of the Aztec communities on the Ixtapalapa Peninsula, including Culhuacan (Anglerius, 1628). A translation of this passage, using modern English spelling follows:

"They go from Ixtapalapa to Tenochtitlan the seat of that great king Montezuma, upon a wall of stone, made by the hand of man and with incredible charge built in the waters, two spears length in breadth [here he refers to the causeway which led west from Ixtapalapa]. That wall is instead of a bridge for Ixtapalapa also itself, some part of it stands in a salt lake, but the rest is built upon the land. Two cities founded partly in the water, join to one side of that bridge. On the other side stands one, ... the first they meet with who goes that way is called Mexicaltzingo: the second is Culhuacan... and the third is called Huitzilopochco. They say that the first contains more than 3000 houses; the second 6000 and the third 4000, all of them furnished with turreted and sumptuous idol temples" (p. 188).

Several early Colonial counts of tributaries in Culhuacan are available which might be useful in estimating its Aztec population:

1) Relacion de las tasaciones de los pueblos de yndios...que estan encomendados en personas particulares, 1560 (Paso y Troncoso, 1939-42, vol. 9: 23), and the related Relacion de las tasaciones de los pueblos de yndios...que estan en la Real Corona, 1560, (MS, Archivo General de Indias, Seville). This is document B in Cook and Simpson (1948: 50).

Here, Culhuacan is assessed at 560 pesos; Cook and Simpson multiply this by four to arrive at an estimate of the total population (on the assumption that each family in the community was assessed one peso), which is 2240.

2) Informacion recibida en la Real Audencia de Mexico...de las encomiendas de indios y la conveniencia de hacer el repartimiento perpetuo-Mexico, 17 de abril de 1597, (Paso y Troncoso, 1939-42, vol. 13: 3-46).

Here a figure is given for Culhuacan (p. 35) of 620 1/2 tributarios. Multiplied by four, this gives a figure of 2482.

3) Descripcion del Arzobispado de Mexico; hecha en 1570, Luis Garcia Pimentel ed., Mexico, 1897). This is document K in Cook and Simpson (ibid.: 8); this source records 1030 tributaries for Culhuacan, which implies a total population of 4120.

Several documents were utilized by Cook and Simpson (ibid.) which were unavailable to me:

4) Their document I (p. 7): Relacion de los pueblos de yndios que los religiosos de Sant Agustin tienen a su cargo... by Fray Juan Adrian, Provincial, 1572 (MS, Archivo General de Indias, Seville). The figure given here is 1000 tributaries which represents a total population of 4000.

5) Geografia y descripcion universal de las Indias, by Juan Lopez de Velasco, 1571, (Justo Zaragoza, ed., Madrid, 1894). This is document N (ibid.: 8). This source gives a duplicate number of tributaries as document K, i.e. 1030, which gives a population estimate of 4120.

Taking the average of documents I, K, and N (which Cook and Simpson consider to be most reliable), they arrive at a final figure for Culhuacan of 4080, for the period around 1565.

The site has an area of 65 hectares, which was densely occupied, as far as I could tell, from the Early through the Late Aztec periods. The density of pottery on the site implies a density of occupation of 25-50 persons per hectare. From this, an estimated range of population between 1625-3250 is derived. This suggests the Cook and Simpson estimate of 4080 is too high for Culhuacan alone. The 1560 Relacion (Paso y Troncoso, 1939-42, vol. 9: 23), which is paragraph 1, above, which gives an estimate of 2240, and the 1597 estimate (paragraph 2, above), of 2482, seem more reasonable. Very likely the Cook and Simpson estimate is too large because the tributaries recorded for Culhuacan included a series of isolated chinampa residences, such as Ix-A-71, and perhaps other communities such as Ix-A-75, which might have been included in the tributary population, but which were not part of Culhuacan proper.

CLASSIFICATION: Primary regional center, population 1625-3250.

Ix-A-73

NATURAL SETTING: Lomas and Hoyas, on fairly steep slope at about 2290 meters. Soil is 1 meter or so deep, not eroded.

MODERN UTILIZATION: Rainfall cultivation of some maize and maguey.

ARCHAEOLOGICAL REMAINS: Evenly scattered sparse to light Late Aztec over an area of several hundred square meters. No structures noted.

CLASSIFICATION: Isolated residence, population 5-10.

Ix-A-74

NATURAL SETTING: Hilltop, at the peak of Cerro de la Estrella, at about 2450 meters. Soil is 1 to 2 meters deep, but severely eroded in some places.

MODERN UTILIZATION: Today the area is a national park. A religious shrine is located west, and just below the hill-top pyramid.

ARCHAEOLOGICAL REMAINS: The site consists of a pyramid-mound on the hill-top, plus a small platform, constructed of stone and plaster, now mostly destroyed, west and downhill from the main pyramid-mound. Evenly scattered sparse Late Aztec pottery was noted scattered over and around the pyramid, over an area of several hundred square meters. Plate 33 shows a remnant wall of the main structure. Terminal Formative and some Early Toltec ceramics are scattered over the area as well as Aztec. The site is within the area of Ix-TF-13.

ETHNOHISTORIC REFERENCES: Cerro de la Estrella has been described as the location of the Aztec "new fire" ceremony (Vaillant, 1941: 200; Gibson, 1964: 11). Duran gives us an accurate description of the location of the ceremony:

"Este cerro, que ellos llamaban Huixachtecatl es uno que esta entre Itztapalapa y Cuitlahuac, junto al camino que para el dicho pueblo de Cuitlahuac va de la ciudad de Mexico, luego en pasando el pueblo de Itztapalapan. En el cual se hacia esta ceremonia de encender nueva lumbre el dia del cumplimiento de los anos del jubileo..." (1967, vol. II: 453-4).

Cerro de la Estrella does fit the described location very well. Sahagun wrote the best description of the ceremony itself, which took place every 52 years and signified the periodic rebirth of the sun (Anderson and Dibble, 1951, Book 2: 147, 177; 1953, Book 7: 25-32; Dibble and Anderson 1957, Book 4: 143-4). At the end of the 52 year period, all the fires in the Aztec area were extinguished. One new fire, kindled by a priest on top of Cerro de la Estrella, was used as a source to rekindle all those which had been put out.

CLASSIFICATION: Isolated civic-ceremonial structure, with no permanent population.

Ix-A-75

NATURAL SETTING: Lakeshore Plain and lake-bed on gentle slope, stretching uphill from about 2240 meters to 2250 meters. Soil is 1 meter or more deep, not eroded.

MODERN UTILIZATION: Most of the site area is covered by the modern town of Culhuacan. The west part of the site is located in what appears to have been a chinampa area, which is used today for rainfall cultivation of maize and sugar-beets.

ARCHAEOLOGICAL REMAINS: Localized and variable very light to light Early and Late Aztec over an area of about 3 hectares. One mound was noted in the part of the site which was probably in the chinampas. This is a low flat mound, slightly over 1 meter in elevation, roughly rectangular in shape, 60 meters east-west by 100 meters north-south. Aztec pottery was noted in the mound fill, along with some construction rubble. The mound serves no function today. This could be a large example of the type of Aztec residences which were noted in other chinampa areas (e.g. Ix-A-68, Ix-A-71). No structures were noted on that part of the site which is on the Lakeshore Plain. This last-mentioned part of the site overlaps with Ix-ET-13.

CLASSIFICATION: Hamlet, population 30-75.

CONCLUSIONS:

Like the occupation of the Teotihuacan Valley and the Texcoco Region, the Aztec occupation of the Ixtapalapa Peninsula Region was characterized by high population (Fig. 61), increasing urbanism (Figs. 28, 29), and a filling-in of all available agriculturally-useful environmental zones (Figs. 30, 31). This last-mentioned aspect of the Aztec occupation of the region distinguishes it from all earlier Prehispanic periods.

Early Aztec:

This period is a difficult one to evaluate for several reasons. First, all of the sites we are calling Early Aztec were occupied, and were usually expanded, during the Late Aztec period. Typically, the heavy overlay of Late Aztec has so obscured the earlier material that it was difficult to evaluate the nature and size of the Early Aztec settlements. In spite of these methodological problems, however, the general outlines of the Early Aztec settlement pattern can be described.

The only site in the region with a significant amount of Aztec I pottery is Culhuacan (Ix-A-72), the type site of the phase. A few Aztec I sherds were also noted at Ixtapaluca (Ix-A-26), but not in sufficient quantity to consider it a site; in addition, some scattered Aztec I was noted from time to time on other Aztec sites, but not in sufficient quantity to consider these as sites. Culhuacan was apparently as large, or nearly as large, in Aztec I times as during the later periods, with a population estimated between 1625-3250. It is obviously difficult to explain the settlement configuration for a period which has only one large site. The Aztec I settlement of the Chalco Region shows the same pattern, i.e. there is no significant rural settlement, but there are two large nucleated sites, Chalco and Xico (Parsons, personal communication). Some possible explanations of this are:

- 1) Perhaps all of the population of the Ixtapalapa Peninsula Region was residing in one large center.
- 2) There may be some chronological overlap of what we call the Aztec I and Late Toltec periods. This would mean that there was a co-occurrence of two distinct cultural traditions in the Basin of Mexico, the rural Late Toltec and the urban lake-oriented Aztec I. The Late Toltec settlement of the Cerro de la Estrella area is much less dense than in comparable other parts of the region. Perhaps this reflects the presence there of Culhuacan.

On the basis of present evidence, neither of these two hypotheses can be adequately tested. The really important aspect of Aztec I settlement is that it represents the first instance of a trend which was to become very important in the Aztec occupation of the Ixtapalapa Peninsula Region and which represents a departure from the settlement configurations of all previous Prehispanic periods: an emphasis on occupation of the lake bed itself. As has been noted above, a considerable amount of evidence suggests that Culhuacan was built on an artificial island in the fresh-water lake. The same seems to apply for parts of Aztec Chalco and Xico in the Chalco Region (Parsons, personal communication). In the early 1950's, a graduate student at Columbia University, George O'Neill, dug a deep pit into a portion of Aztec Chalco (O'Neill, 1963). This pit showed a depth of Aztec occupation of 7 meters which was Aztec I in the lowest levels. 4 1/2 to 5 meters of the Aztec deposit is below the water table. To account for this, O'Neill suggests that the level of Lake Chalco had been 4 1/2 to 5 meters below its pre-drainage level. It seems likely, instead, that some or all of the material below water level represents fill which had been put there to create an artificial island on

which the site was located. O'Neill found a few Classic period ceramic objects in the lower levels, but not in sufficient abundance to suggest a Classic occupation. As at Culhuacan, the sparse Classic noted in the lower levels probably represents pieces which were in the fill used to build the island, which was probably carried from the slopes around the site. Parsons feels that the closest source of fill dirt for Aztec Chalco would have been Xico Island, where there is a large Classic site (Parsons, personal communication). The fill-dirt could have been carried to the dumping area from Xico by boat.

During the Aztec II period, Culhuacan continued to be the only large settlement in the Ixtapalapa Peninsula Region. Ixtapaluca was apparently founded during this time, and achieved a size of approximately 15 hectares. The occupation of all available agriculturally useful zones, which characterizes the Late Aztec occupation of the area, was initiated during Aztec II. This included occupation of the Upper Piedmont (Ix-A-3), the Cerro Pino Lower Slopes (Ix-A-21, 32, 33), and the Lomas and Hoyas (Ix-A-51). In contrast to the Late Toltec occupation of the region, there was almost no occupation of the Lakeshore Plain. The emphasis on occupation of the lake-bed area was continued, not only at Culhuacan, but also at new sites like Mexicaltzingo (Ix-A-70) and Ix-A-75.

To conclude, the Early Aztec occupation of the Ixtapalapa Peninsula Region was characterized by:

- 1) An emphasis on occupation of the lake-bed, for the first time in the Prehispanic period (Fig. 30).

- 2) The initiation of occupation of agriculturally marginal areas, such as the Upper Piedmont and the Cerro Pino Lower Slopes.

- 3) An increase in urbanization (Fig. 28). A similar situation obtained in the Early Aztec period in the Texcoco Region. Two large sites, at the juncture of the Lakeshore Plain and the Lower Piedmont, were founded (Huexotla and Coatlinchan). Parsons (MS: 371) suggests that the locations of these sites demonstrate that some of the important factors which determined the configuration of the Late Aztec settlement first emerged during the Early Aztec period. The following section will show that the same could be said for the Ixtapalapa Peninsula Region.

Late Aztec:

The settlement pattern trends noted for the Early Aztec period in the Ixtapalapa Peninsula Region continued into the Late Aztec period and were accompanied by an increase in population to the highest levels of any Prehispanic period (Fig. 61). The estimated maximum population for this period is 13,367, and the minimum 7950. It should be noted that the maximum population figure could be too low, since the population values utilized for Ixtapalapa and Mexicaltzingo were figures for the period of 1560-70. The severe destruction of these sites by subsequent occupation makes it impossible to derive reasonable population estimates for the two sites.

The following is an analysis of Late Aztec settlement patterns of the Ixtapalapa Peninsula Region, followed by a discussion of the implications of this data for an understanding of agricultural systems, local exchange and specialization, and local organization of the Aztec population.

1) SETTLEMENT PATTERNS: A series of new sites were founded in the Lower and Upper Piedmont zones east of the Acuautila Lakeshore Plain (Ix-A-1, 4, 5, 7, 8, 10). Two sites in this area which had only traces of Early Aztec grew during the Late Aztec period (Ix-A-2; 9). Ix-A-3 and Ix-A-6 remained unchanged from the Early period into the Late. The Acuautila Lakeshore Plain remained unoccupied except for one small hamlet (Ix-A-29). Very little Aztec pottery and no tlatels were noted in the modern town of San Francisco Acuautila. Many yards and open fields in the town were examined, and the absence of Aztec remains does not seem to be due to Posthispanic occupation. Also, alluviation does not account for the absence of Aztec ceramics here either; just south of the modern town two earlier sites were recorded (Ix-EC-2 and Ix-LT-6), which are, for the most part, surface deposits.

Aztec Acuautila was probably located in the Lower or Upper Piedmont east of the present location of the community. Ix-A-4 and Ix-A-8 are both relatively large hamlets, either of which could have been the Aztec Acuautila. There is a brief description of Acuautila in the Relacion de Coatepec y su Partido written in 1597 (Paso y Troncoso, 1905-48, vol. 6: 39-65), which supports this hypothesis. In the relacion Acuautila is listed as a cabecera governed by Coatepec, with the following four estancias under its domain: Sanct Andres Chiautla, Sancto Thomas Texcaltitlan, Santo Domyngo Tlalanoztoc, Los Reyes Suchitenco (ibid.:40). None of these estancias exist as communities in the area today. A footnote on page 49 of the relacion explains that the name Acuautila signifies that the community was founded at an oak grove (oak is ahuatl in Nahuatl, according to Standley, 1920: 172-3), near water. Unfortunately the exact location of the site is not described in the relacion, but the map included with it, which has been reproduced here (Plate 34), might be of some help. The equivalent of the Sierra zone seems to be the mountainous-looking area near the top of the map; the road to Veracruz runs east into the sierra south of Coatepec, probably approximately where that road is today. The dark lines running down from the sierra probably represent barrancas or valleys. South of Coatepec, and located between several of these barrancas or valleys are several small churches which apparently represent a series of small communities. The map is highly stylized, and poorly proportioned, but the scatter of what are apparently small communities between the dark lines is much like the observed Late Aztec settlement pattern east of modern Acuautila. Today all of the population of this region resides in one large community, San Francisco Acuautila; no single large community with this name is shown on the relacion map. Presumably the congregacion policy in this area, which must have taken place after the relacion was written, resulted in the movement of population in this area into one large community. The relacion map, then, suggests that our interpretation of the Aztec settlement of the area is correct.

This scatter of small piedmont sites east of Acuatla is not like the more-or-less continuous piedmont "strip settlements" of the Teotihuacan Valley or the piedmont settlements of the area east of Texcoco in the Texcoco Region, where it was at times difficult to delineate sites. The piedmont sites east of Acuatla are, in contrast, small and discrete; these do not represent a large body of population. It seems strange that these communities should have been located far up in the agriculturally marginal piedmont zone where they would not have had easy access to the deep-soil alluvial plain below. At least two factors, however, may have militated against settlement adjacent to the open plain: 1) Larger centers in the area, such as Coatepec and Ixtapaluca, may have controlled the agriculturally-valuable plain, or 2) This area was near the boundary between the Chalca and the Acolhua domains (Fig. 62). Warfare between Coatepec and Chalco is mentioned in the Coatepec relacion (Paso y Troncoso, *ibid.*, vol. 6: 50-1, 55), and Ixtlilxochitl mentions the animosity between the Acolhua and the Chalca in several places (1952, vol. I: 224, 241; vol. II: 223-8). This area could have been a shatter-zone where settlements would only have been located in defensible locations, away from the exposed flat alluvial plain. The only large Aztec site in the area, Ixtapaluca (Ix-A-26), is, for the most part, located on a high ridge overlooking this same plain, in an obviously defensive position. Ix-A-1, which was apparently a fortress, could have served as a place where the population of the piedmont zone could retreat in times of war.

One other factor may be important for understanding the occupation of the piedmont zone east of Acuatla: the possibility for exploitation of resources which are particularly suited to that environment. More will be said of this below under the heading, local exchange and specialization.

Occupation of the Cerro Pino Upper Slopes and Lower Slopes by a population residing mostly in isolated residences (Ix-A-18, 19, 21, 22, 23, 24, 25, 33, 34), represents a continuation and intensification of a process which began in the Early Aztec period. Occupation of this steep, eroded, agriculturally-marginal zone is characteristically Aztec, and had no precedent in other Prehispanic periods. Similarly, Late Aztec population expanded in another agriculturally marginal zone, the rugged and rocky Lomas and Hoyas. Like the Cerro Pino Lower and Upper Slopes, the settlements in the Lomas and Hoyas consist of isolated residences and small hamlets (Ix-A-39, 40, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 58, 59, and 73). The Late Aztec occupation of the marginal zones in the region, however, represents only a small percentage of the total population (Fig. 31).

Tlapacoya Island has only one definite Aztec site, an isolated residence (Ix-A-31), near the top of the volcano on gentle slopes. A very light sherd scatter in two locations on the Lakeshore Plain at the base of the volcano could be the remains of Aztec sites, but it was not possible to say for sure. Perhaps these sites have been completely covered by the modern occupation in the area.

Settlement density on the Lakeshore Plain, in parts of the region, increased considerably compared to the Early Aztec period. The Early sites in the Lakeshore Plain were still occupied (A-32, 41), and a series of new sites were founded (Ix-A-32, 34, 36, 37, 38, 41, 42, 43, 53, 56, 57, 60, 61, 62, 63, 64, 65, 66, and 67). Also located on the Lakeshore Plain were portions of Ix-A-69, 70, and 75. Several sites on or near the Lakeshore Plain, around the flanks of Cerro Pino, are located adjacent to alluvial fans of barrancas, including Ix-A-32, 34, and 37. In spite of the large increase in the number of Aztec sites in the Lakeshore Plain zone, however, this still does not represent a majority of the total Late Aztec population (Fig. 31).

The south edge of the peninsula, except for the northeast part, is void of settlement except for three small hamlets (Ix-A-56, 57, 65). This area was within the territory of Cuitlahuac, an island-city located between Lakes Chalco and Xochimilco (Fig. 62). The presence of the large island-city of Cuitlahuac adjacent to this nearly abandoned part of the peninsula is probably not just coincidental. Very possibly, the people utilizing this part of the peninsula for agricultural purposes were living in Cuitlahuac, or in the extensive chinampa area which surrounded that city (chinampas in the area around Cuitlahuac have been mapped by Armillas, [1971]). Several alternative reasons for this pattern can be put forth, none of which can be tested with the available data:

- 1) Nucleated settlement at Cuitlahuac was favored for defensive reasons. This small city-state was involved in a series of wars with the Tepanecs, the Mexica, the Xochimilca, and the Acolhuaque (Olivera Sedano, 1954-5: 301-302; Gibson, 1964: 12). In the northeast part of the domain of Cuitlahuac, however, this suggested nucleation policy apparently did not apply. There were several communities in this area (Ix-A-36, 53, 57, and 56); the largest of these, Ix-A-53, was probably the Aztec Cuahtli-itlacuayan, which has been identified as being part of the domain of Cuitlahuac. None of these latter sites are in defensible positions.
- 2) The relatively greater agricultural productivity of the chinampa zone, plus the possibilities for exploitation of lacustrine products, made residence there more desirable than on the less-productive mainland. In addition, occupation in the chinampa zone would have allowed easier canoe access to the market system of the Basin of Mexico. Because of these factors, perhaps the peninsular area north of Cuitlahuac was reserved for growing of nopal and maguey, for forest resources, and for hunting and other wild-food resources.

An analogous situation obtained in the area of Cerro de la Estrella. This area was also a small, semi-autonomous state, like Cuitlahuac (Gibson, 1964: Map 2, which is partially reproduced in Fig. 62). Most of the population of that state was situated in the lake-bed area, on artificial island communities. These included the large towns of Culhuacan (Ix-A-72), Ixtapalapa (Ix-A-69), and Mexicaltzingo (Ix-A-70). In addition, there were apparently scattered isolated chinampa residences around these nuclear centers, three of which were mapped and described (Ix-A-68, 71, 75). Also, there was a large Lakeshore Plain village which was a salt-making site (Ix-A-67). Other than Ix-A-67, however, occupation of the Lakeshore Plain and the Lower Piedmont of Cerro de la Estrella was sparse. An

isolated residence (Ix-A-66), and a civic-ceremonial center (Ix-A-74) are the only other sites. This situation probably reflects the marginal value of the Lakeshore Plain and the Lower Piedmont for maize agriculture, compared to the chinampas. Possibly the dry mainland area was reserved for growing of maguey and nopal, for wood products, and for collection of wild-food resources.

That small area on the north and west of Cerro de la Estrella, which was the location of Culhuacan, Ixtapalapa, and Mexicaltzingo, was densely inhabited. In addition, Huitzilopochco (now Churubusco), another large Aztec town, (outside of the survey area) was located just a few kilometers west of these three centers. Most of this dense population resided in the lake-bed environmental zone, which was the most heavily populated area of the Ixtapalapa Peninsula Region in Aztec times (Fig. 31). This situation is analogous to the central zone of the Texcoco Region, where the three largest centers in the region, Texcoco, Huexotla, and Coatlinchan, were grouped closely together at the juncture of the Lower Piedmont and the Lakeshore Plain. Parsons (MS: 428, 439) has argued that this concentration of population can be accounted for in terms of two variables: 1) The agricultural potential of the Lakeshore Plain which, when drained, was possibly as productive as any agricultural area in the Basin of Mexico). 2) The sites are located such that they would have had ready access to the intensive Basin-wide market system which was focused on the lakes.

These same variables can probably help to explain the impressive concentration of Early and Late Aztec population on the western tip of the Ixtapalapa Peninsula. The actual lake-bed locations of these sites would have allowed ready access to the market system by canoe transport. This factor was particularly important since all three of these large communities had easy access to the main canal which was the key transportation route between Lakes Chalco-Xochimilco and Tenochtitlan. A further important factor in understanding the locations of these communities is that they were located less than 20 kilometers from the most important markets in the Basin of Mexico; those in Tenochtitlan and Tlatelolco. The great productive potential of chinampa cultivation is undoubtedly the other variable of key importance for understanding the locations of these sites, and the clustering of a large population in this area. If these two variables are kept in mind, then it is perhaps possible to understand why a tremendous amount of labor was expended to construct island-communities in the lake, and to construct dams and other features, which were necessary to control the level of the lake-water (in order to protect these communities and their associated chinampas from floods). It is interesting to note that the labor expenditure needed to locate communities in the lake-bed environment first became worth-while during Aztec I times, and not during any previous Prehispanic period. This suggests that chinampa cultivation was not important previous to Aztec I times in the Basin of Mexico. Similarly, this could indicate that the intensive lake-borne trade which characterized the Aztec period was not as important during earlier periods.

2) AGRICULTURAL SYSTEMS: The increase in population in the Late Aztec period was closely related to the intensification of agriculture, which was an important part of Aztec adaptation to the region. This intensification involved, for example, the use of agriculturally marginal lands, made possible, in part, by the construction of soil and water-maintaining stone-faced terraces. Terracing was noted in association with the following sites: Ix-A-2, 8, 11, 12, 16, 21, 25, 26, 31, 33, 45, 55, and 58. Although it is not normally possible to date terraces directly, in almost all cases the terraces were in very suggestive association with the Aztec sites. Similarly, the use of the agriculturally marginal Lomas and Hoyas required that large quantities of pumice chunks be moved in order to expose sufficient soil-this too is a form of intensive agriculture.

Probably the most intensive form of agriculture in the Ixtapalapa Peninsula Region, and probably in the Basin of Mexico as a whole, was chinampa cultivation. The importance of this form of cultivation in the Aztec period has been noted by several people (cf. West and Armillas, 1950; Palerm, 1955; M.D. Coe, 1964; Sanders, 1965: 191; 1968; Sanders and Price, 1968: 148, 177; Wolf, 1959: 74-76; Armillas, 1971). References to the use of chinampa cultivation in the ethnohistoric, conquest period, and early colonial literature have been presented in the site descriptions (Ix-A-68, 69, 70, 71, 72). In addition, as has been noted, there are some areas in the vicinity of Culhuacan, Ixtapalapa, and Mexicaltzingo which had functioning chinampas in 1942 (Fig. 63). Some of these are still partially or completely functioning today (in particular north of Ixtapalapa), or are still recognizable, even though they are not presently functioning. No attempt will be made here, however, to estimate the extent of Aztec chinampas in the vicinity of these Aztec towns. Armillas is now working on a map of the extent of chinampas in all parts of the lake system, and his preliminary map (Armillas, 1971) shows a continuous area of chinampas around all three of these main sites.

Sanders and Price (1968: 177) suggest that chinampa cultivation, while highly productive and therefore important in economic sense, does not require "large cooperative undertakings for success"; in other words, they argue that centralized government was not a prerequisite for the construction of chinampas. On the other hand, as has been pointed out by Palerm (1955: 37-39), chinampa agriculture is a complex agricultural system which required considerable organizational complexity to build and maintain. The basic problem in chinampa cultivation was that of maintaining a consistent depth of fresh water, in order to avoid either flooding or drying-out of the chinampas, because of seasonal fluctuation of the lakes.

Water control in the chinampa area involved mostly construction of dikes and dams. One of these dams, called the Calzada of Mexicaltzingo (Diaz del Castillo, 1908-16, vol. II: Appendix A), connected the Ixtapalapa Peninsula to the west edge of the lake. It ran from Ixtapalapa, through Mexicaltzingo, west to Huitzilopochco (Fig. 2). Cortes described this dam (which was also a main road) as follows:

"The day after arriving at this city [Ixtapalapa], I set out, and after marching half a league I entered on a causeway which goes for two leagues across the middle of this lake until it reaches the great city of Tenochtitlan, which is built in the middle of the same lake. This causeway is as broad as two lances and very well built, so that eight horsemen abreast could march along it, and in these two leagues from one end to the other of the said causeway there are three cities, the greater part of one of them named Mesicalsingo [sic.] is built in this same lake and.. the other named Huchilohuchio [sic.] are on the shores of it, with many of their houses in the water." (translation modified from Diaz del Castillo, *ibid.*: 307-8).

In this same appendix, (p. 311), there is a passage from an obscure reference to the function and dimensions of the Mexicaltzingo Causeway: "the causeway of Mexicaltzingo, which holds back the Lake of Chalco, and which begins at the town of Ixtapalapa [and passes] through that of Mexicaltzingo is 5200 varas long [1 vara equals 33 inches] and eleven varas wide" (from the Relacion Universal Legitima y Verdadera del sitio en que esta fundada la muy Noble, etc... Ciudad de Mexico, by Don Fernando de Cepeda and Don Fer. Alonzo Carillo, 1637). No archaeological evidence of this causeway could be found in this now heavily occupied area.

In addition to the Causeway of Mexicaltzingo, control of lake levels was further accomplished by the construction of a dike across Lake Texcoco, north from Ixtapalapa, the famous "Albarradon de Nezahualcoyotl" (Palerm, 1955: 39; West and Armillas, 1950: 168-9). This allowed construction of chinampas in the area of Tenochtitlan which had previously been part of the saline Lake Texcoco, in addition to protecting Tenochtitlan from flood. In order to build chinampas in what had been a saline lake, it was apparently necessary to flush the soil with fresh water; as pointed out by Palerm (*ibid.*: 37-39), the numerous aqueducts built to supply water for Tenochtitlan served "... to wash" the nitrous soil, for irrigation and to maintain the level of the lake in addition to domestic use."

To conclude, contrary to the assertion of Sanders and Price (*ibid.*), there is considerable evidence that maintenance of chinampas required large-scale water-control devices, and it is likely that the construction and maintenance of the devices could only have been accomplished by a centralized government. Armillas has uncovered further evidence that chinampa construction and maintenance was directed by a centralized government (Armillas, 1971). He found that large areas of chinampas display a consistent orientation, which implies their construction was planned. All of this implies, that during the Aztec period, the large chinampa communities, on the western tip of the Ixtapalapa Peninsula Region, must have been closely tied to a centralized government, which was responsible for water-control projects. The first locus of such a centralized government was probably Culhuacan, during the Early Aztec period, and later, the focus of this government was surely at Tenochtitlan.

West and Armillas (*ibid.*, p. 171) suggest that there were no chinampas in the area around Ixtapalapa until recently:

"Es probable que las chinampas de Ixtapalapa hayan sido construidas en las postrimerías de la época colonial o después de la Independencia. Anteriormente las aguas del lago de Tezcoco cubrían gran parte de las tierras del pueblo que eran, según la Relación de 1579, salitrosas e improductivas. Aun en 1911 las chinampas de Ixtapalapa tenían que ser inundadas periódicamente con agua dulce del canal de la Viga a fin de lavar el suelo de sales perjudiciales."

I feel that this is not correct. First, the descriptions of Cortes and Bernal Diaz del Castillo indicate the town was built in the lake and had chinampas. Second, the presence in the area north of Ixtapalapa of isolated, mounded Aztec residences (e.g. Ix-A-68) suggests that the area was used for chinampas in the Aztec period. If the Aztec water-control system fell partly or wholly into disuse following the conquest, perhaps that area was temporarily rendered uncultivable.

The low area to the east of Cerro de la Estrella appears to have been lake-bed before the lakes were drained (Fig. 7). As I have suggested above, it is likely that the area was under water at least during those times when the lakes were high. If Aztec water control was as effective as I have so far suggested, then we might expect to find a dam across this gap to help control the seasonal fluctuation of the lakes. Unfortunately, much of the gap area, particularly the north part, is today covered with modern settlement and no traces of a dam in this area was detected. There is some indirect evidence that such a dam existed, however. Shortly after establishing himself at Texcoco, Cortes undertook a raid on Ixtapalapa. On the way there he described passing a dike or dam "....that is between the fresh and the salt lakes; that can be seen in the map I sent to your majesty...And the dike or dam was opened, commencing with much force to release water from the brackish lake into the fresh-water lake, although at that point the lakes are separated by 1/2 league, and not observing this trick...we continued our pursuit."

"As they had been forewarned [in Ixtapalapa], all the houses on solid ground were unoccupied; and all of the people and spoils were placed in the houses of the lake, and there all those gathered who were fleeing, and they fought with us very fiercely...Because night was coming, I collected the men and put fire to some of their houses...and...it seemed that Nuestro Señor inspired me and brought back the memory of the dike or dam that I had seen broken in the road, and it occurred to me the great danger there was; and running, with my men nearby, I began to come out of the city...when I arrived at that water...there was so much, and running so rapidly, that we passed by jumping, and we lost some of our Indian friends, and lost all the spoils that we had taken in the city, and I swear to your majesty, if we had not passed by the water that night, or if we had waited three hours more none of us would have escaped because we would have been surrounded by water; not being able to go anywhere. And when dawn arrived, we saw how the water from one lake was mixed with the other, and was no longer running, and all of the salt lake was full of canoes with warriors, thinking to take us there" (translated from Cortes, 1963: 125-6). Cortes could be referring here to the "Albarradon de Nezahualcoyotl", but opening this would serve only to flood Ixtapalapa. This would not have cut him off, since all he would have to do would have been to advance to higher ground on the peninsula behind Ixtapalapa. The

only way he could have been cut off would have been to surround Cerro de la Estrella with water-this could only have been done by flooding the low area to the east of that mountain, which is apparently what the Aztecs tried to do. Cortes mentioned that the dike was included in a map which he sent to the king of Spain; an early version of that map was consulted, but was of no value in clarifying the problem (Cortes, 1524).

3) LOCAL TRADE AND SPECIALIZATION: Direct evidence of local trade and specialization normally requires excavation. For the Late Aztec period, however, surface evidence, combined with some information from early colonial documents, combine to supply a very useful body of data on this subject.

One example of this approach concerns the communities in the piedmont east of San Francisco Acuautla. It has been suggested above that the piedmont occupation of this area was favored because this was near the shatter-zone between the Acolhua and Chalca domains, and that settlement in the piedmont was a defensive measure. Another factor may have been equally as important, however; the locations of these sites allowed ready access to the products of the piedmont and the sierra environments. While maize cultivation in this area was probably not highly productive, the xerophytic domesticates, nopal and maguey, are well adapted to the area and could have been important crops for the piedmont population. In addition, the nearby Sierra zone would have been a source of various kinds of products, including fire-wood, construction wood, charcoal and medicinal products made from the tree resins and oils (some of these latter products are mentioned in Paso y Troncoso, 1905-48, vol. 6: 60). The Relacion de Coatepec-Chalco (ibid.: 39-65) contains several references to the economic importance of wood-working and the production of related products in the villages in the Coatepec area (ibid.: 60, 63, 78). As I mentioned above in the site descriptions for this area, particularly around IX-A-7, 8, and 9, I noted a high percentage of nosed keel-scrappers. If wood-working was an important activity in this vicinity, the nosed keel-scrappers might have functioned as wood-working tools. This could be tested by noting the wear patterns on these tools. Scraping of maguey interiors is another possible function of the keel scrapers.

The same Relacion refers to the importance of wood-working at the town of Ixtapaluca (IX-A-26) (ibid.: 78). According to Robelo's Diccionario de Aztequismos (p. 412), the name Itztapaluca implies that wood-working was done in that town.

Today the most important crops in the Cerro Pino Upper Slopes and Lower Slopes, and in the Lomas and Hoyas are nopal and maguey. It seems likely that the Aztec population of these zones was engaged in specialized production of these two crops. These xerophytic domesticates probably thrive better on the dry, eroded slopes of the Cerro Pino Upper and Lower Slopes, and the Lomas and Hoyas, than they do in the wet chinampa areas; the population of the chinampas, then, would have depended on groups in the agriculturally marginal areas to supply them with tuna, pulque, and other maguey and nopal products. It is interesting to note that the occupation of these agriculturally marginal zones took place at the same time that occupation of the lake-bed (which probably implies the construction of chinampas) was initiated (during the Early Aztec period),

which perhaps reflects the importance of exchange between the two environmental zones. During earlier Prehispanic periods, occupation of the marginal zones had been either for defense (i.e. during the Terminal Formative period), or was normally near the edge of these marginal zones, where there would have been access to the agriculturally productive Lower Piedmont and Lakeshore Plain.

Apparently, another important activity of specialized producers in the Aztec period was salt-making. The following sites are located on the edge of saline Lake Texcoco, and have the indicators of salt-making activity, namely salt tlatels and a high percentage of Texcoco Fabric-Marked pottery: Ix-A-42, 43, 62, and 67. Ix-A-67, adjacent to Ixtapalapa, is by far the largest of these sites. It was probably the production of salt at this site, which gave Ixtapalapa its name (from iztatl, salt, according to Robelo, *ibid.*: 202). Cortes (1963: 67) noted the importance of salt-making at Mexicaltzingo and Huitzilopochco. Peter Martyr also described salt-making in this area (Anglerius, *ibid.*: 188).

It is likely that the chinampa communities were producing food not only for their own consumption, but also for the markets in nearby Tenochtitlan and Tlatelolco, as they do today for Mexico City (West and Armillas, 1950: 180-2).

One last bit of information with respect to exchange and specialization comes from the Relacion de Mexicaltzingo quoted above (Paso y Troncoso, 1905-48, vol. 6: 196). Here it was stated that, prior to the conquest, the residents of Mexicaltzingo had been full-time soldiers who fought for Tenochtitlan. It seems unlikely that a whole community could have been specialized in this activity, but it was probably an important specialization for some portion of the population. Salt-making and production of chinampa crops for exchange in the urban centers was very likely also done. In 1580, most of the inhabitants of the community made a living from production of fodder for sale in Mexico City (*ibid.*: 195).

4) LOCAL ORGANIZATION: The best data from the Ixtapalapa Peninsula Region, which can serve as a basis for a discussion of local organization, comes from Ixtapaluca Viejo (Ix-A-26). Because the site is very well preserved, we were able to accurately describe a large number of residences and civic-ceremonial structures. For 99 residences, out of a total estimated 142-151 on the site, it was possible to measure the size in square meters. For 60 of the 99 residences, preservation of stone foundations, stone floors, and in some cases stone-walls, was such that it was possible to record partial, or in some cases complete, floor plans. Examination of this data revealed a wide variation in the complexity and size of residences.

The following is an attempt to compare this data from Ix-A-26 with the Aztec calpulli as it is known from documentary sources. As noted in the introduction to this chapter, the calpulli has been the subject of intense interest among some students of Aztec culture (cf. Monzon, 1949; Moreno, 1962; Sanders, 1965; Katz, 1966; Sanders and Price, 1968). Detailed analysis of the calpulli in recent years was originally an attempt

to show that Aztec society displayed features of social stratification, and was not a primitive society, as had been suggested by Bandelier (1878) and others. The elements of this debate need not be repeated here; most writers now subscribe to the view that aspects of stratification and kinship organization characterized Aztec social structure. The *calpulli* has remained a subject of considerable interest, however, because it was apparently the basic organizational unit of Aztec society.

A majority of people writing about the *calpulli* recently have compared it to Kirchoff's (1959) conical clan (Monzon, 1949; Wolf, 1959: 135-136; Sanders and Price, 1968: 156; Parsons, MS: 408). The conical clan, although organized on the principle of descent, has features of stratification. Genealogical proximity to the group's common ancestor is the determinant of status (Kirchoff, *ibid.*: 266). That group of people nearest the common ancestor forms a distinct group- the aristoi. As was noted by Kirchoff, this type of organization, with its tendency toward stratification, lends itself admirably to higher forms of development, such as the state.

Most of what has been written about the *calpulli* has been based on aboriginal documents, histories written by Hispanicized Indian nobility, Spanish chroniclers, and early colonial documentary materials. Little archaeological evidence has been used in analysis of the *calpulli*. The only exceptions to this, of which I am aware, come from Sanders (1965) and Parsons (MS). Surveying rural Aztec settlements in the Teotihuacan Valley, Sanders noted that residences occurred in more-or-less distinct clusters of 10-60 each. He suggests (*ibid.*: 87) that these clusters represent the "*barrio pequeno*" unit, which he describes (*ibid.*: 72) as territorial subdivisions of *calpultin*. These are probably the same as the *tlaxilacallis* units noted by Monzon (1949) as subdivisions of the *calpultin* in Tenochtitlan. Sanders (*ibid.*) suggests that the "*barrio pequeno*" units had only minor religious, political, and educational functions; in the rural Teotihuacan Valley settlements, this was reflected by the absence, in most of the clusters of residences, of significant civic-ceremonial architecture. At widely-spaced intervals along linearly-arranged clusters of this type, an occasional series of civic-ceremonial structures or high-status residences were noted by Sanders. These features were usually located above, below, or at either end of one of the "*barrio pequeno*" units. Based on this kind of distribution, Sanders suggests that each of these civic-ceremonial or high-status residence clusters plus the nearby "*barrio pequeno*" units together formed *calpulli* units. In the Lower Valley, where greater agricultural productivity allowed more compact, densely-occupied communities, Sanders suggests that the *calpultin* were single "Compact High Density Villages", or ward divisions of urban communities.

In the Texcoco Region (Parsons, *ibid.*: 450-2), the "*barrio pequeno*" units were nowhere as obvious as in the Teotihuacan Valley, but several distinct occupational units were located which fit Sanders' description of the *calpulli* as a physical community. The best preserved of these is Tx-A-25, which had an estimated population of 600 to 1200 people scattered over an area of 115 hectares. There is a small area of civic-ceremonial architecture in the southeastern corner of the site.

Beyond these two preliminary studies, however, little is known about the calpulli which is based on archaeological evidence. The following is an attempt to utilize archaeological evidence to elucidate, in a small way, the nature of the calpulli. Specifically, I wish to test the hypothesis that the calpulli was a conical clan. In order to do this, I will start by making two assumptions:

1) Ix-A-26 was a single calpulli. Perhaps, the best evidence for this is size. Few quantitative estimates of calpulli size are available. Sanders (ibid.) suggests that each Lower Valley nucleated village in the Teotihuacan Valley was a single calpulli. An example of this kind of village is Aztec Cuanalan, which had an estimated population between 500 and 1250. In the Texcoco Region, the site which Parsons suggests is a calpulli had a population estimated at between 600-1200. An independent, perhaps useful, estimate of calpulli size comes from Cortes. Each calpulli was a military unit; Cortes described what are probably calpulli military units as consisting of 200 to 400 men (Katz, 1966: 162). If this represents all or most of the adult males in the calpulli, then by multiplying this figure by 4 to account for women and children, we arrive at a figure of 800 to 1600 for the total size of the calpulli. This range agrees reasonably well with the above estimates from both Sanders and Parsons.

The population of Ixtapaluca Viejo was calculated by counting the estimated total number of residences (142-151) and multiplying this times the two estimates which have been given for Aztec household size: Carrasco (1964) calculated 5.6 per household based on 16th century data from the ward of Tepoztlan called Tlacateopan; Sanders (ibid.: 134) utilizes an estimate of 10 per household based on 16th century documentary data from the Basin of Mexico. (Editors note: see editors note page 21). This gives a population estimate for Ixtapaluca Viejo of between 862-1630. As has been noted above, this population range agrees well with population estimates derived from other means, including use of 16th century tribute lists for the community. This population fits reasonably well with the population estimates derived above for the calpulli.

Examination of the map of Ix-A-26 (Fig. 64) shows that there are three clusters of residences. Part A has two loosely-defined clusters, A1 and A2. The area between these two clusters was simply open ground, since no topographic reason for a break between the two could be seen. Part B forms an obviously distinct cluster. Cluster A1 has a total estimated 38-40 residences; A2 has 53-56, and B has 51-55. These clusters are comparable in size to what Sanders called the "barrio pequeno" units in the rural Teotihuacan Valley settlements. At the north edge of cluster A2 and, physically part of it, is a large civic-ceremonial precinct. The structures in this precinct include three large pyramid-mounds (the largest of which sits on an elevated platform), a ball-court, and a series of smaller non-residential structures. A1 and B have very little civic-ceremonial architecture. This cluster of three, probable "barrio pequeno" units, only one of which has significant civic-ceremonial architecture, fits Sanders' description of the composition of the calpulli unit.

Based on the sum of evidence, then, I feel that it is reasonable to assume Ix-A-26 is a single calpulli.

2) Status differentiation in the calpulli was manifested, in part, in terms of size and complexity of residences. The histogram (Fig. 65) shows the range in residence sizes from small (less than 50 square meters) to very large (the largest I am assuming as a residence is located in the civic-ceremonial precinct adjacent to the ball-court, has rooms over an area of 1456 square meters, and has two open "plazas" adjacent to the rooms which have a combined area of 2280 square meters). Residences were defined, in all cases, on the basis of the presence of the normal range of Aztec household pottery and lithic debris. Only four residences show surface evidence of plaster floors and/or walls. All of these structures are very large and architecturally complex. These will be referred to from now on as "high status residences". The tight association of plaster floors and walls with large structures strengthens the suggestion that size of residence is closely related to status.

Considering only those remaining structures, without plaster floors, there is a wide range in variation of size and architectural complexity. Residences range from simple one or two room structures to structures with 10 or more rooms. Rooms are square or rectangular, usually from 2 to 5 meters on a side. Normally a residence consists of several of these rooms joined, although in some cases the rooms are separated by a few meters. Architecturally complex residences are characterized by a large number of rooms which vary widely in size; in some cases, individual rooms are more than 100 square meters in area. In addition, architecturally complex residences often have shaped-stone foundations, walls, etc. (in some cases the stones are ground to shape). Floor plans of typical residences, which display complex architecture, are presented in figures 66 and 67. Simple residences, on the other hand, normally consist of a few rooms only, none of which are normally outstanding in size. In addition, the stone used for foundations in such rooms is often unmodified, or crudely shaped, probably by the block-on-block percussion technique. Floor plans of typical simple residences are presented in figures 68 to 72.

In the conical clan, status is determined by nearness of relation to the group's common ancestor. Those nearest are the elite, and below that level there should be a gradation downward in status to those who are most distant from this common ancestor. Archaeologically, this should be manifested as a more-or-less steady range in variation of indicators of status from elaborate to simple. This would reflect the range in variation in status from those close to the core (or part of it), to those not-so-close, to those furthest away from this core of high-status individuals. The range in variation in size and elaborateness of residences at IX-A-26 reflects this situation very well.

An immediate problem with this type of analysis is that some of the range in variation of residence size can be explained in terms of sizes of households rather than in terms of status differentiation. Carrasco (ibid.: 208) found that a typical household in the Tlacateopan ward passed through a cycle of composition through time. This involved "...a change from nuclear toward joint families of the head-with-sons and later of the head-with-brothers types, only occasionally growing to larger types. All along the cycle split-offs could take place that produced more nuclear families subject to the same cycle." Archaeologically, this would

presumably be manifested as a range in sizes of residences in a given community from small, where nuclear families resided, to large, where joint families resided. This kind of cycle surely accounts for some of the range in various sizes of residences in the Ix-A-26 sample.

Other factors at Tlacateopan, however, directly related to status could have had an effect on house-size. For example, the cacique's household was the largest in the ward; (consisting of 23 persons) this surely meant that he lived in a large house. Carrasco noted that only well-to-do families had slaves (tlacatl) and their families associated with them; and some well-to-do families had attached poor families living with them. 200 of the households in a section of Tlacateopan were directly subject to the cacique. This was the high-status section. The cacique's subjects, as this group was called by Carrasco, were distinguished from the rest of the population of the barrio in terms of land holdings, and they had preferred treatment as far as tribute was concerned. Family size for the cacique's subjects was an average of 6.2 persons, while for the remainder of the barrio the average household size was only 5.2. This evidence suggests that high status individuals live in larger households, for a variety of reasons. Size of residence, which was surely a function of household size, then, probably reflected status. In addition, it is likely that high status residences had more room per member than low-status residences. Unfortunately the data at hand is not sufficient to test this.

I suggest that a range in variation in household size can account for some, but not all, of the range in variation in residence size which is present at Ix-A-26. The remaining variation should be due to differences in status. This suggestion is strengthened by the fact that only large residences had plaster floors. In addition to those "high status" residences, there were nine other large residences (ranging in size from 250 to 600 square meters of area), which were architecturally complex. These nine residences are distinguished as "large residences" on the site map (Fig. 64). The remaining residences on the site, those which are neither "high status" residences, or "large residences", are called "average residences". With very few exceptions, the "average residences" are smaller than the architecturally-complex "high status" and "large residences". Figure 64 shows the distribution of the three types of residences. A1 has one "high status" and one "large residence"; A2 has three "high status" residences, two of which are associated with the civic-ceremonial precinct, and five "large residences"; B has three "large residences". The following figures show the difference in size of "large residences" in the three parts of the site:

	number	range	average
A1	1	325 square meters	325 square meters
A2	5	280-600 square meters	446 square meters
B	3	250-375 square meters	308.3 square meters

The following is a comparison of sizes of "high status" residences:

A1	1250 square meters
A2	1456, 590, and 605 square meters
B	none

The following is a comparison of average sizes of "average residences" on the three sections:

	number	average
A1	27	105.5 square meters
A2	45	137.2 square meters
B	27	104.3 square meters

The following figures show the number of "average" residences" per "high status" and "large residences":

A1	13.5	(19-20 for the total estimated number of residences)
A2	5.6	{ 6.6-7 " " " " " " }
B	9	{ 17-18.3 " " " " " " }

This suggests that the population of A2 as a group had higher status than A1 and B. A2 was probably analogous to the "cacique's subjects" in Tlacateopan ward. In addition, the calpulli civic-ceremonial precinct is physically a part of A2. Those individuals who directed calpulli religious and civic activities, then, probably resided in A2. Similarly, A1 was probably ranked relatively higher than B, based on the presence there of one high-status residence and the absence of even one at B.

Although A2 is probably a high-ranking section, the histograms of house-sizes (Figs. 73-5) show a range in variation from small to large in all three of the sections. This suggests that each of the supposed "barrio pequeno" units was ranked both internally and with respect to each other. This arrangement seems to coincide with Kirchoff's description of the conical clan, which he describes as "...a type of society which may be likened to a cone, with the legendary ancestors at its tip, but within it are a larger or smaller number of similar cones, the top of each coinciding with or being connected with the top of the whole cone. The bases of these cones, representing the circles of living members of the various clans at a given moment, overlap here and there" (ibid.: 267). The "barrios pequenos" perhaps are like the smaller cones, several of which form together a large cone, the calpulli.

The methodology used to derive this conclusion is obviously imperfect. It is only suggestive in terms of showing differences in status. Intensive, controlled surface collection of artifacts and/or excavation at a wide range of variation of types and sizes of residences should be much more productive for this type of analysis than the simple surface survey which was done. Other, more productive status markers, which would have more utility than residence size and plaster floors, should be available. For example, it is my impression that Chalco polychrome pottery is most abundant on high-status residences.

One other variable noted at IX-A-26 should be mentioned. The presumed high-status part of the site; A2, is also the oldest part of the site. Aztec II pottery was found over an area of 15 hectares around, and just south of the civic-ceremonial precinct (Fig. 64). Over the remainder of the site, Aztec III was by far dominant. Does this suggest that parts A1 and B formed by budding-off from A2? A1 and B were probably both founded sometime during Aztec III times. It is interesting to note that the oldest portion of the site became the high-status portion. Relative status of the "barrio pequeno" units might have been determined by relative age- i.e. the oldest "barrio pequeno" would become the one with highest status and those which formed later, perhaps by budding-off from the original unit, would have had lower status.

Chapter 11

General Conclusions

Throughout the previous chapters I have presented a series of conclusions and hypotheses regarding the various societies which resided in the Ixtapalapa Peninsula Region from the Early Formative through the Aztec periods. In part, the purpose of this final chapter is to briefly reiterate these conclusions and hypotheses. However, in this chapter, I have rearranged the chronological periods into a series of cycles, each defined in terms of settlement pattern and demographic variables. In addition to reiterating the various conclusions and hypotheses which have already been presented, this chapter will contain provisional explanations of the observed cycles.

Cycles:

1) Early and Middle Formative Cycle (Figs. 41, 42): This was a long period, encompassing approximately 550 years, during which population levels remained very low (Fig. 61). During this time, all communities in the Ixtapalapa Peninsula Region were small hamlets and villages oriented toward agricultural exploitation of the Lakeshore Plain zone. I have suggested that population density remained low during this time, because cultigens were probably not yet productive enough or dependable enough to allow high population densities.

During the Early and Middle Formative cycle, the Basin of Mexico was peripheral to cultural developments in other parts of Mesoamerica, particularly along the southern Gulf Coast, in the Olmec heartland (Drucker, Heizer, and Squier, 1957, 1959; Coe, Diehl, and Struiver, 1967; Coe, 1968a, 1968b, 1969). Some of the population of the Basin of Mexico, however, was apparently participating in a nearly pan-Mesoamerican exchange network centered in the Olmec heartland, as evidenced by the presence of Olmec-style pottery on Early Formative sites.

Very little can be inferred about the nature of social organization during the Early and Middle Formative cycle in the Basin of Mexico. There are no apparent clusters of sites which would indicate the presence of territorial groups. The elaborate burials at Tlatilco suggest there was some kind of status differentiation during this cycle, but the significance of these burials cannot be fully assessed until a complete sample of all types of burials of the period has been excavated.

2) Late and Terminal Formative Cycle (Figs. 43, 44): During this time, a number of significant changes occurred within the Ixtapalapa Peninsula Region and within the Basin of Mexico as a whole. In the Ixtapalapa Peninsula Region, population apparently increased rapidly during the early portion of the cycle, then tapered off slightly toward the end of the cycle (Fig. 61). In the Texcoco Region and the Teotihuacan Valley Region, population increased rapidly throughout the cycle (Figs. 76, 77). For the first time in the Prehispanic sequence, beginning during the Late Formative period, clusters of sites are discernible which Parsons (MS: 311) suggests were autonomous "political entities," perhaps like chiefdoms. During the latter part of this cycle, the clusters of sites became more distinct, and there is evidence that there was competition between the various groups. During the Late and Terminal Formative cycle, for the first time in the Prehispanic sequence, there was a distinct hierarchy of communities in the Basin of Mexico, ranging from large centers like Cuicuilco, (with large-scale civic-ceremonial architecture and large populations (Palerm, 1961: 300), probably in the thousands or tens of thousands), to smaller local centers like Tlaltenco (Ix-LF-6)

and Tlapacoya (Ix-LF-2, Ix-TF-4) (which had populations in the thousands and some civic-ceremonial architecture), to numerous hamlets and villages.

During the Late and Terminal Formative cycle, environmental zones were colonized which had been virtually unoccupied during the Early and Middle Formative cycle. In the Ixtapalapa Peninsula Region, for example, the Upper Piedmont, the Lower Piedmont, and the Lomas and Hoyas zones were occupied for the first time. In the Texcoco Region, the first extensive use of the Lower Piedmont zone occurred during this time, and in the Teotihuacan Valley Region there was the first extensive occupation adjacent to the main alluvial plain.

The population increase and the colonization of a wide range of environmental zones, which occurred during the Late and Terminal Formative cycle in the eastern Basin of Mexico and perhaps a wider area in the Central Highlands, can probably be attributed, in part, to the development of varieties of maize, and perhaps other cultigens, which were highly productive compared to earlier varieties. These were probably relatively frost-resistant, and therefore, more dependable than earlier varieties had been. Sanders (1965: 168) and Parsons (MS, 309-13) suggest the population increase and colonization of a wide range of environmental zones can be attributed to elaboration of soil and water control techniques, but there is little evidence to support this from the Ixtapalapa Peninsula Region. The other changes which distinguish this period, such as the beginnings of construction of large-scale civic architecture and the appearance of a marked hierarchy of communities, are more difficult to explain; but I suggest the following factors may have been important: 1) Population growth during the Late Formative in the Ixtapalapa Peninsula Region is reflected as: a) the growth of the large Middle Formative sites at Tlaltenco and Tlapacoya. Each increased over 300% in area, and they were densely occupied; b) "budding-off" occurred, i.e., new communities were formed. All of these "daughter" communities were smaller than the "parent" communities, and they lack evidence of civic architecture. Some of these new communities were formed in the same environmental zone which had been favored since the Early Formative (on or near the Lakeshore Plain zone). Significantly, however, some communities were established in environmental settings which had not been previously occupied. This latter group comprised an estimated 20-25% of the total Late Formative population of the region. The appearance of more hardy varieties of maize was probably the key factor which allowed full-time occupation of these agriculturally-marginal zones, but subsistence activities must have been more precarious for these colonizers than for those who continued to exploit the Lakeshore Plain zone. In dry years, these "daughter" communities may have been dependent upon the more suitably situated communities. This factor could have contributed substantially to the observed socio-cultural change during the Late and Terminal Formative period because, for the first time in the Prehispanic sequence, some portion of the population had differential access to preferred land. Past writers have noted the possible importance of this in enhancing differences in status among the members of a population (cf. Adams, 1965, 54; Flannery, et. al., 1967). Evidence of marked status differentiation during the Late and Terminal Formative in the Ixtapalapa region is present in the form of a series of tomb burials located in the large pyramid-platform at Tlapacoya, excavated by B. Barba de Pina Chan (1956). These individuals were buried with numerous items, including goods obtained through long-distance trade, such as sea-shell and jade. In contrast, the twelve non-tomb burials excavated at the site dating to this period were far less elaborate. The presence of large-scale civic architecture at Tlaltenco and Tlapacoya reflects

the importance of these communities as "parent" communities controlling the optimal agricultural land, where high status individuals or groups were in a position to organize and underwrite communal work efforts. 2) Formation of new communities in the Piedmont zones and the Lomas and Hoyas by "budding-off" may have had another important consequence, that of fostering exchange and specialization of production, or symbiosis. While the Piedmont and Lomas and Hoyas communities did not have access to the deep soil of the alluvial plain and lacustrine resources such as fish, wildfowl, and salt, they were well situated for the cultivation of nopal and maguey, and some had ready access to the products of the Sierra zone. Sahlins, in his study of social stratification in Polynesia, pointed out that when "budding-off" occurs such that new communities are founded in distinct environmental zones where they no longer have access to the complete range of resources in a region, an exchange mechanism becomes essential to effect "...equitable distribution of goods, by both reciprocal and redistributive methods" (Sahlins, 1958: 216). The status of dominant individuals or groups can be enhanced as a result because they serve as the foci of the exchange networks. Flannery and Coe (1968) have previously discussed the importance of this factor in the origins of ranking and stratification in the highlands of Mesoamerica.

Whatever factors were responsible for the abrupt socio-cultural and adaptive changes of the Late and Terminal Formative, the Ixtapalapa Peninsula Region was by no means unusual. The surveys conducted by Sanders and Parsons suggest that similar changes were occurring over the remainder of the Basin of Mexico. The significance of these changes for understanding the later evolutionary developments, I suggest, is that societies organized on the basis of ranking and stratification have great evolutionary potential in the context of the natural environment of the Basin of Mexico. As hierarchical organization became more pronounced, high ranking individuals or groups would have been in a position to organize and underwrite the construction and maintenance of large-scale irrigation systems. Where these systems were feasible they would have allowed increases in population density and would have further enhanced the position of those who controlled them. Eventually, this process could have resulted in the growth of "Irrigation States" where the power base of a ruling elite was largely the control and regulation of large-scale irrigation systems. While there is evidence of increased status differentiation coupled with population growth during the Late and Terminal Formative period in the Ixtapalapa Peninsula Region, large-scale irrigation is not possible there and so the area remained relatively static compared to an area where large-scale irrigation would have been feasible, the Teotihuacan Valley. As I have noted, after about A.D. 0, the Ixtapalapa Peninsula Region communities were abandoned at the same time the Teotihuacan Valley became the locus of Mesoamerica's first large urban center.

3) Classic Cycle (Fig. 45): In the Ixtapalapa Peninsula Region, and in the Texcoco Region (Parsons, MS: 330-5), (Fig. 35), the onset of the Classic cycle can best be described as the transition from a situation where there were a series of autonomous, competing social units, probably like chiefdoms, to a situation where these units were integrated into one large social unit, centered at Teotihuacan. The Classic cycle probably began in the Tzacualli phase, continued through the Early Classic, and perhaps lasted into the Late Classic. As I have pointed out, there may be problems with the Late Classic ceramic sequence in the Basin of Mexico outside the Teotihuacan Valley, which make it difficult to evaluate the configuration of Late Classic settlement and population density in the Ixtapalapa Peninsula Region. The settlement configuration in the Ixtapalapa Peninsula Region and in the Texcoco Region during the Classic cycle was distinct in a number of aspects from the preceding cycle. The clusters of sites disappeared and were replaced by evenly scattered small hamlets and villages.

Generally, during the Classic cycle, communities were less nucleated than during the preceding cycle; the light density of occupation of these Classic cycle communities suggests there was a pattern at that time of "calmil" cultivation (Palerm, 1955), where each residence in a community is surrounded by a kitchen garden. As far as I could tell, none, or very few of the Classic cycle communities in the Ixtapalapa Peninsula Region, have complex, elaborate architecture. Ix-EC-37, the only site in the survey region which I classified as a Secondary Regional Center, does not appear to have been qualitatively different from the other Classic communities in terms of population density or architectural complexity; rather, it is only larger.

The very rural settlement pattern of the Ixtapalapa Peninsula Region for this time period is similar to the pattern in the Texcoco Region. Population densities in both regions declined from the levels of the preceding cycle (Fig. 61, 76). This rural-appearing settlement pattern and low population density also characterizes the Classic period in Tlaxcala (Snow, 1969), and in the Puebla Valley (Tschohl, 1966).

The settlement pattern and demographic characteristics of the rural hinterland of Teotihuacan, in so far as these are known, from portions of the Basin of Mexico, Tlaxcala, and the Puebla Valley, which have been mapped, contrast sharply with the settlement pattern and demography in the Teotihuacan Valley. Here there was marked urbanism and population growth (Fig. 77), attributable mainly to the increase in size of Teotihuacan (Millon, 1967b). Even rural communities in the Teotihuacan Valley, as exemplified by T-C-8, were nucleated settlements with architecture in the style of the urban center (Sanders, 1965: 110-14; 1966). These rural Teotihuacan Valley communities, as Sanders suggests, (ibid.) were closely tied into the economic system of Teotihuacan, and apparently specialized in the production of products for exchange in the Teotihuacan market system. In contrast to this situation, the population of the Texcoco Region, and the Ixtapalapa Region, and probably most of the population of the Basin of Mexico, most likely did not participate actively in this market system. Provincial centers, such as the Portezuelo site (Ix-EC-32) and Cerro de la Estrella (Ix-EC-37), were very small, in comparison to Teotihuacan, and therefore probably were not as important as market centers. The only large market, administrative, and religious center during the Classic cycle was Teotihuacan, and this center was too distant from most of the population to allow intensive Basin-wide exchange. I will later consider the significance of this fact in the final section.

The population decline which characterized the Classic cycle in the Ixtapalapa Peninsula Region and in the Texcoco Region is peculiar for two reasons:

a) As the population of the Basin of Mexico became increasingly dominated by Teotihuacan, the competing autonomous groups which were present during the Late and Terminal Formative cycle were subdued. Warfare and competition, at least within the Basin of Mexico itself, therefore, should have been less prevalent. It seems that the result of the cessation of military confrontation of local groups would have been an increase, rather than a decrease, in population density.

b) The dispersed settlement pattern of the Classic cycle, where each community was presumably directly adjacent to the agricultural land it was exploiting, should have been a more efficient adaptation than that of the previous cycle, which was characterized by population nucleation, and toward the end of the cycle, the location of some settlements on hill-tops for defensive reasons. During the Classic cycle the cultivators would have been close to the fields they were cultivating, which would have allowed more efficient maintenance of terraces, floodwater irrigation

systems, and the like, and the guarding of fields would have been facilitated. Again, the expected result of the Classic pattern is population growth, rather than the observed decline. In the final section of this chapter, I will offer a provisional explanation for this Classic cycle decline in population.

4) Early Toltec Cycle (Fig. 47): Because of the apparent problems with the Late Classic ceramic sequence, in areas of the Basin of Mexico outside the Teotihuacan Valley, it is not possible to determine at this time whether the Early Toltec cycle began during the Late Classic period, or if it should be restricted to the Early Toltec period, i.e., during the time Coyotlatelco pottery was used. This cycle was characterized by the emergence of widely distributed local urban centers, such as the Portezuelo site (Tx-ET-18), the Cerro de la Estrella site (Ix-ET-13), and Azcapotzalco and, outside the Basin of Mexico, the emergence of new major regional centers such as Xochicalco, Tula, and Cholula. All of these new centers apparently replaced Teotihuacan as the focus of political and economic activity in the Central Highlands. I have earlier suggested the Early Toltec period was a period of political fragmentation, as a series of competing, autonomous units developed, which were probably like "city-states", each represented as a cluster of sites dominated by one or several large centers, surrounded by a zone of abandoned, contested land. For the most part, the centers which dominated each of these units had been small provincial centers during the Classic cycle, except for Teotihuacan, which was considerably reduced in size and influence during the Early Toltec cycle. Perhaps the most interesting aspect of the Early Toltec cycle is the population increase which occurred in the Ixtapalapa Peninsula Region (Fig. 6), as well as in the Texcoco Region (Fig. 76). This population increase is difficult to explain because:

a) Large areas of the Basin of Mexico were apparently abandoned. Even if these abandoned areas were used for cultivation, there would have been the problem of time spent getting to and from fields which were far from where the cultivators were residing.

b) If, as I have suggested, this was a period of competition and warfare between local, autonomous territorial groups, one might expect a concomitant population decrease rather than the observed population increase. Only in the Teotihuacan Valley was the predictable population decline a reality (Fig. 77).

Parsons (ibid.: 342-343) suggests the population increase during the Early Toltec period in the Texcoco Region resulted from the sloughing-off of population from Teotihuacan following its decline as a major center. Can this explanation be applied to the Ixtapalapa Peninsula Region as well? The Early Toltec population increase, in the Texcoco Region, and the Ixtapalapa Peninsula Region, amounts to an estimated 15,000 - 30,000, which is nearly one-fourth to one-half the total Metepec phase population of Teotihuacan (Millon, 1967b). We may conclude that this factor might be responsible for the observed population increase in these two survey regions, but if the Early Toltec population increase in the Basin of Mexico as a whole was as great as it was in the Ixtapalapa Peninsula Region and in the Texcoco Region, then there would not have been sufficient population at Teotihuacan to account for the observed growth. The large Early Toltec size of such sites as Xico (Parsons, personal communication) and Cerro Tenayo (Rattray, 1966) suggests the Early Toltec population was generally dense over the entire Basin of Mexico, but proof of this will depend upon more settlement pattern surveys. In the final section of this Chapter, I will offer an alternative explanation for the population increases observed in the Early Toltec cycle.

5) Late Toltec Cycle (Fig. 48): In the Ixtapalapa Peninsula Region and the Texcoco Region (Parsons, *ibid.*: 299; 344-51), (Fig. 38), the Late Toltec cycle was characterized by rural-appearing, dispersed settlement pattern, decline of the local Early Toltec centers, and a population decline (Figs. 61, 76), much like the Classic cycle. The clusters of sites which were probably autonomous socio-political units during the Early Toltec cycle disappeared, and the population resided in dispersed communities, all hamlets and villages, evenly scattered over the landscape. The Teotihuacan Valley was also characterized by low population density (Fig. 77), and a rural-appearing settlement pattern (Sanders, 1965: 127-31; 179-87; Fig. 10). It is possible that the same factors which caused the ruralization of population and the population decrease in the eastern Basin of Mexico during the Late Toltec cycle caused these patterns in the Texcoco Region and the Ixtapalapa Peninsula Region during the Classic cycle also. I will return to consider this possibility in the concluding section.

An aspect of the Late Toltec cycle in the Basin of Mexico which deserves close attention in future archaeological work is the possibility, as I pointed out above, that there were two coexisting cultural traditions, the urban "Toltec", represented by Aztec I sites such as Culhuacan and Chalco, and the "Chichimec", represented by Mazapan sites.

6) Aztec Cycle (Fig. 50): During this time there was a return to a condition of political fragmentation, as a series of local political entities like "city-states" emerged, probably to replace the power vacuum left by the decline of Tula. In part, there was a return to the pattern which we have observed during the Late and Terminal Formative cycle and the Early Toltec cycle - i.e., a pattern of spatially distinct clusters of sites, each dominated by one or a few urban centers, surrounded by open land which was apparently contested. Ethnohistoric accounts document the competition and warfare between these independent units during the Aztec cycle (cf. Dibble, 1951; Ixtlilxochitl, 1952). Evidence of the presence of shatter-zones surrounding these "city-state" units is present in the Ixtapalapa Peninsula Region, including the area along the border of the Chalca and Acolhua domains, and the open area between the domains of the Cuitlahuaca and the Colhua (Fig. 62). The Aztec population of the Basin of Mexico was divided into 50 to 60 of these "city-state" units, each with a population of at least 12,000 - 15,000 (Sanders and Price, 1968: 151-2). Toward the end of this cycle, the population was integrated into a large, unified socio-political unit, centered at Tenochtitlan. Information supplied by the Conquistadors, and the early colonial descriptions indicate, as I outlined above, that the entire Basin was also integrated into a large economic system, centered on the markets at Tenochtitlan-Tlatelolco, but including a large number of other major and minor markets.

A striking feature of the Aztec cycle is that, like the previous cycles characterized by the presence of a series of local, autonomous units, (visible as spatially distinct clusters of settlements), population was very high. This was true not only in the Ixtapalapa Peninsula Region (Fig. 61), the Texcoco Region (Fig. 76), and the Teotihuacan Valley Region (Fig. 77), but apparently throughout the Basin of Mexico.

Irrigation, Symbiosis and the Origin of the State in the Basin of Mexico:
This section will consist of an application of the settlement pattern data collected in the Ixtapalapa Peninsula Region in particular, and the eastern Basin of Mexico as a whole, to test some of the hypotheses which have been presented to explain the evolution of states (or civilization) in the area.

It is difficult to define states archaeologically. The characteristics of states most commonly mentioned by anthropologists (cf. Service, 1962; Fried, 1967; Adams, 1966), elaborate social stratification, monopolization of power by an elite, marked occupational specialization and exchange, and centralization of power, may

not be readily detectable archaeologically. In particular, it is difficult to distinguish simple states from complex chiefdoms, which may have, in attenuated form, some of the attributes of states. In the absence of any quantified means of defining states archaeologically, I will follow the suggestion of Sanders and Price (1968: 139-41) that the best indicator of the presence of state organization is the presence of large-scale monumental architecture. Using this criterion, Sanders and Price suggest the Classic and Post-classic in Mesoamerica were qualitatively distinct from the Formative generally. This means, they suggest, that state organization characterized the Classic and Post-classic but not the Formative. They further suggest that developments at Teotihuacan indicate that the state level of organization had been achieved there by the Early Classic Miccaotli phase (Sanders and Price, *ibid.*).

Wittfogel (1957) pointed out the importance that the control of large-scale irrigation systems could have as a factor causing the centralization of power, characteristic of states. Several authors have used this same concept to help explain the origin and development of states in the dry central Highlands of Mexico (cf. Armillas, 1947; Millon, 1954; Palerm, 1961; Wolf and Palerm, 1955; Wolf, 1959; Sanders, 1956, 1962, 1965: 5-7; 194-200; 203-4, 1968; Sanders and Price, 1968; Parsons, 1968, MS: 319). There are at least two problems with the application of this concept to the origin of the state at Teotihuacan:

- 1) There is no direct archaeological evidence, to date, of an irrigation system in the Teotihuacan Valley during the Terminal Formative period. Most authors agree, however, that the location of Teotihuacan at the head of the main Valley springs, in a position to exploit and control the agriculture potential of the Lower Valley alluvial plain, suggests such a system did exist. The major supporting evidence is from palynology. Cores from the spring area by Kovar (1971) show a sudden decrease in swamp vegetation that probably is the product of artificial drainage.

- 2) A more general problem, not restricted to an explanation of the origin of the state in the Basin of Mexico, is that even if it were possible to demonstrate there was a large-scale irrigation system in the Teotihuacan Valley during the Terminal Formative, as Sanders puts it "...there still remains the difficult problem of evaluating in an archaeological setting the cause-effect relationship between hydraulic agriculture and civilization" (1965: 197).

Sanders (1956, 1962, 1965: 5-7; 200; 1967, 1968) and Sanders and Price (1968) have suggested another variable which they feel might have had a causal role in the origin of the state in the Basin of Mexico in particular and in Mesoamerica as a whole-symbiosis. Sanders defines symbiosis as "...the economic interdependence of social and physical population units in a given region" (1965: 200). The localization of resources, he suggests, on a small scale such as, for example, in the Basin of Mexico, or on a large-scale, in major environmental zones in Mesoamerica as a whole, encouraged exchange and occupational specialization, a characteristic of civilizations. As with attempting to use large-scale irrigation as a causal variable to understand the origin of the state, however, (to use Sanders' phraseology), there still remains the difficult problem of evaluating in an archaeological setting the cause-effect relationship between symbiosis and civilization. Could exchange and occupational specialization cause the centralization of power characteristic of states? At this time I cannot evaluate this possibility in any depth. Two aspects of the settlement pattern configuration of the eastern Basin of Mexico, however, during the Terminal Formative period, may indicate something regarding the importance of symbiosis in the origin of the state at Teotihuacan:

1) As I pointed out above, Tlapacoya Island was the location of an important settlement during the Early Formative period, possibly because it was in a position to control the movement of long-distance trade goods in and out of the southeastern Basin of Mexico (Grove, 1968a, 1968b). Tlapacoya Island retained its position as the locus of an important community during the Late and Terminal Formative periods, I would suggest, for the same reason, i.e., control of a major trade route. The abrupt abandonment of this site at the end of the Terminal Formative period was probably the result of the integration of the community into the Teotihuacan state. Apparently, the control of a key long-distance trade route during the Terminal Formative did not cause, at Tlapacoya, the organizational breakthrough which occurred at Teotihuacan, and therefore Tlapacoya was subdued by the rapidly-evolving new state. Teotihuacan was also located in a position to control a major trade route - that between the Basin of Mexico and northern Veracruz, but had in addition, the potential to construct and control a major irrigation system, a potential which Tlapacoya lacked.

2) Similarly, it may be possible to evaluate the importance of local symbiosis as a causal variable in the origin of the state at Teotihuacan. It is necessary to distinguish local symbiosis, which involves occupational specialization and exchange in a small region such as the Basin of Mexico or one of its subdivisions, from large-scale symbiosis, which involves long-distance trade over larger regions, for example exchange of products between tropical and highland Mesoamerica. Large-scale symbiosis involves mostly the exchange of high status, valuable items, which are relatively easily transportable over long distances. Local symbiosis, on the other hand, involves the exchange of bulky, perishable foodstuffs, for example maize or pulque, and bulky items such as charcoal, construction wood, construction stone, etc. I earlier outlined briefly the basic concepts of Central Place Theory, as developed by Christaller (1966). This theory predicts, that, in a region, characterized by a marked degree of occupational specialization and exchange, the central places, i.e., the foci of exchange, will emerge in locations where they can best service the largest number of people in a region, i.e., where the largest number of people in a region will have access to the center.

If local symbiosis were the key variable in the origin of the state in the Basin of Mexico, one could predict that the focus, or the center of that state, would be located in a position where it could have served as a focus of exchange for a large region, probably the entire Basin. Teotihuacan is centrally located with respect to the Teotihuacan Valley, and it could have served as an exchange center for the population of that region. This small valley, however, is surrounded by hills on three sides and is therefore relatively isolated and difficult of access for populations in other parts of the Basin of Mexico and adjacent regions. I would suggest that if local symbiosis in the Basin of Mexico had been intense during the Terminal Formative period, the center which would have emerged to act as the main point of exchange would have been located near the center. This would have meant that the center could have effectively controlled local symbiosis for a much larger region than that which Teotihuacan was in a position to do, and a central location would have given access to the lake system, the most efficient and rapid means of transportation during the Prehispanic period. The rise to power of a much later center in the Basin of Mexico Tenochtitlan-Tlatelolco, although obviously not an example of pristine origin of the state, was probably related in part to just these factors - i.e., central location with respect to a large region, and access to the lake system transportation route. From this we may infer that Teotihuacan did not emerge as the dominant center in the Basin of Mexico because it was optimally located to serve as the center of a Basin-wide exchange system. The location of the main center in a position to control the construction and maintenance of a large-scale irrigation system seems to have outweighed any other factor which might have

determined location of the city, and this suggests that large-scale irrigation was the key variable which caused the origin of the state at Teotihuacan. An important ramification of the location of Teotihuacan, optimally located in terms of its ability to control a large-scale irrigation system, but poorly located to serve as the center of a Basin-wide exchange system, is that the growth of such an exchange system, (except in the Teotihuacan Valley itself), would have been severely inhibited because the bulk of the population of the Basin of Mexico would not have had access to the major center, and local centers were small and unimportant. Perhaps the process of nucleation, carried out to such extremes at Teotihuacan, was partly a response to resolve this problem.

Local Symbiosis and the Cycles Observed in the Eastern Valley of Mexico:

The population fluctuations which characterized the eastern Basin of Mexico from the Classic cycle through the Aztec cycle may have been due to changes in the intensity and importance of local symbiosis.

During the Classic Cycle, in the eastern Basin of Mexico, and apparently in the Basin generally, there was a very lopsided hierarchy of communities. There was one outstandingly large center, Teotihuacan, that was probably the focus of administrative and religious activities and exchange for the entire region and perhaps adjacent regions in the Central Highlands. Below that level of size and degree of urbanism, however, there were no centers in the Basin of Mexico which even approached Teotihuacan. The next-largest centers, as far as we know, such as the Portezuelo site (Tx-EC-32) and Cerro de la Estrella (Ix-EC-37), had perhaps no more than 1000 inhabitants, and were not densely occupied or architecturally complex. The size of Classic Azcapotzalco is unknown, but there has never been any mention of structures there even approaching the scale of Teotihuacan. The remaining communities in the Ixtapalapa Peninsula Region and in the Texcoco Region were small scattered villages and hamlets. This very rural pattern probably characterized the Classic cycle in the entire Basin of Mexico, outside the Teotihuacan Valley and adjacent regions. This pattern contrasts sharply with the Aztec cycle, when there was one center as large as Teotihuacan, Tenochtitlan-Tlatelolco, but which was characterized by a well-developed hierarchy of centers below the main urban center. For example, there were a series of market and administrative centers that served large portions of the Basin of Mexico, such as Xochimilco, Texcoco, and Chalco, with populations well over five thousand. Below this level there were a number of even smaller administrative-market centers, with populations in the thousands, which served local populations, such as Coatepec, Tenayuca, Cuitlahuac, and Mixquic. Probably the bulk of the Aztec population participated in this Basin-wide market system, which crosscut the boundaries of political units.

The Early Toltec cycle in the Basin of Mexico was similar in some respects to the Aztec cycle. The population during the Early Toltec cycle was apparently divided into a series of small autonomous or semiautonomous units, perhaps like "city-states", each of which was dominated by an urban center, which probably served as the focus of local exchange. As during the Aztec cycle, the entire population would have been in a position to articulate intensively in an exchange system, because large urban centers were widespread over the Basin, and therefore easily accessible. In contrast, local symbiosis was probably not intensive during the Classic cycle and the Late Toltec cycle, because the bulk of the population did not have access to urban centers, which would have served as the foci of exchange. It should be possible to demonstrate archaeologically that the intensity of local symbiosis varied cyclically in the Basin of Mexico. For example, during periods of intensive local symbiosis, there should be evidence of marked occupational specialization, not only at the urban centers themselves, but in all types of communities. Settlement pattern data provides little in the way of direct evidence

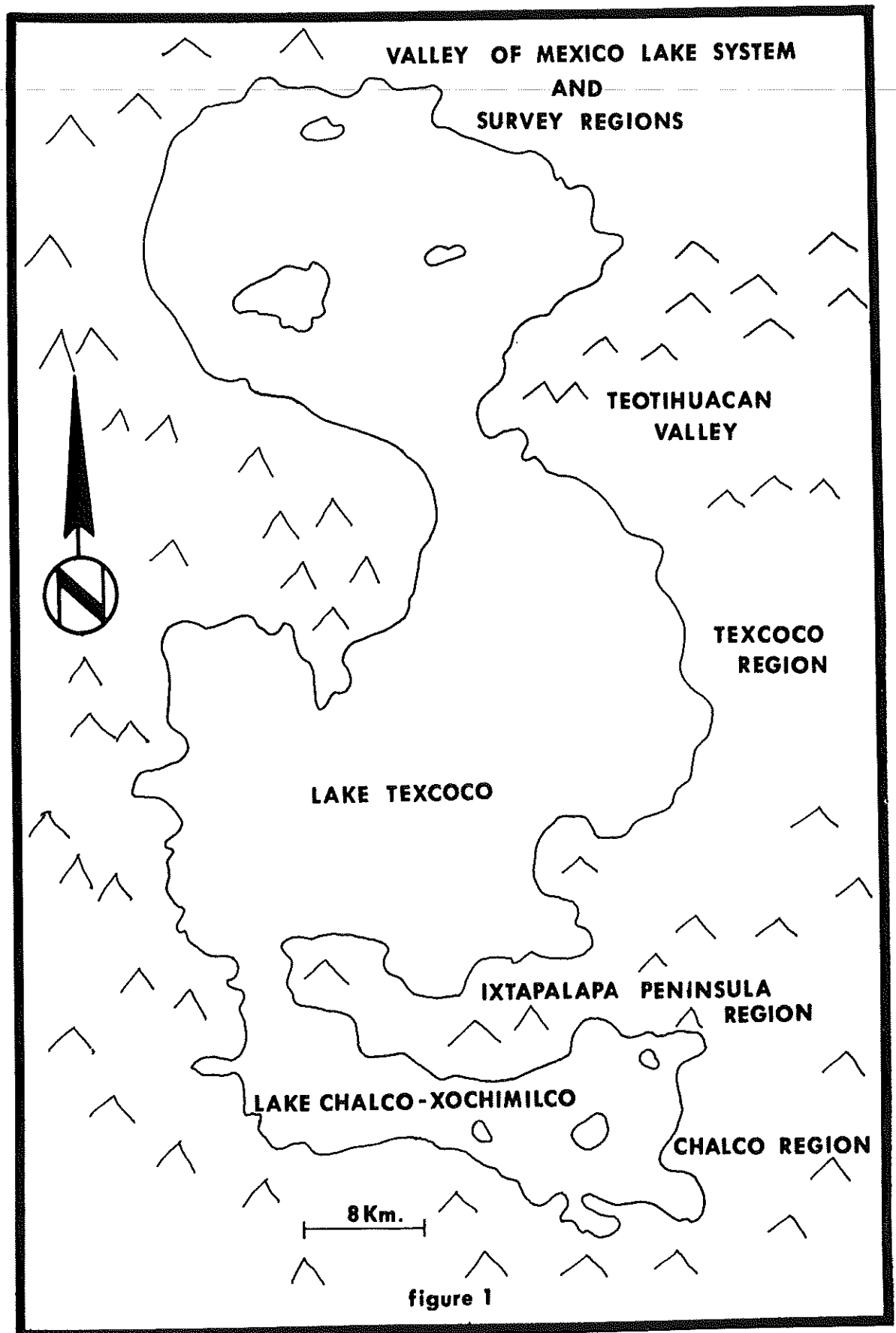
for the intensity or nature of local symbiosis, but it is interesting that the site east of Cerro de la Estrella, on the low, saline peninsula which projected into Lake Texcoco, which was probably a salt-making site, was heavily occupied during the cycles which I have suggested were characterized by intensive local symbiosis, the Early Toltec cycle, and the Aztec cycle. This suggests these were periods when a large number of people were engaged in specialized production of salt. The site was only lightly occupied during the periods I am suggesting were characterized by less intensive local symbiosis, the Classic cycle and the Late Toltec cycle.

If cyclical fluctuation in intensity of local symbiosis existed, it is possible that this is related to the observed population fluctuations which accompany the cycles. I suggest that intensive local symbiosis is adaptive, i.e., local symbiosis is an efficient adaptation to the environmental mosaic of the Basin of Mexico, and therefore allows a higher population in the region than would be possible in the absence of intensive local symbiosis. The population density in the Ixtapalapa Peninsula Region (Fig. 61) and in the Texcoco Region (Fig. 76) was higher during the cycles which I have suggested were characterized by intensive local symbiosis than during the cycles which lacked this feature. Teotihuacan itself was a large center during the Classic cycle, not only because of the presence there of a large-scale irrigation system, but probably because tribute from a large region was directed there, and also because there was intensive exchange in the Teotihuacan Valley. As a whole, however, I would suggest that the Classic cycle was a time of low population density over most of the area under the direct control of Teotihuacan. Was this also the case during the hegemony of Tula in the Central Highlands? The evidence from the eastern Basin of Mexico shows this was a time of very low population densities (Figs. 61, 76, 77), but the Basin of Mexico, during the Late Toltec period, was probably on the fringes of the Tula empire - perhaps the situation was far different closer to the core of that empire.

During the Aztec cycle, the combination of intensive local symbiosis, plus the introduction of a new technique of intensive cultivation (chinampas), allowed the highest population densities of all previous Prehispanic periods.

The Late and Terminal Formative cycle displays some features which are similar to the Early Toltec and Aztec cycles, i.e. high population density accompanied by a period of apparent political fragmentation, with large local centers scattered widely over the Basin of Mexico. Were these centers, such as Tlapacoya and Ix-LF-5, the foci of exchange in a system of intensive local symbiosis, analogous to what I have suggested was the pattern during the Early Toltec Cycle and which was the pattern during the Aztec cycle? Again, this should be amenable to archaeological testing.

One last possible ramification of the hypothetical cycles of intensity of local symbiosis can be seen. Many hypotheses have been presented to explain the decline of Classic Teotihuacan and the cessation of the Classic period. The literature dealing with this subject is vast and for that reason cannot be reviewed here. The factors that I suggested distinguished the Classic cycle and the Early Toltec cycle, however, may throw some light on the nature of the Classic-Postclassic transition in the Central Highlands of Mexico. If it were true that the Classic period in the Central Highlands, in that area controlled by Teotihuacan, had been a time of little intensity of exchange, and concomitant low population density (except in the Teotihuacan Valley itself), it is likely that Teotihuacan would not have been able to compete effectively with emerging centers on the periphery of its influence, such as Tula, Xochicalco, and Cholula, if these centers had been the foci of states characterized by a high degree of intensive local symbiosis, and concomitant higher population densities.



THE VALLEY OF MEXICO, SHOWING PRINCIPAL ARCHAEOLOGICAL SITES

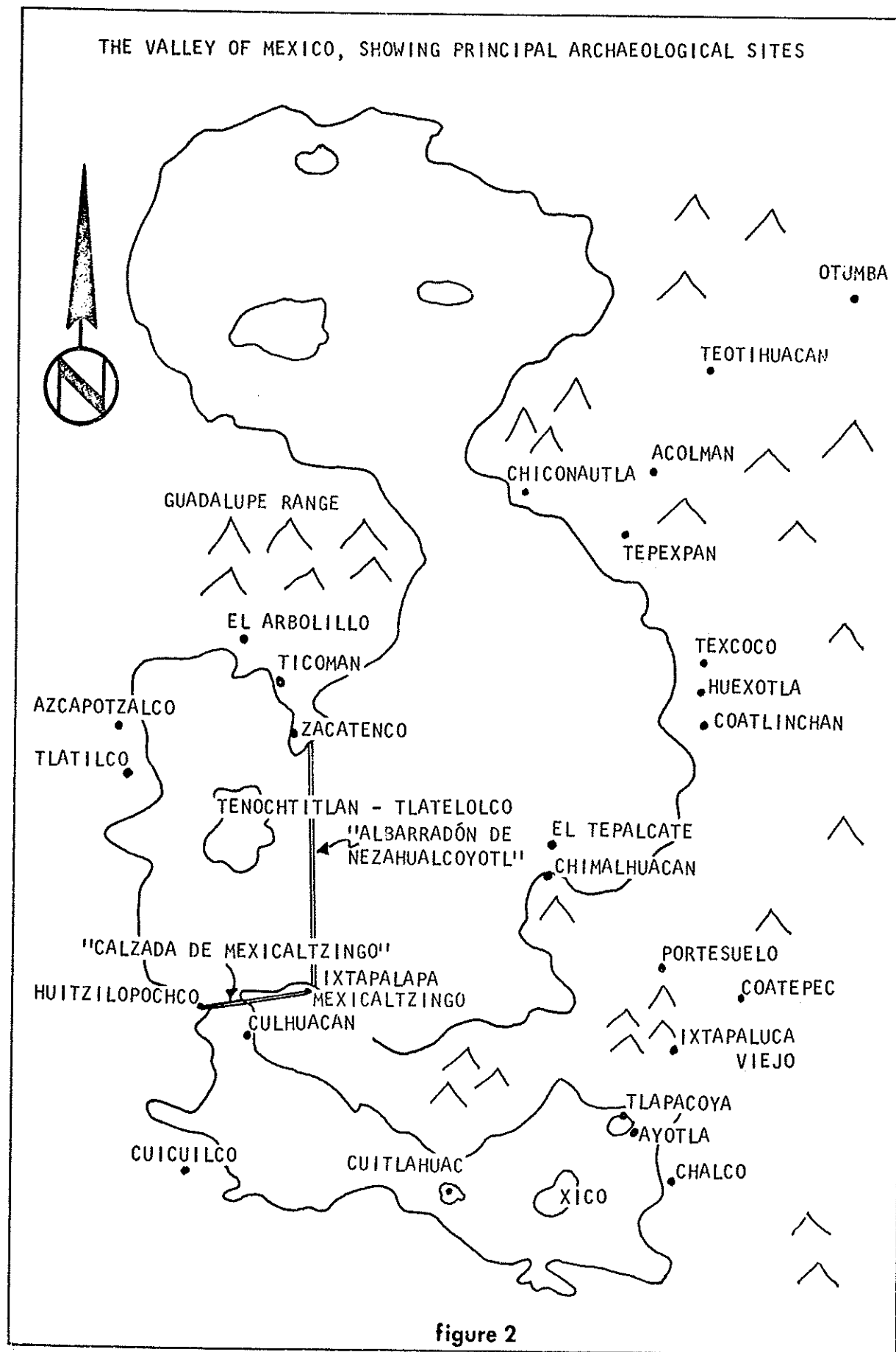


figure 2

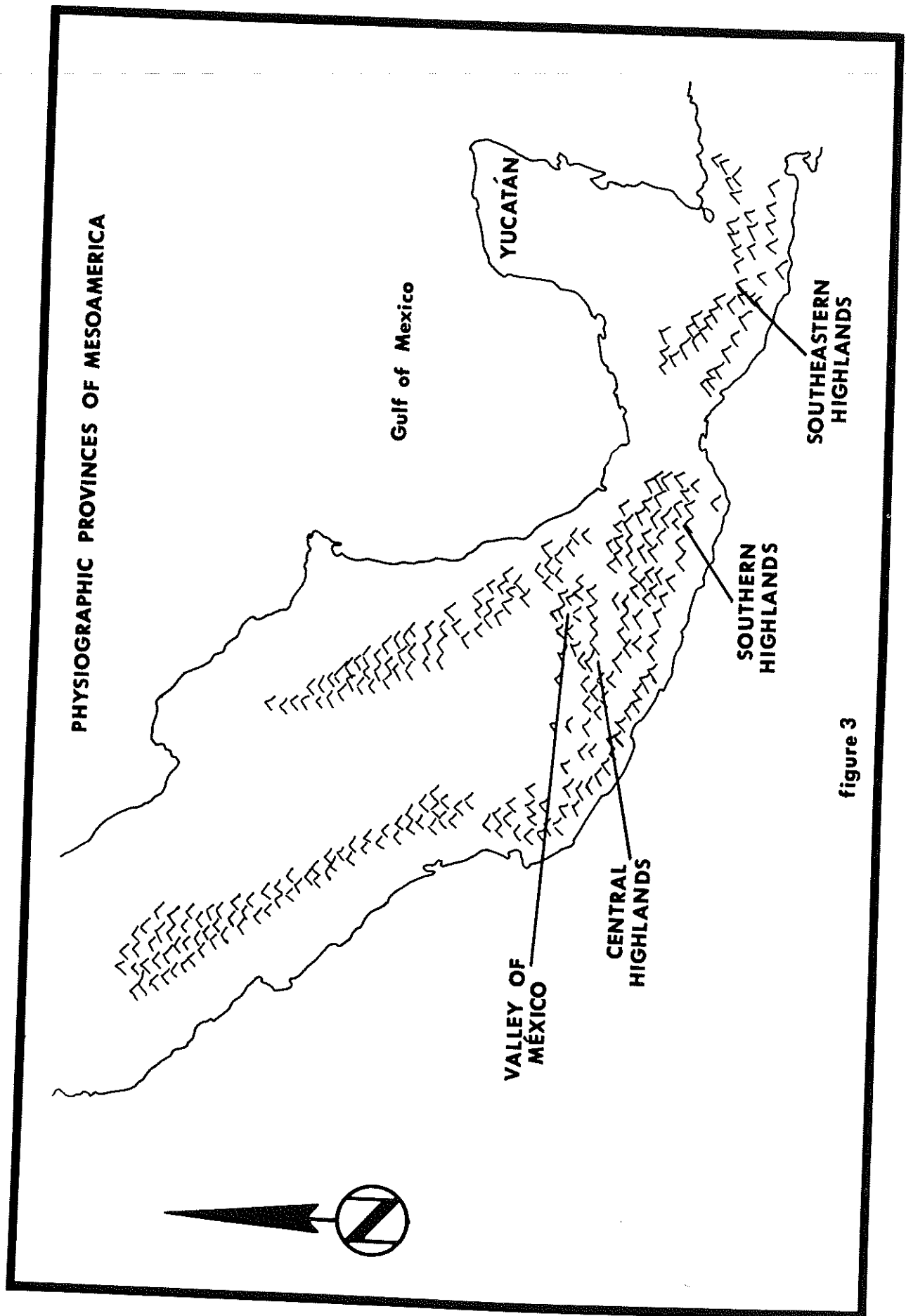
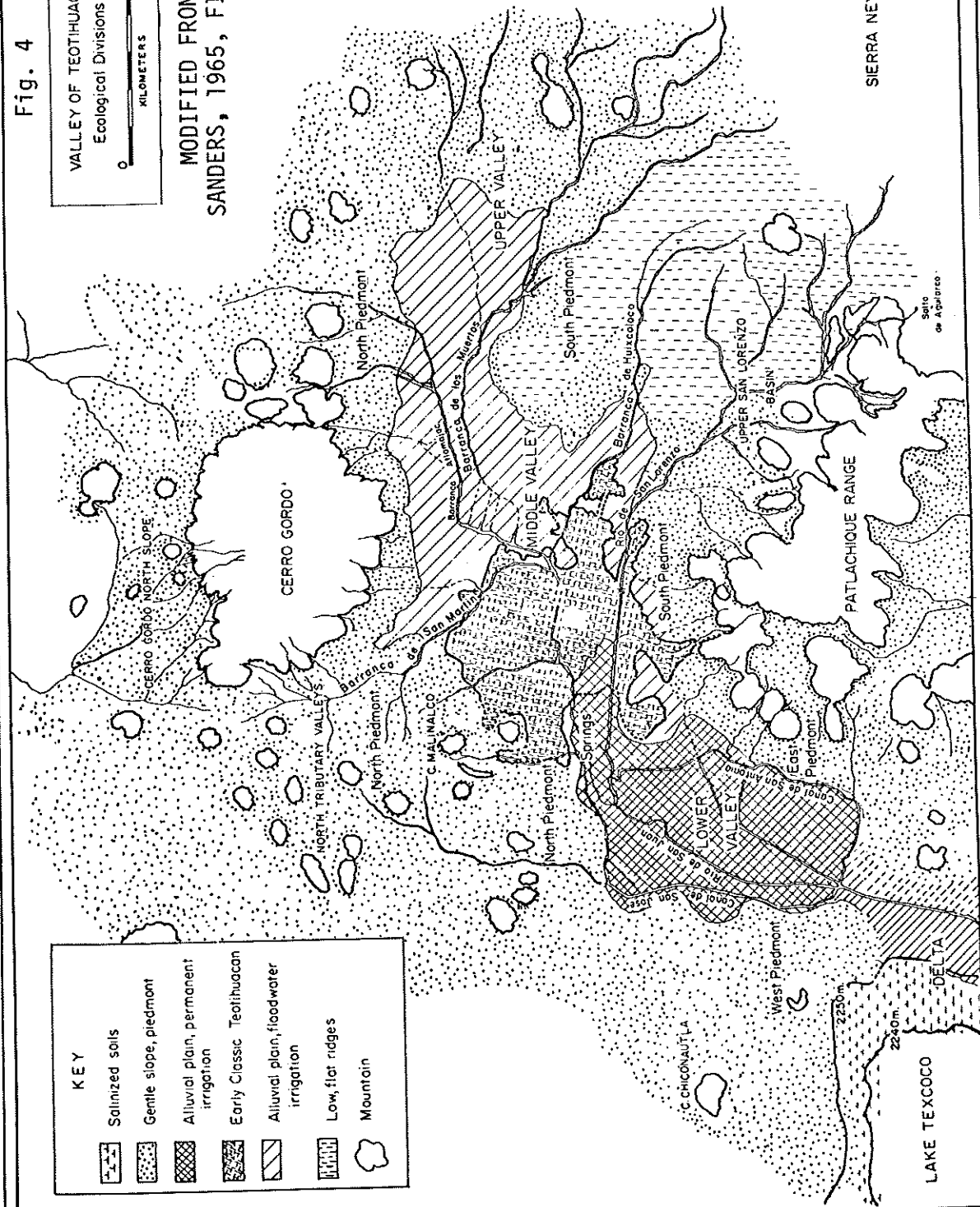


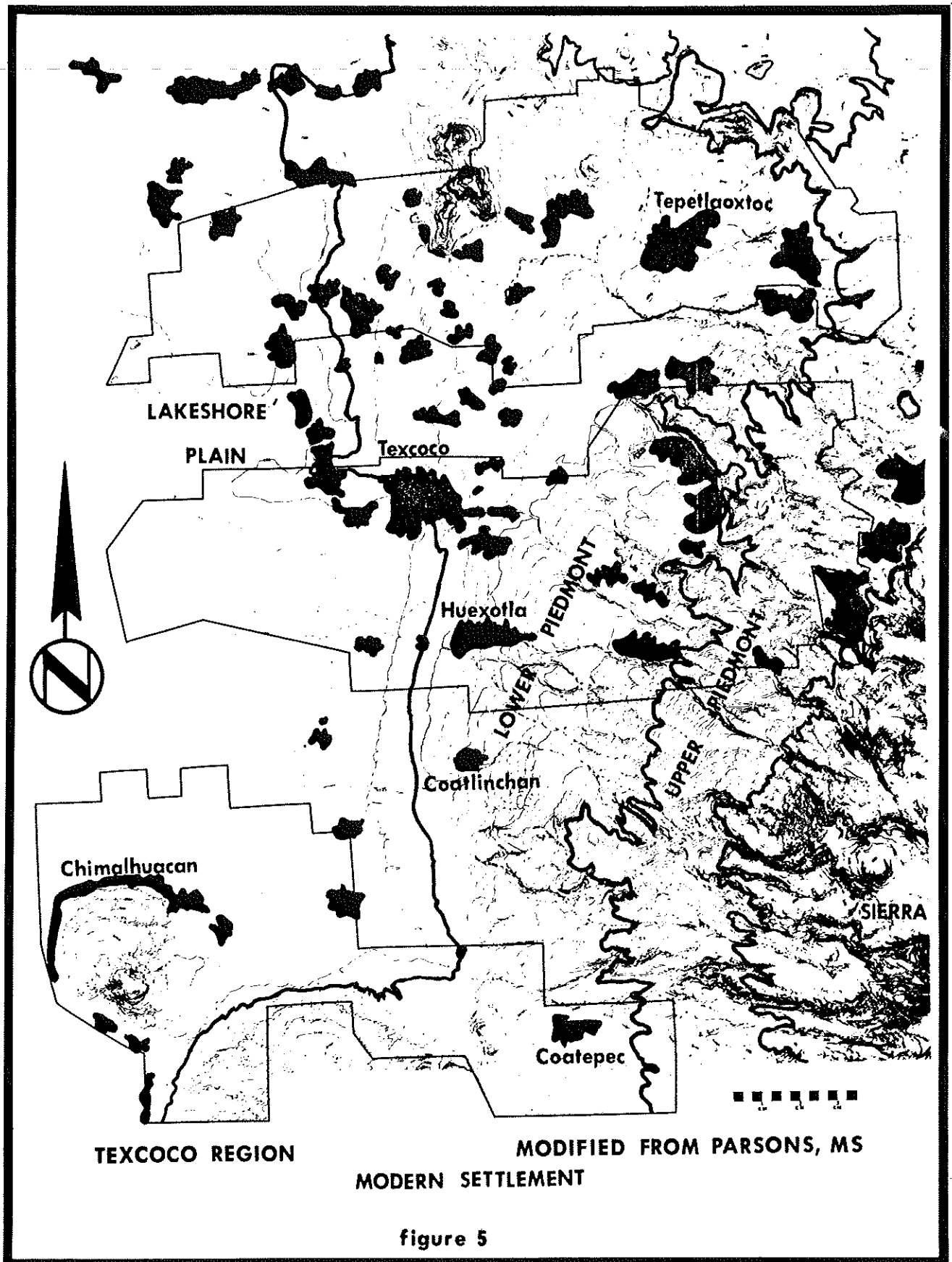
Fig. 4

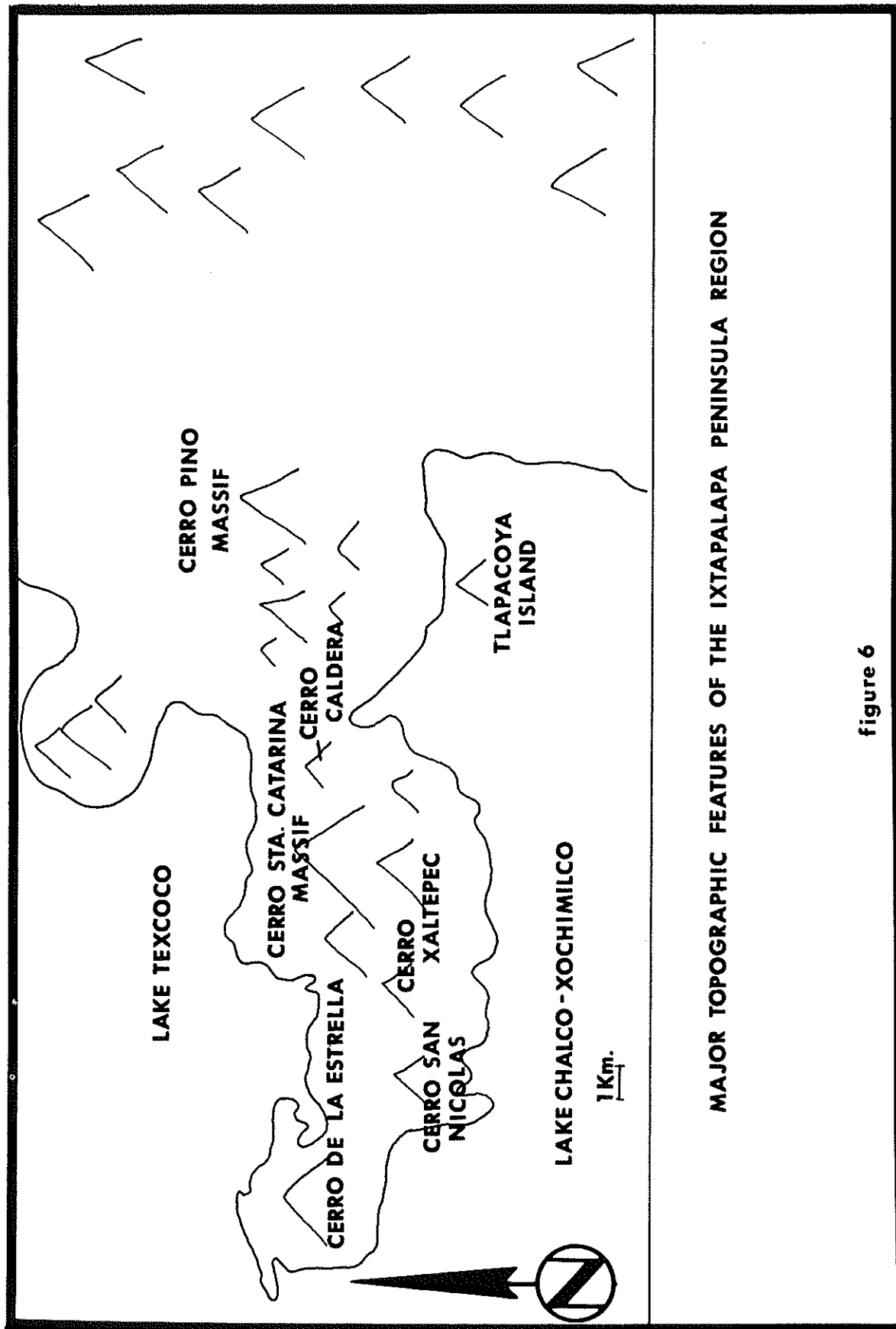
VALLEY OF TEOTIHUACAN
Ecological Divisions



MODIFIED FROM
SANDERS, 1965, FIG. 3







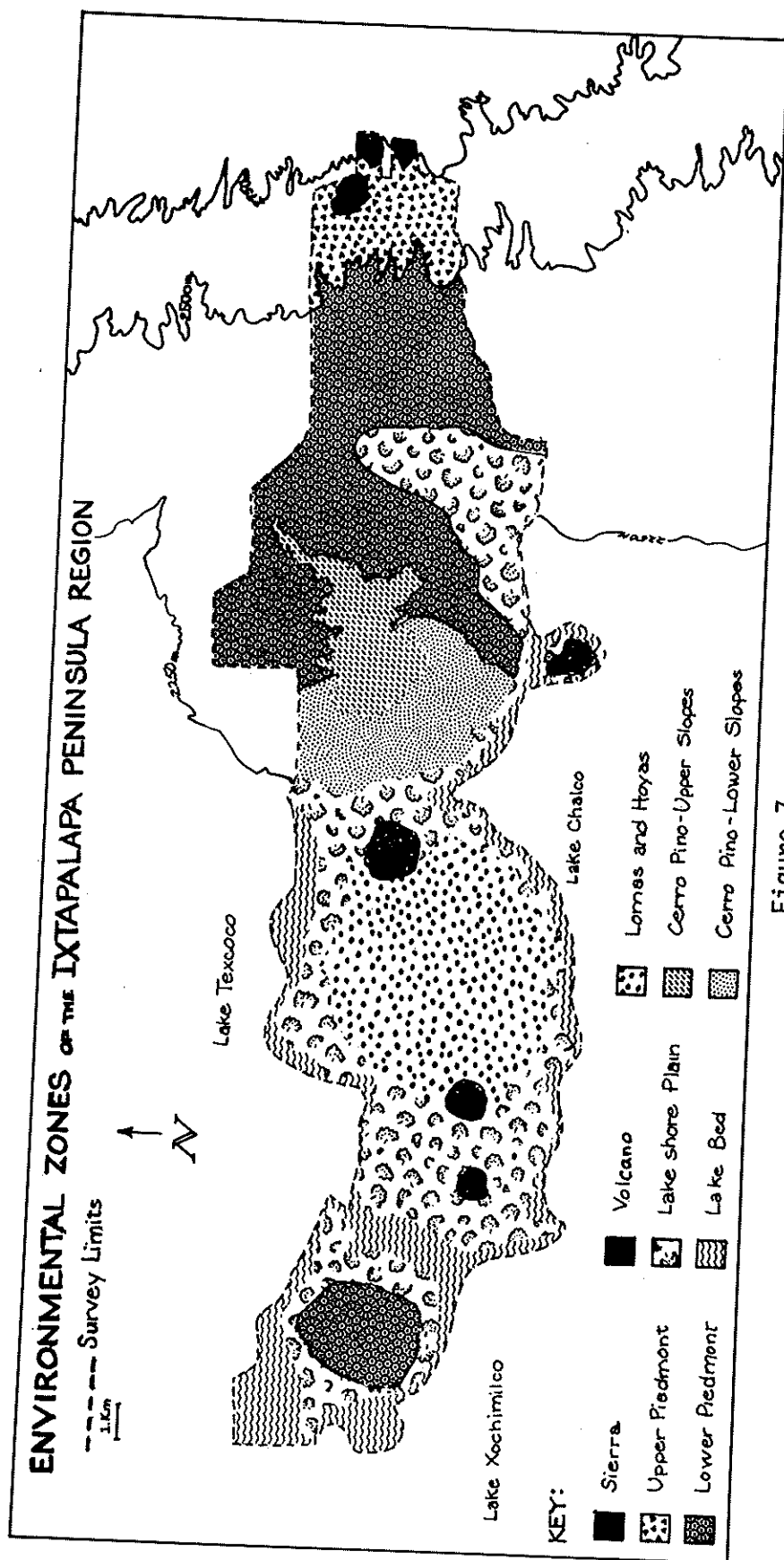


Figure 7

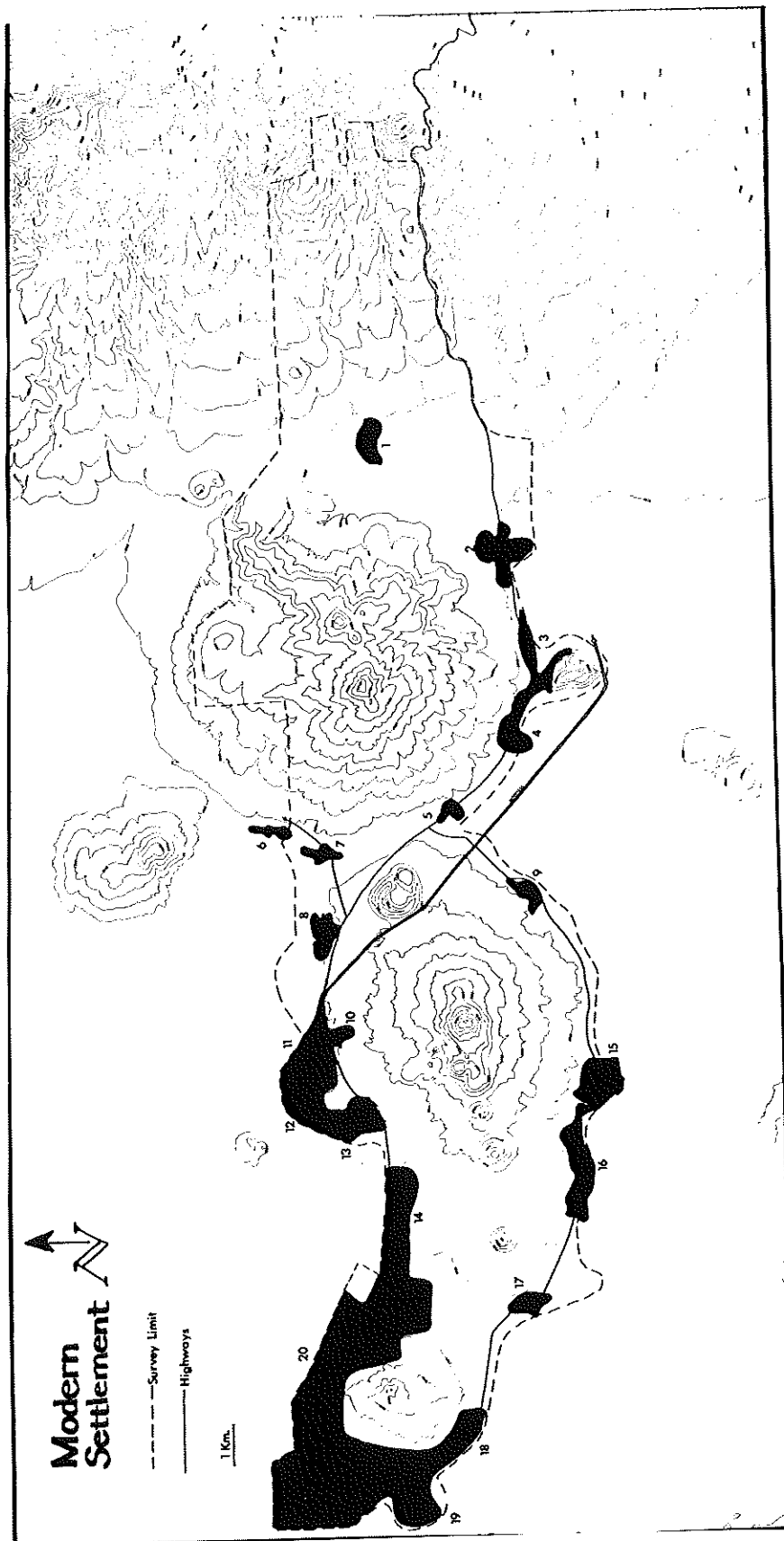


Figure 8

**ARCHAEOLOGICAL SITES
AND
FEATURES
AT TLAPACOYA ISLAND**

* approximate locations of now-dry springs (Peñafiel, 1884: LAM.3a)

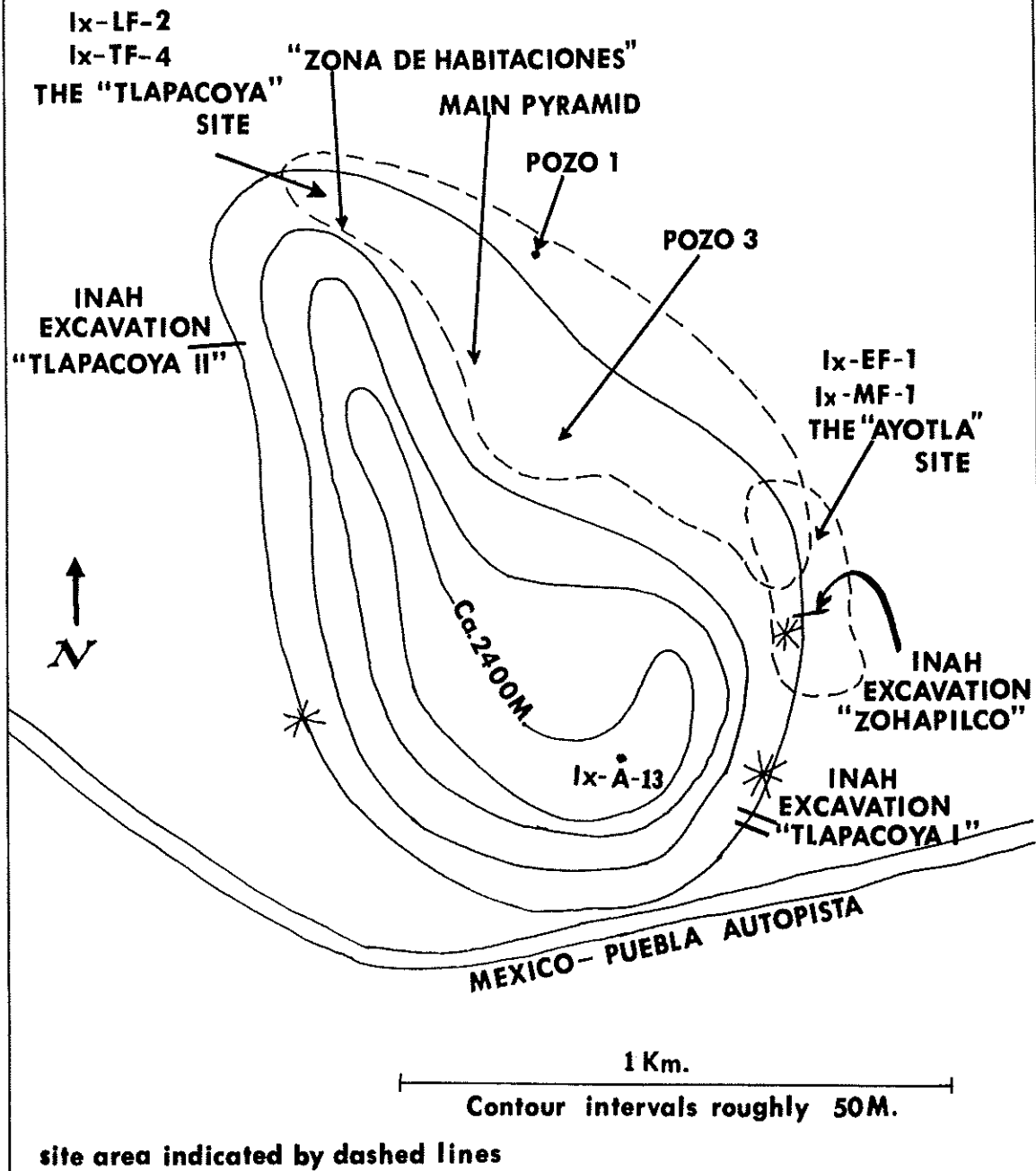
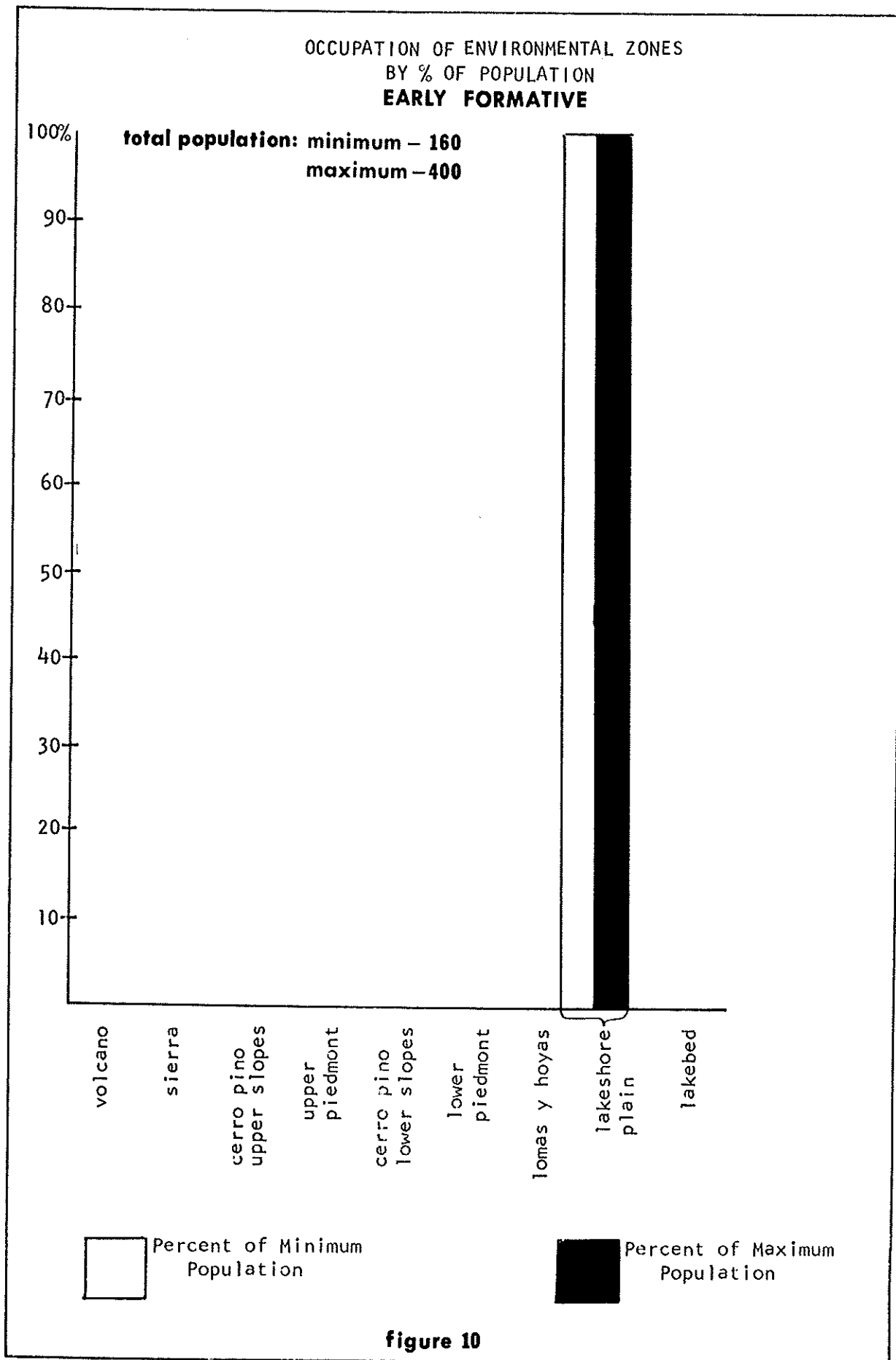
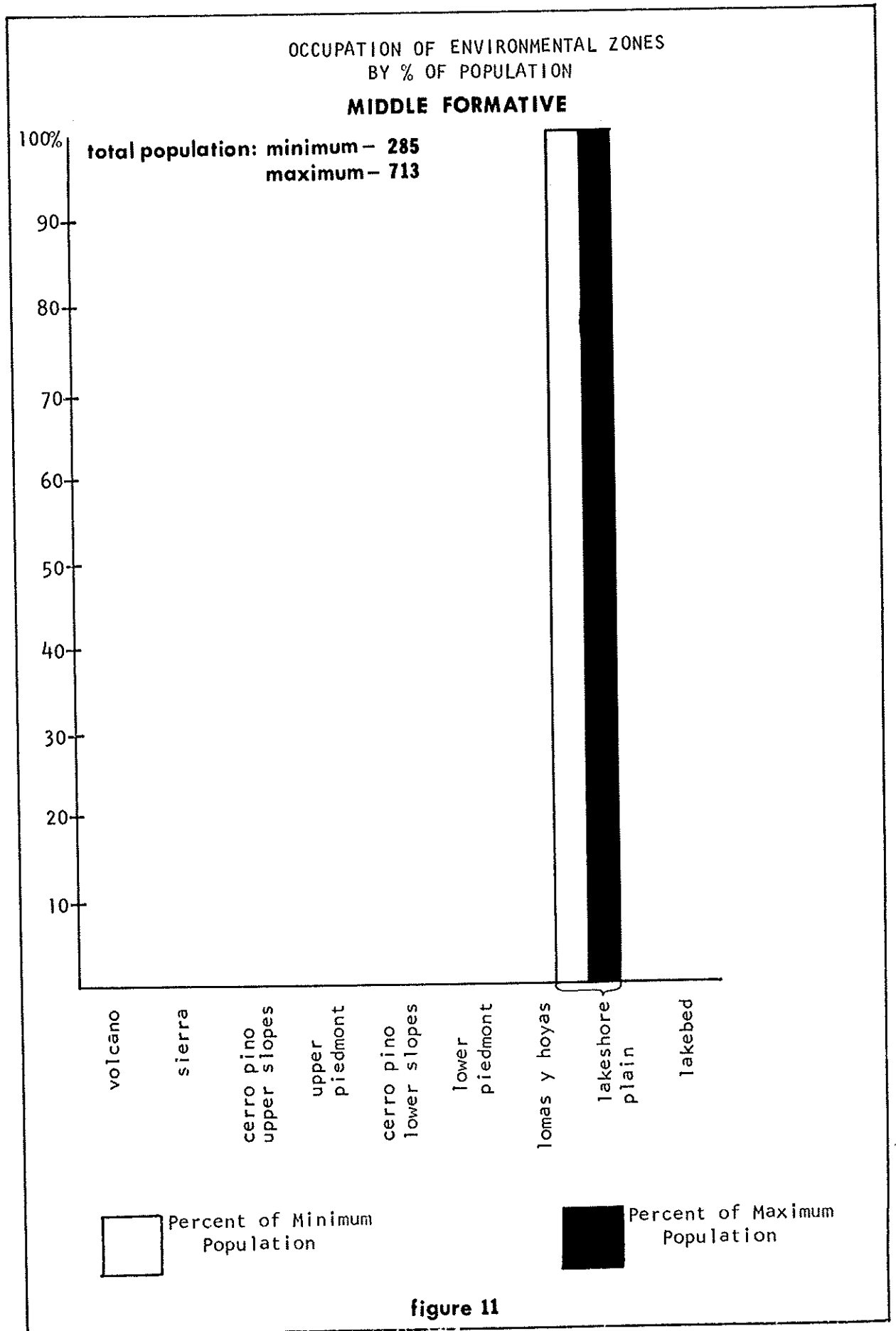


figure 9





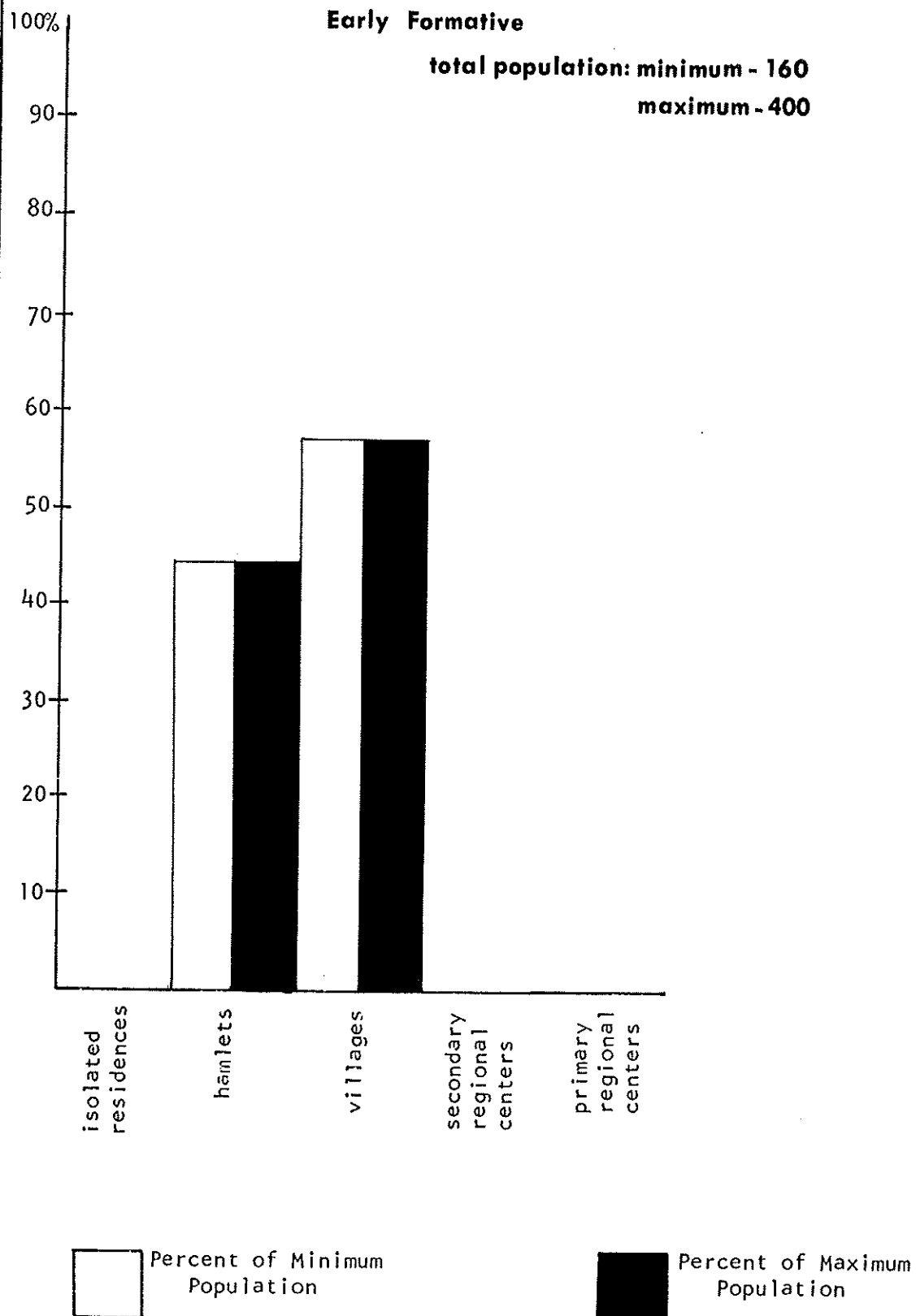
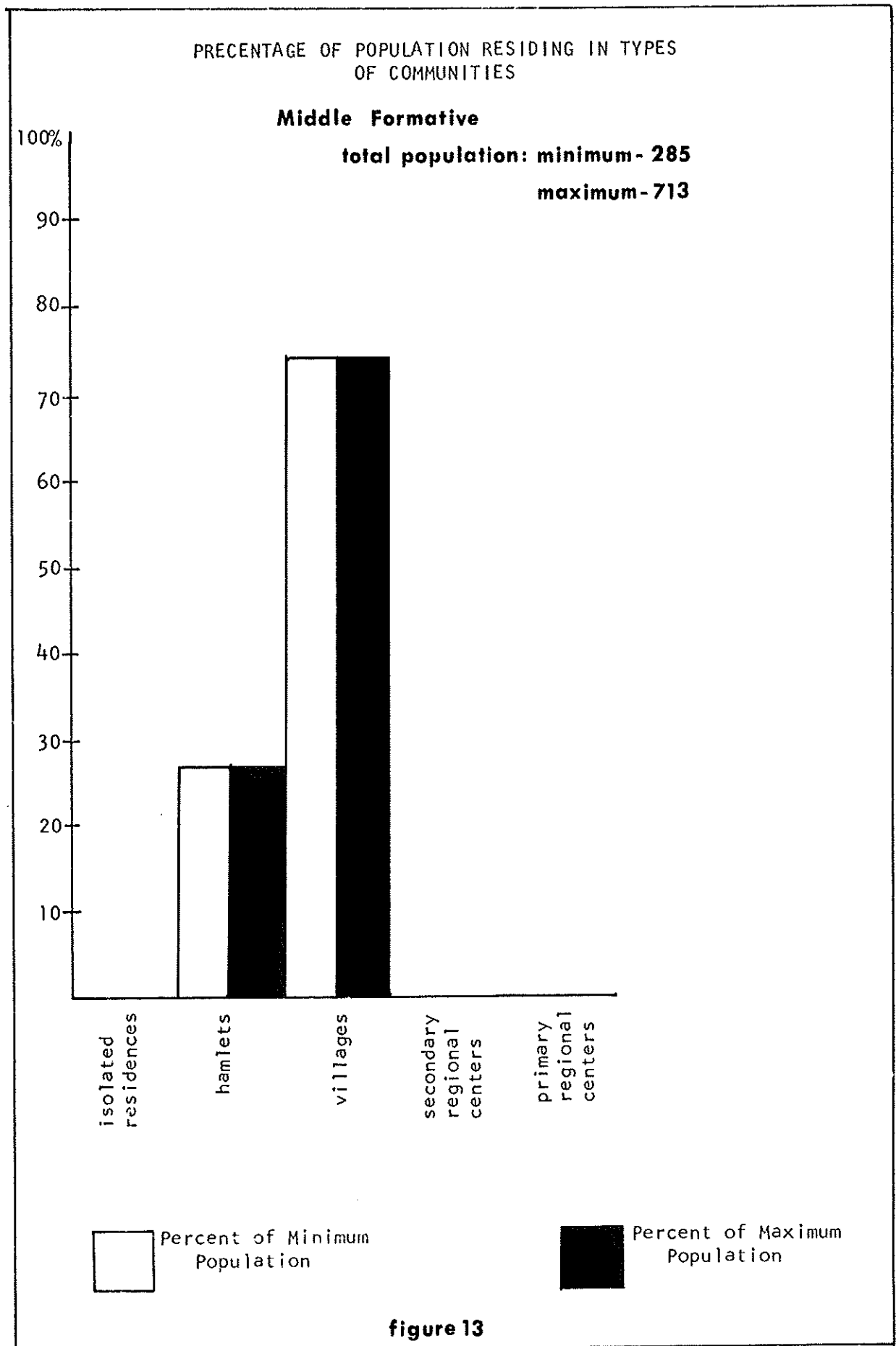
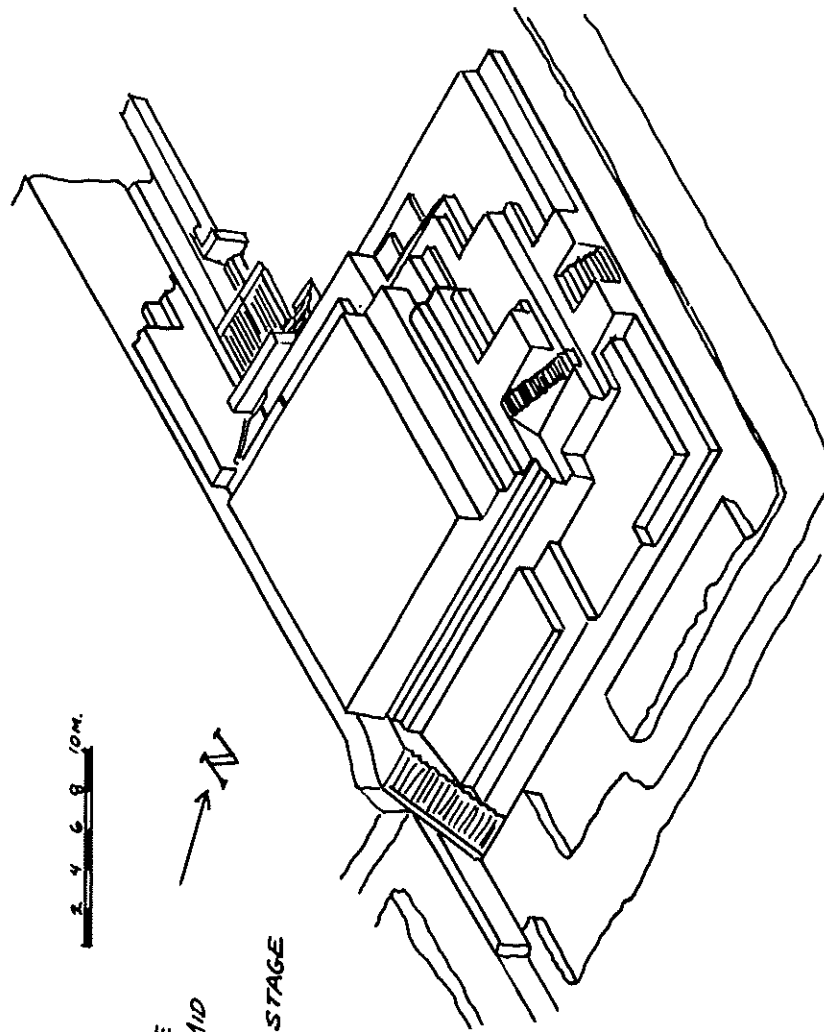
PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

figure 12





2 4 6 8 10m.

OBLIQUE VIEW OF THE
RECONSTRUCTED PYRAMID
AT TLAPACOYA
FINAL CONSTRUCTION STAGE

IX-LF-2
IX-TF-4

MODIFIED FROM
BARBA, 1956
PLANO 7

figure 14

OCCUPATION OF ENVIRONMENTAL ZONES
BY % OF POPULATION

LATE FORMATIVE

total population: minimum— 3,928

maximum— 8,220

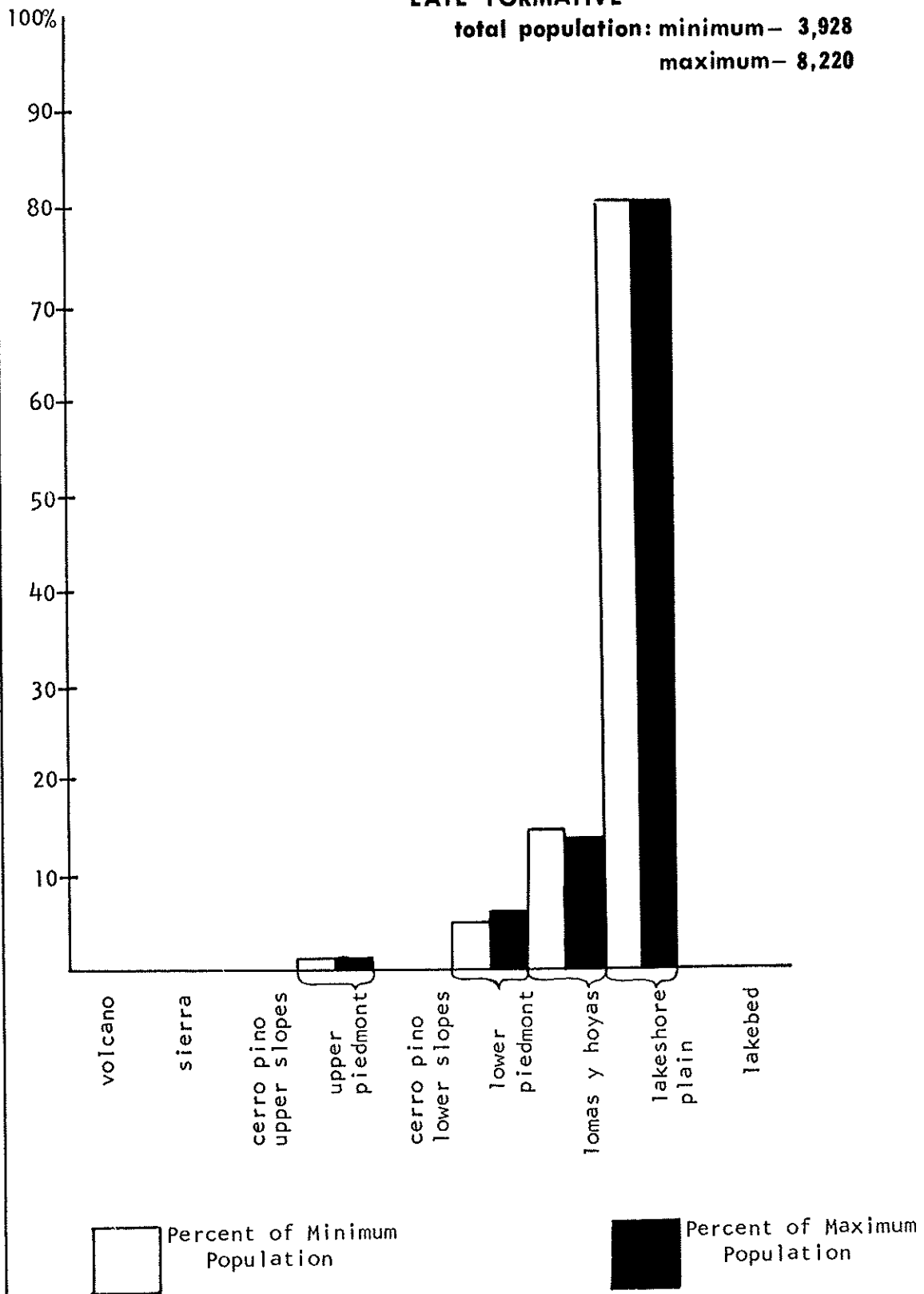


figure 15

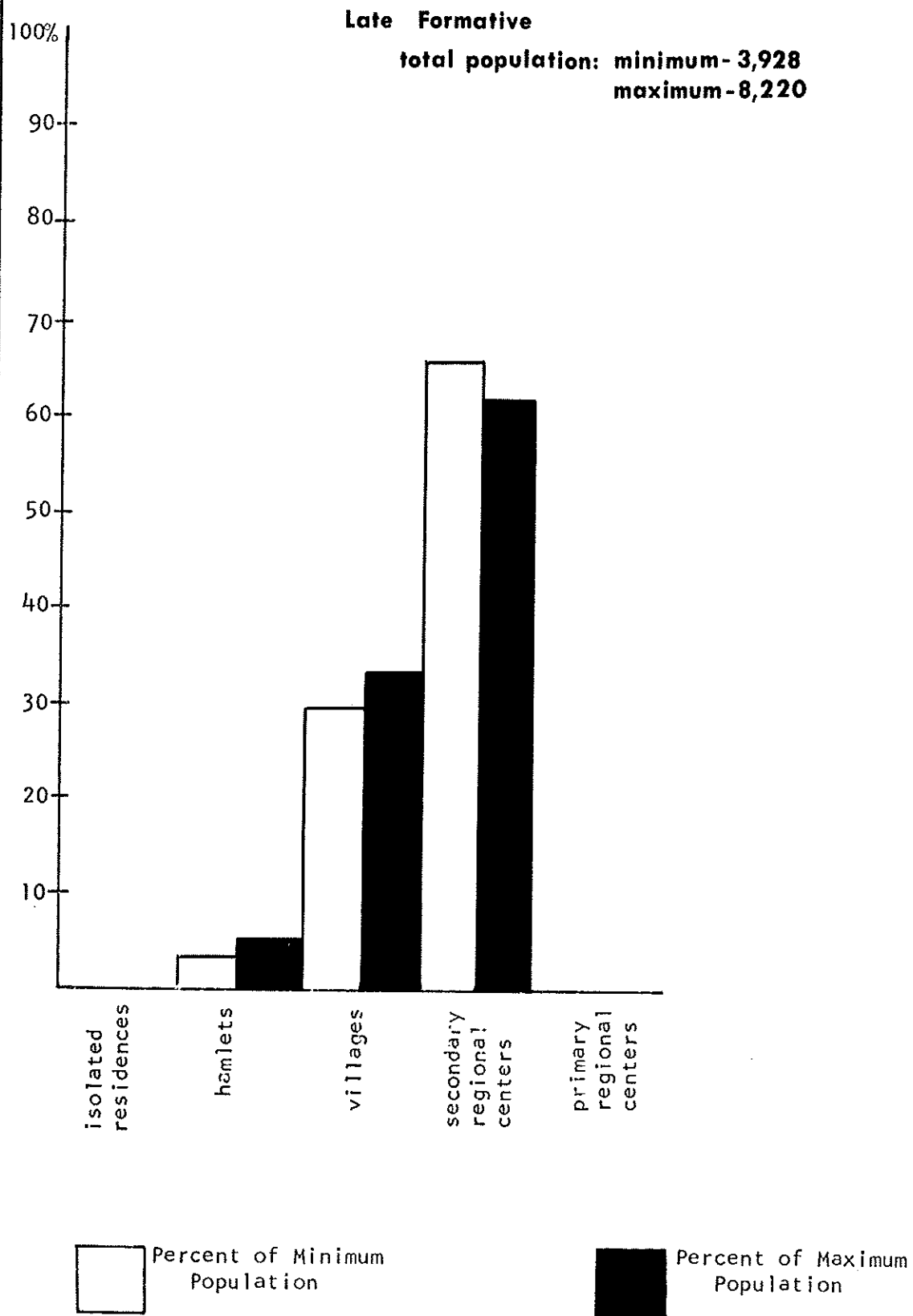
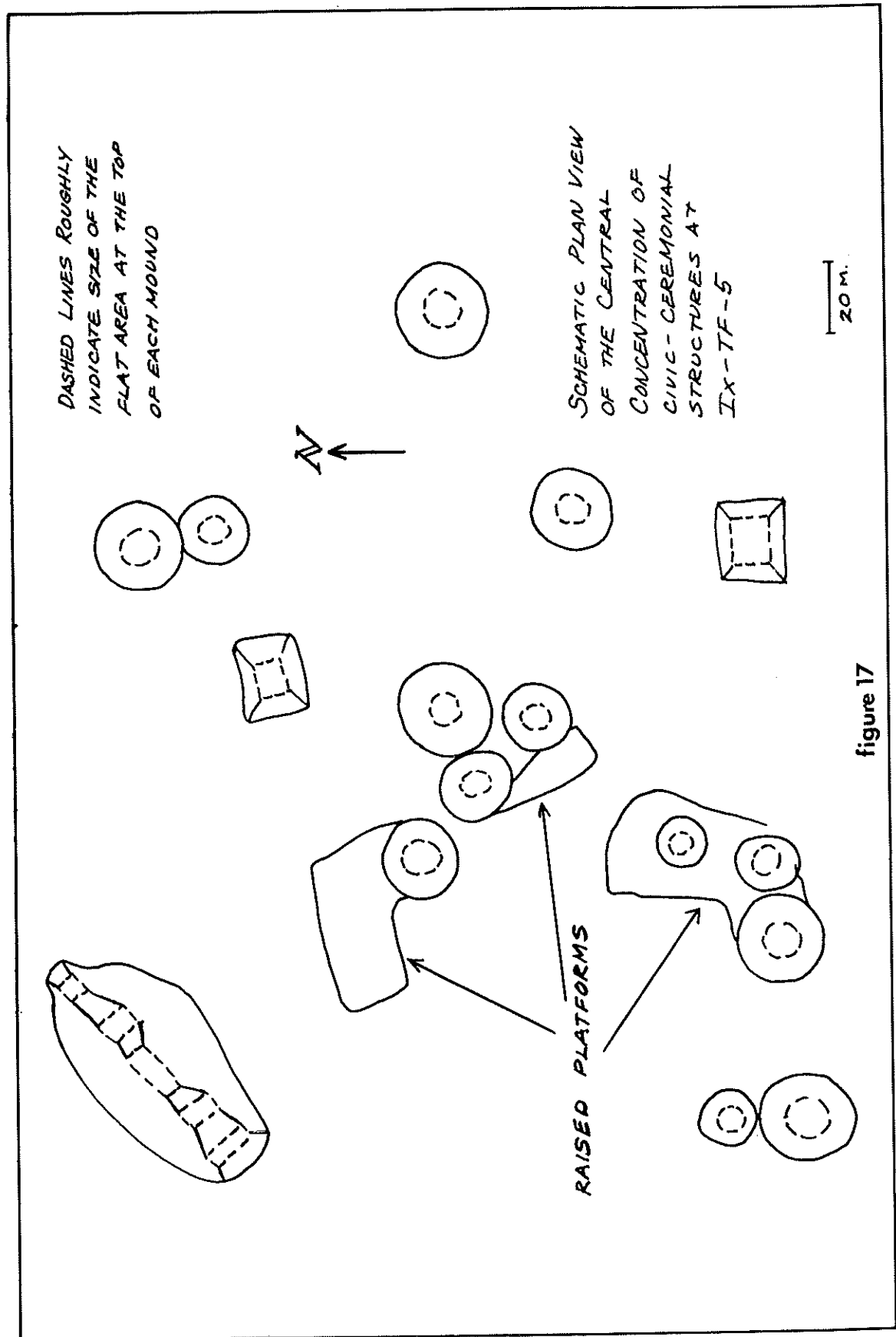
PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

figure 16



OCCUPATION OF ENVIRONMENTAL ZONES
BY % OF POPULATION

TERMINAL FORMATIVE

total population: minimum - 3,470

maximum - 7,405

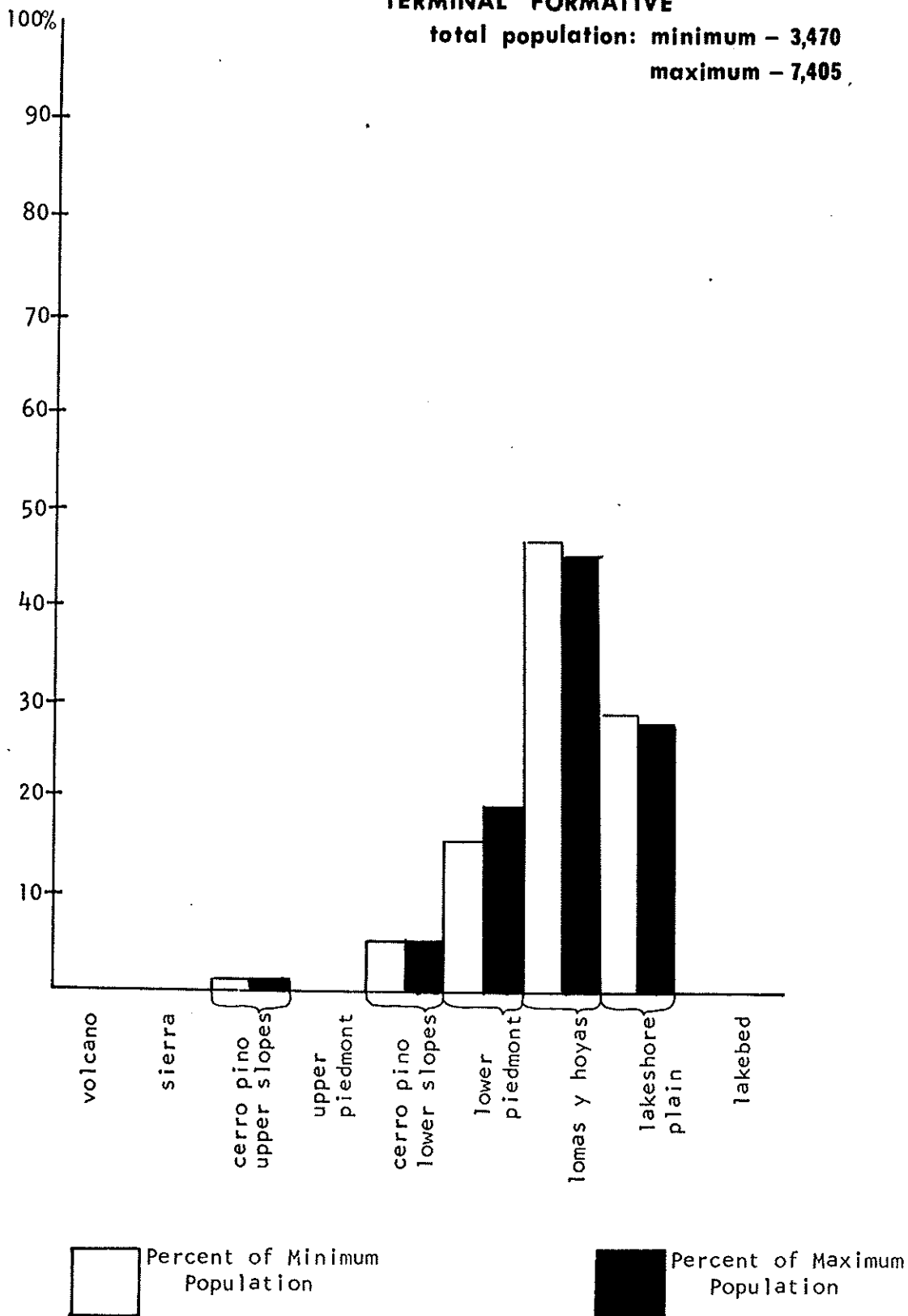
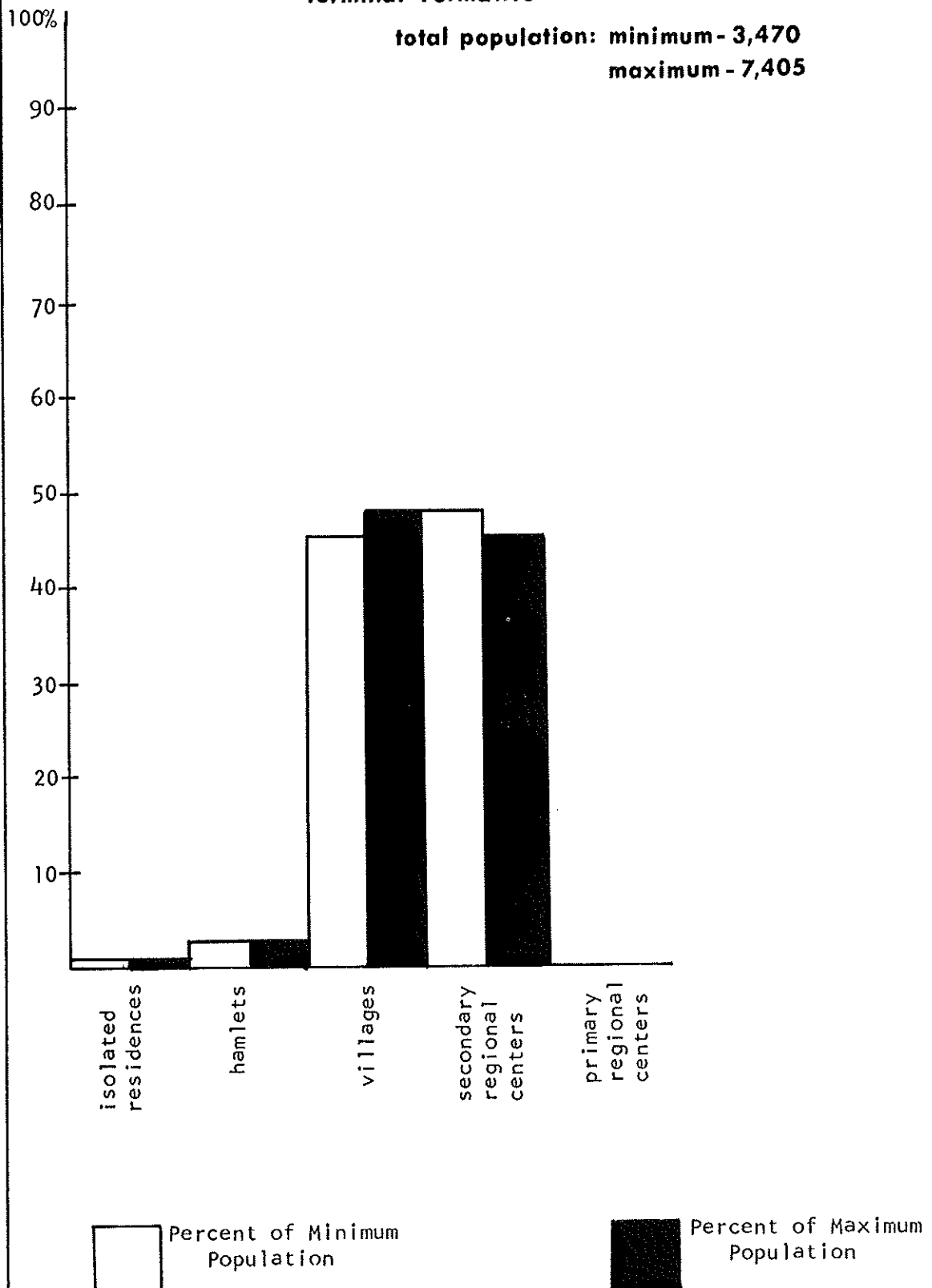


figure 18

PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES**Terminal Formative****total population: minimum - 3,470****maximum - 7,405****figure 19**

OCCUPATION OF ENVIRONMENTAL ZONES
BY % OF POPULATION

EARLY CLASSIC

total population: minimum - 2,133

maximum - 4,607

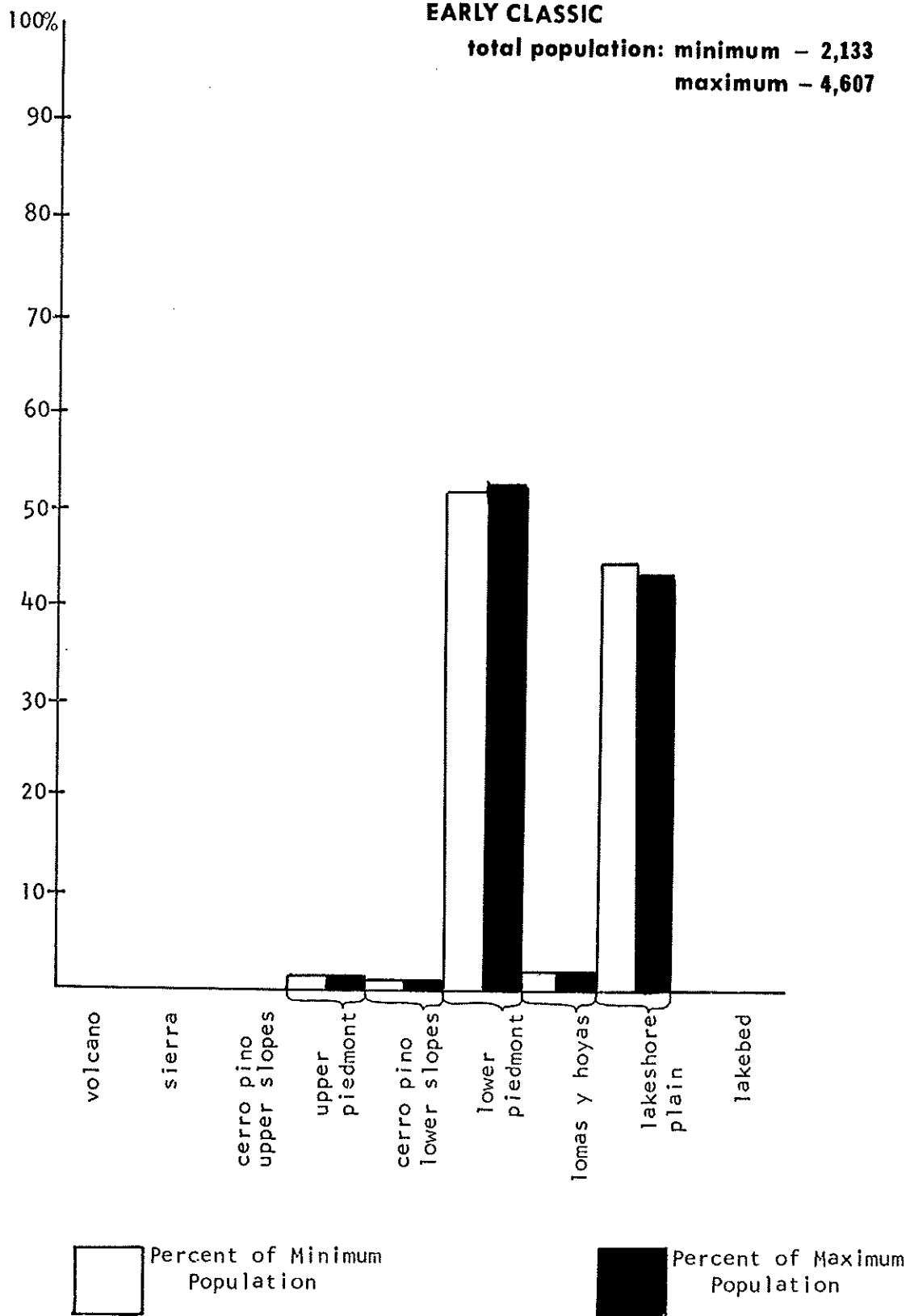


figure 20

**LOCATIONS AND DISTANCES BETWEEN EARLY CLASSIC REGIONAL
CENTERS IN THE SOUTHERN VALLEY OF MEXICO**



figure 21

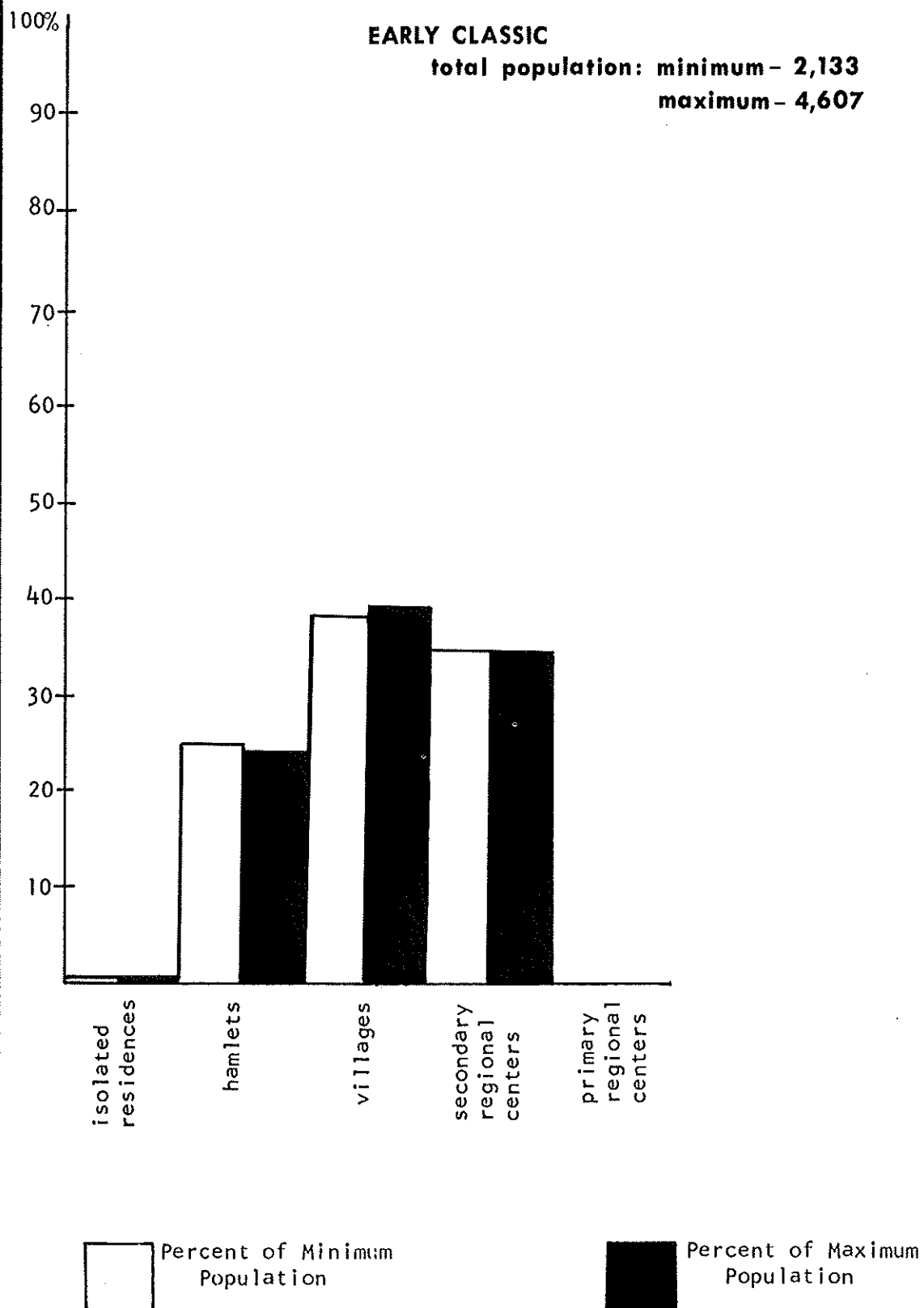
PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

figure 22

PRECENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES**EARLY TOLTEC**

total population: minimum - 2,540

maximum - 6,283

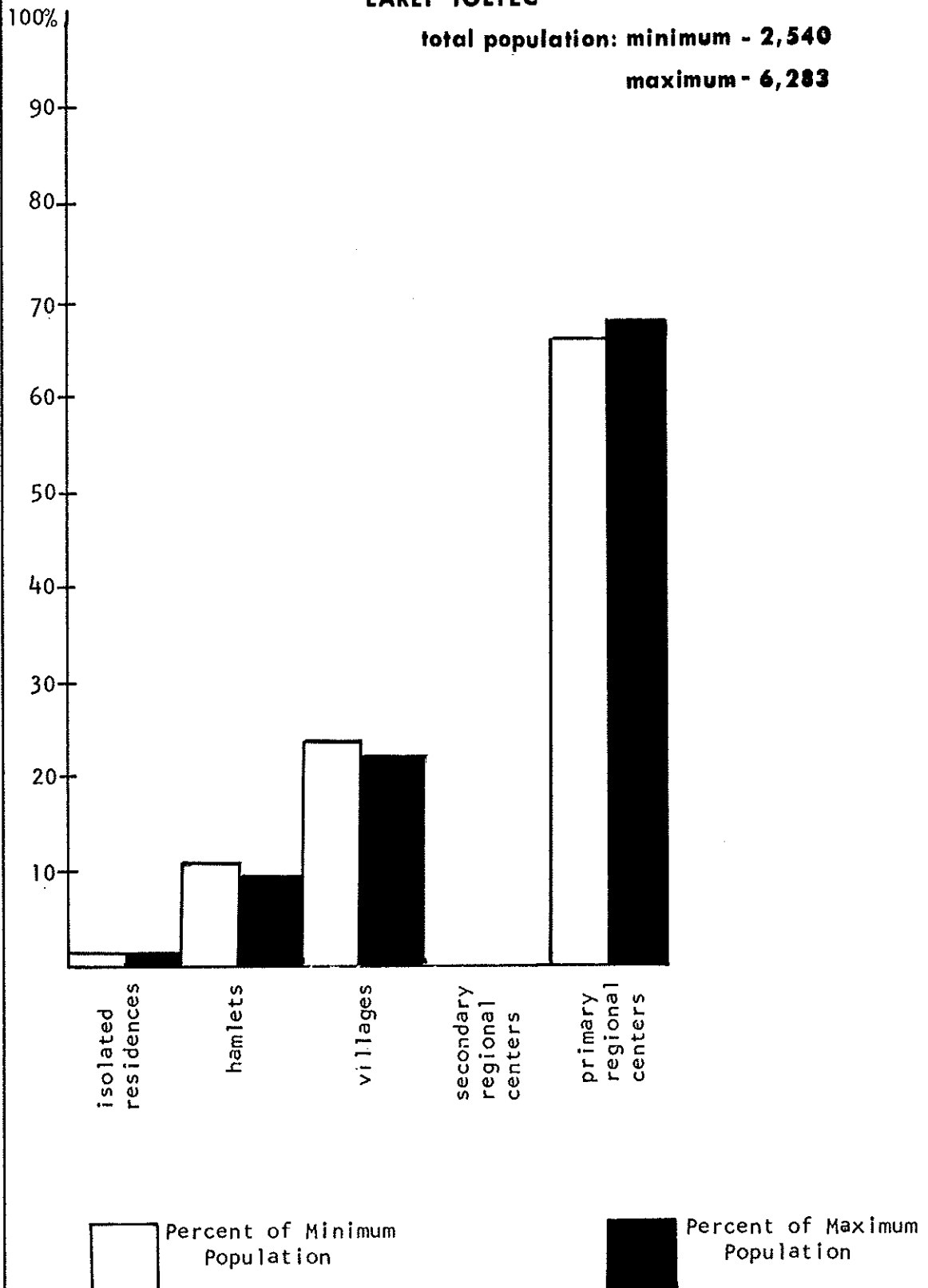


figure 23

OCCUPATION OF ENVIRONMENTAL ZONES
BY % OF POPULATION

EARLY TOLTEC

total population: minimum - 2,540

maximum - 6,283

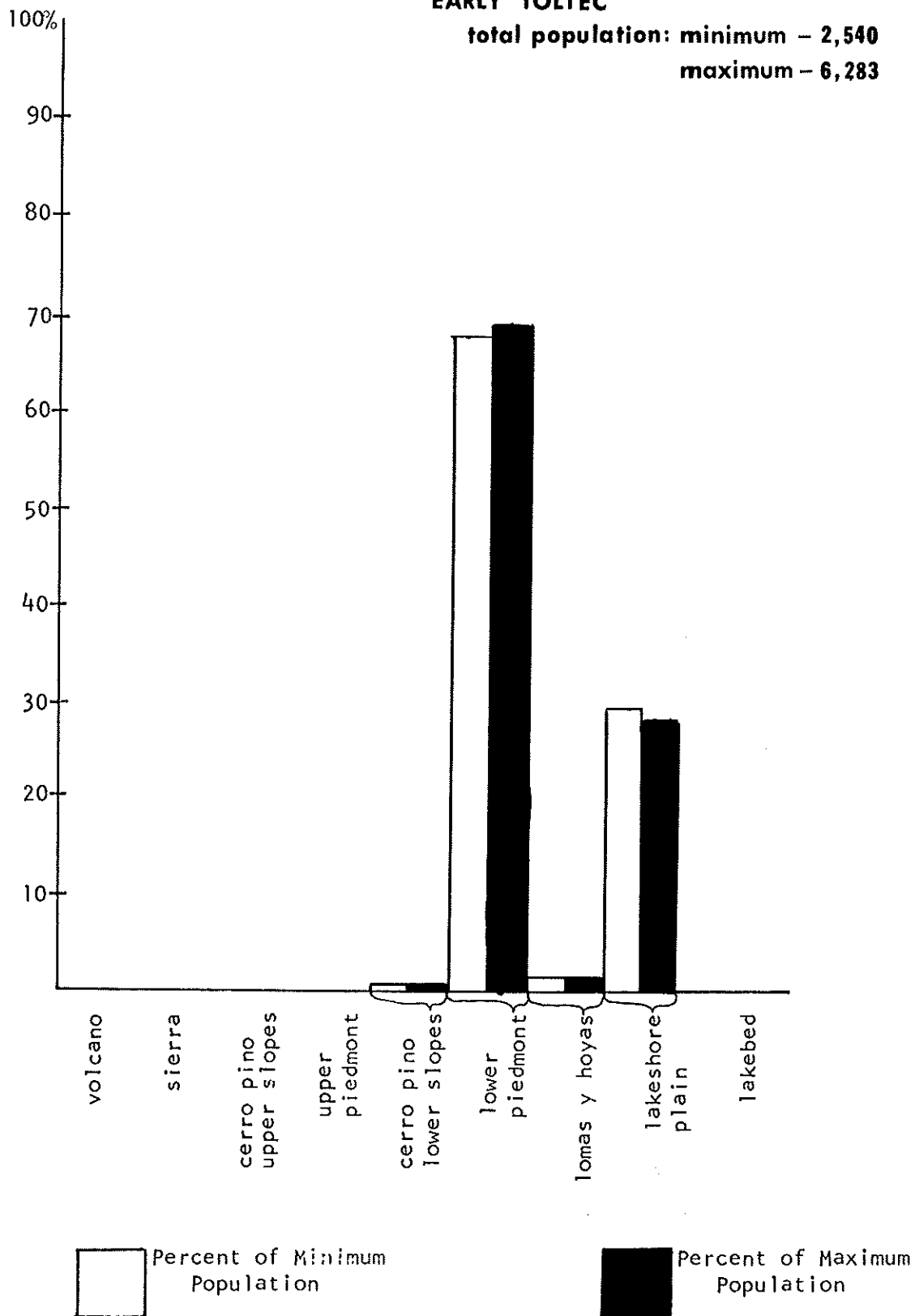


figure 24

PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

LATE TOLTEC

total population: minimum- 870

maximum- 1,795

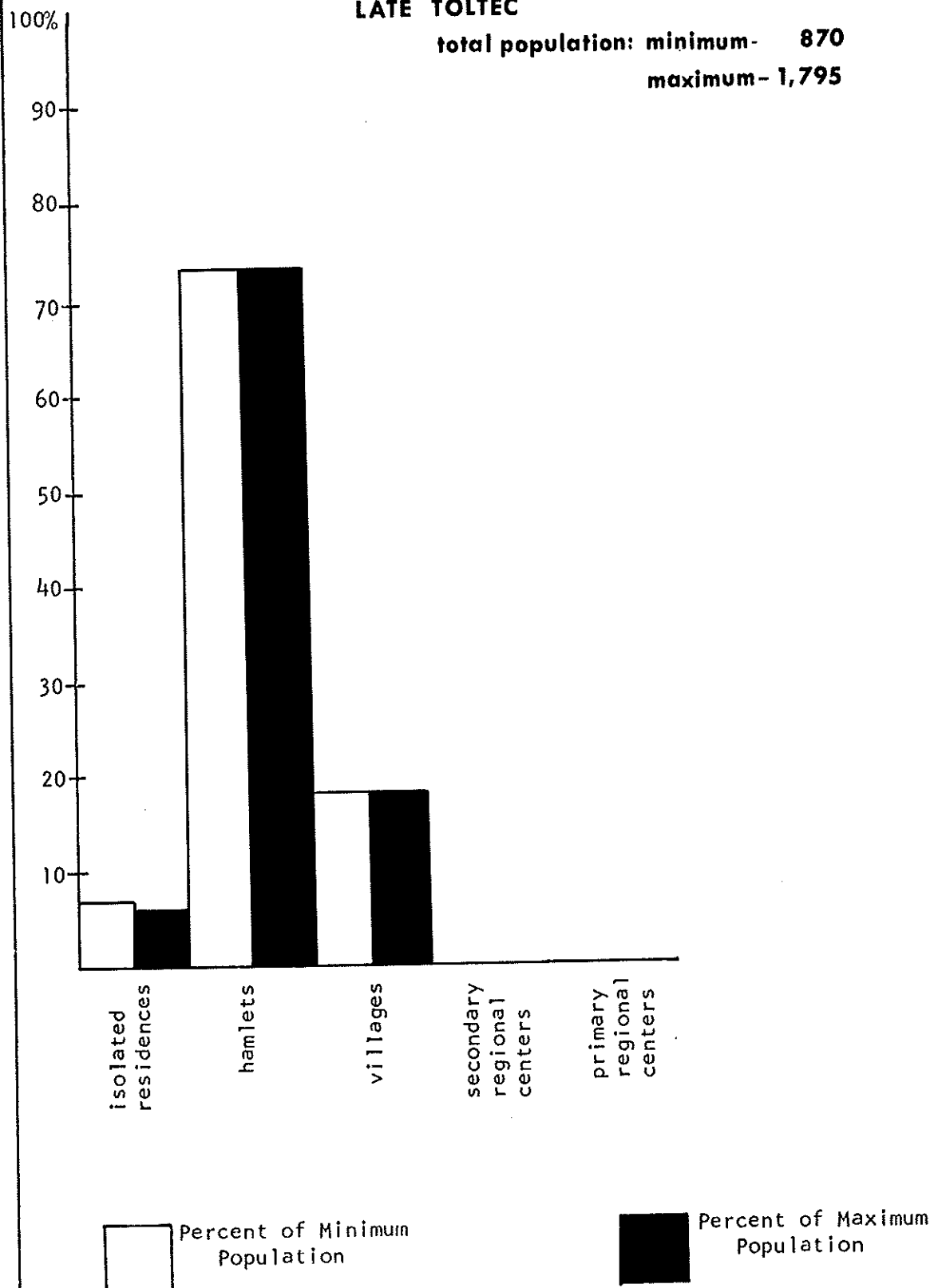


figure 25

OCCUPATION OF ENVIRONMENTAL ZONES
BY % OF POPULATION

LATE TOLTEC

total population: minimum - 870

maximum - 1,795

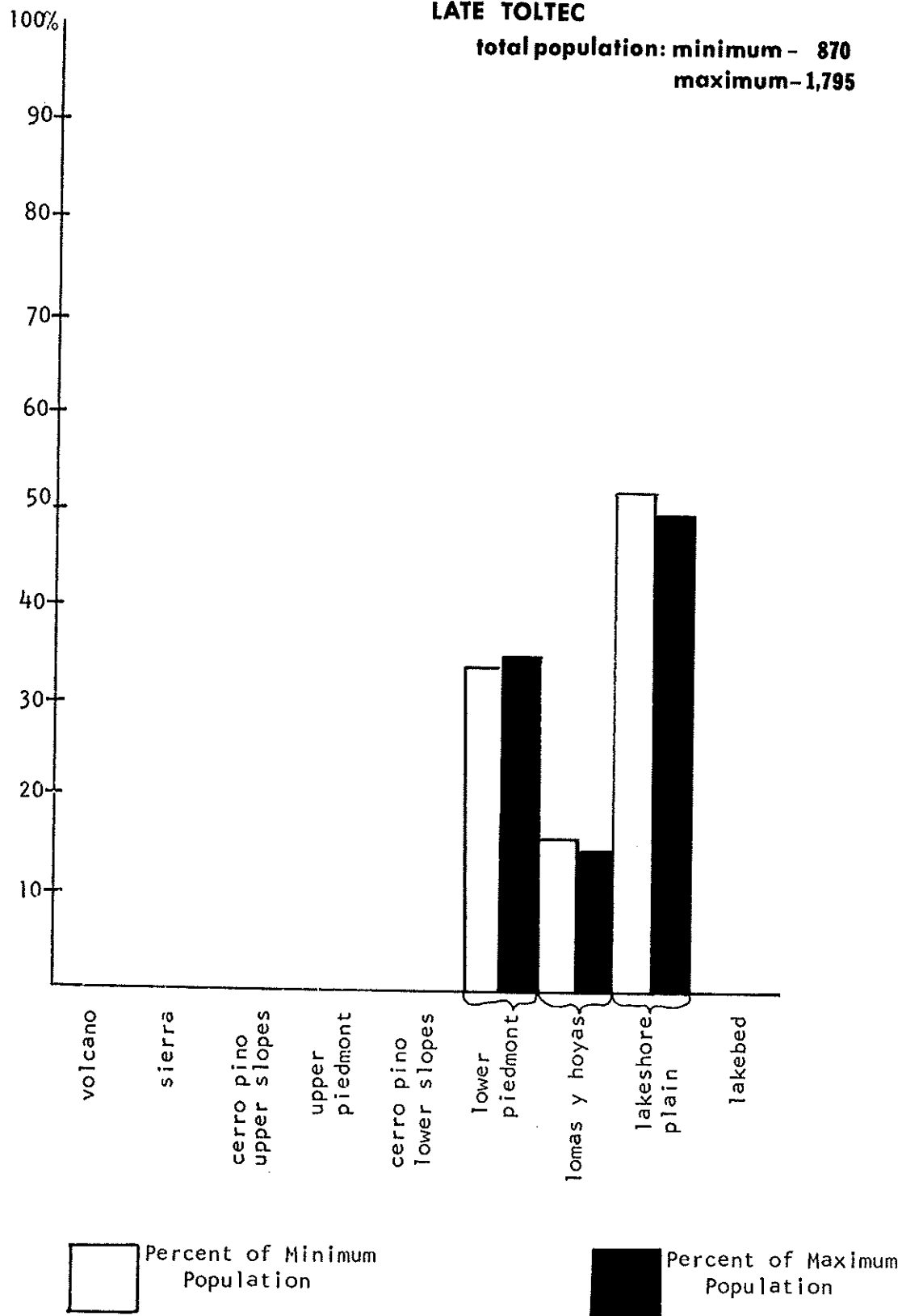
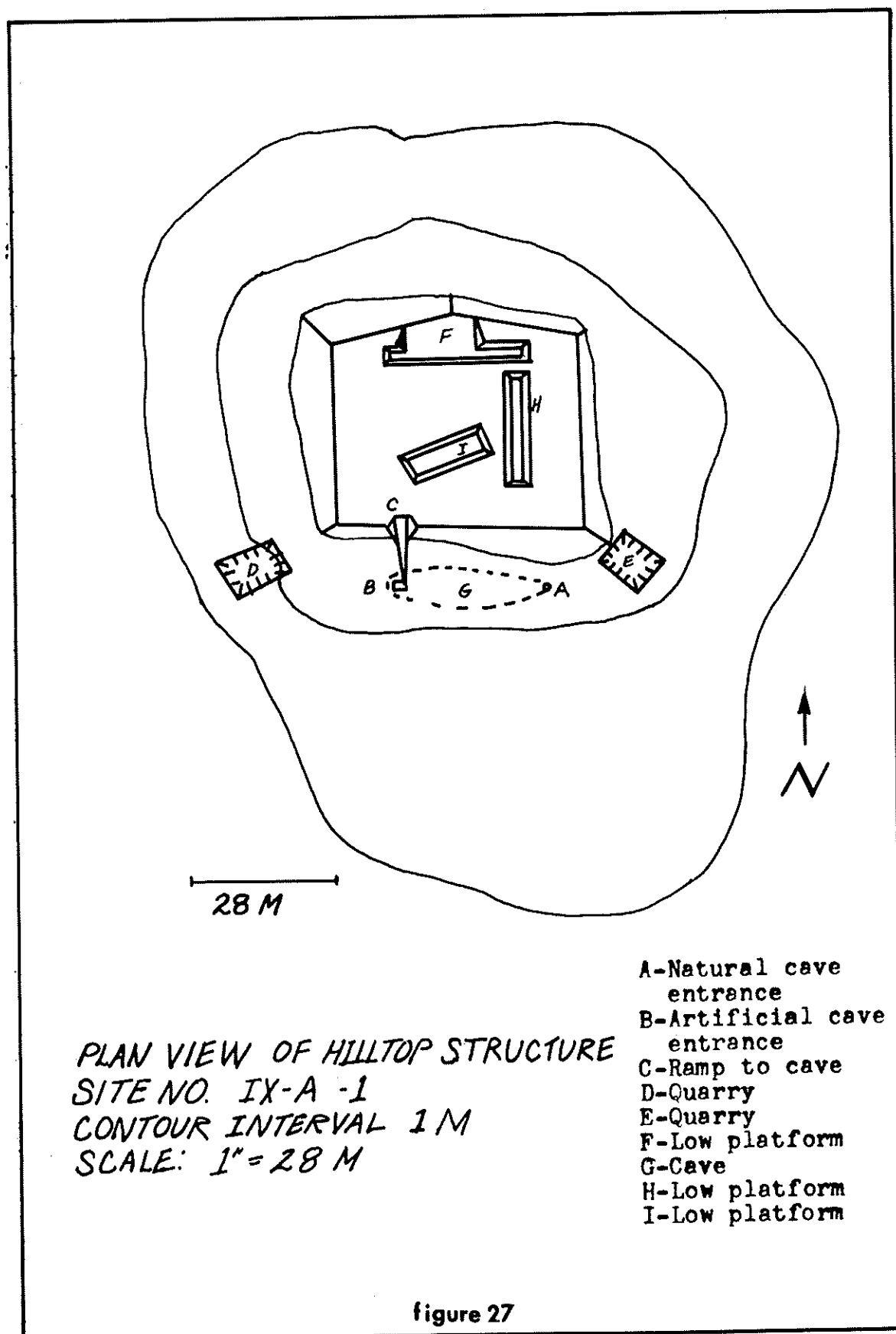


figure 26



PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

EARLY AZTEC

total population: minimum - 1,958

maximum - 4,103

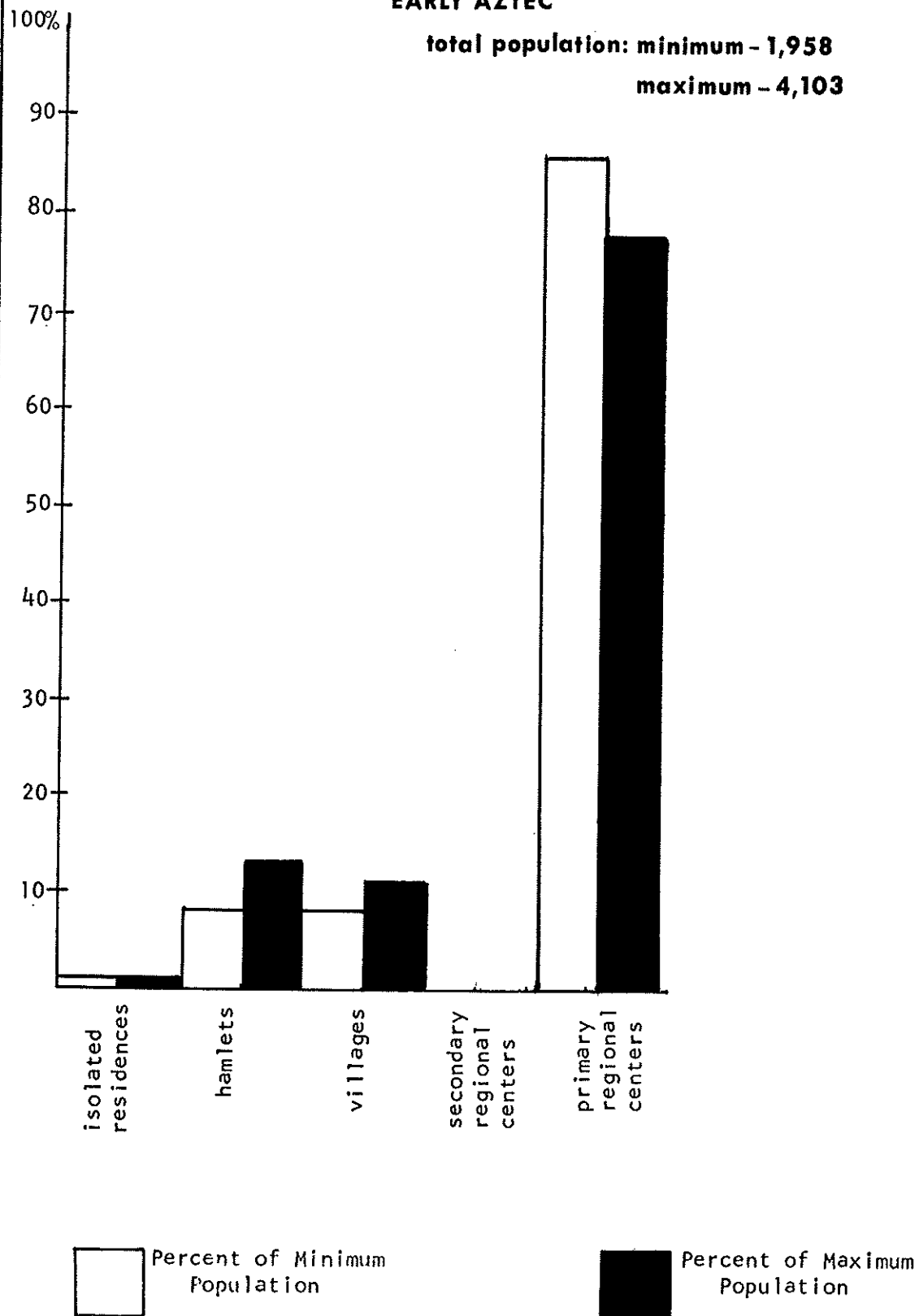


figure 28

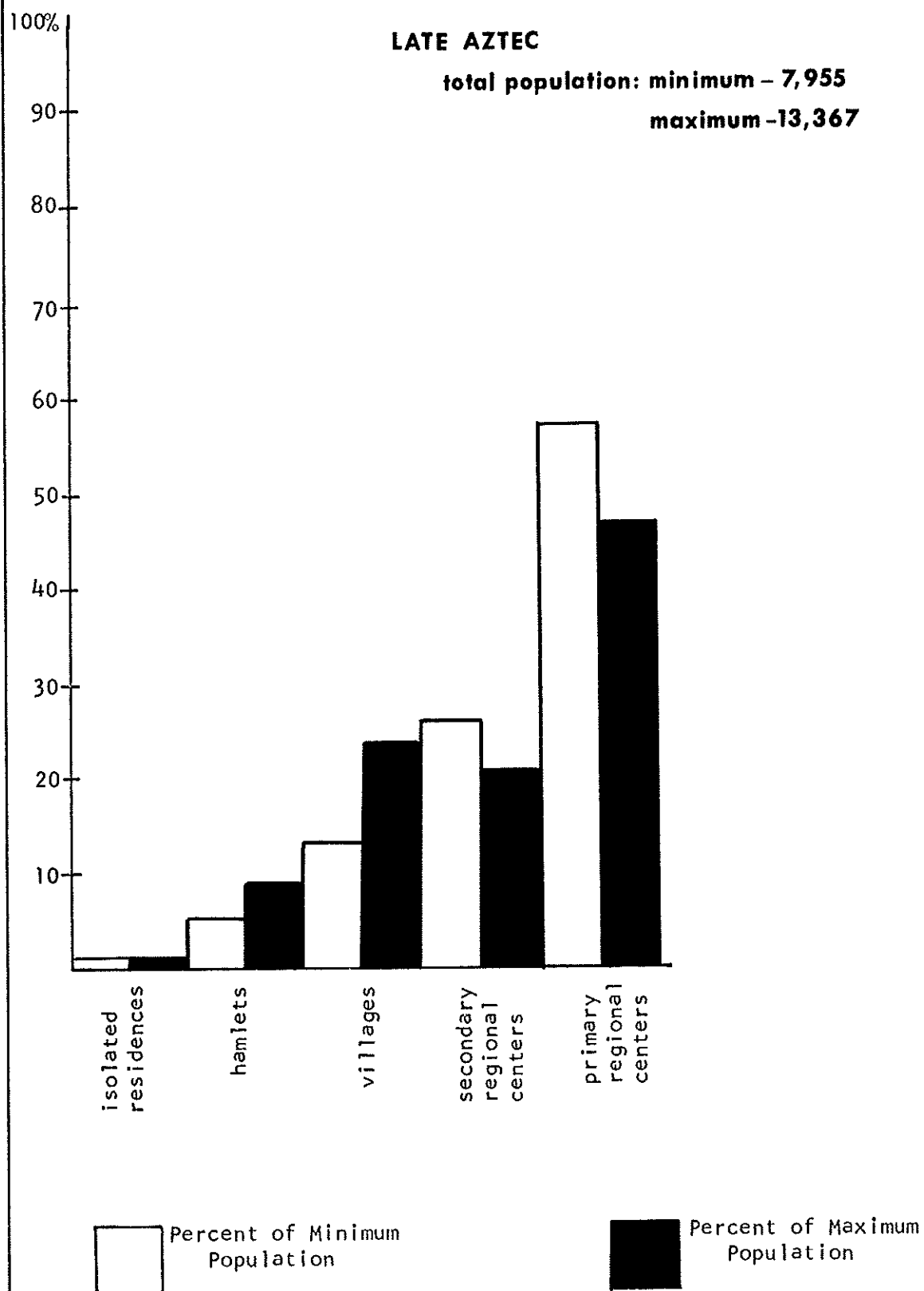
PERCENTAGE OF POPULATION RESIDING IN TYPES
OF COMMUNITIES

figure 29

OCCUPATION OF ENVIRONMENTAL ZONES BY % OF POPULATION

EARLY AZTEC

total population: minimum 1,958

maximum 4,103

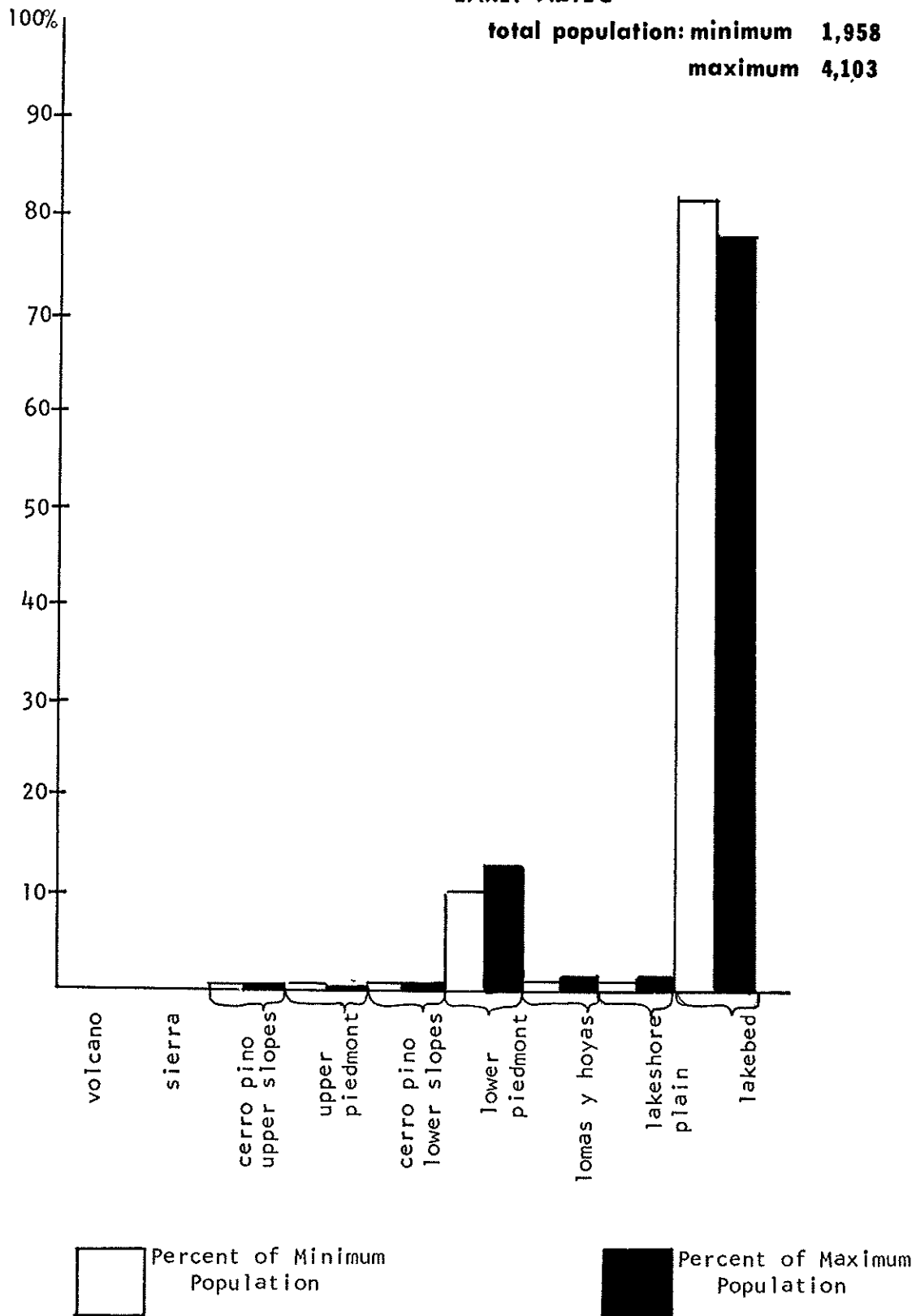
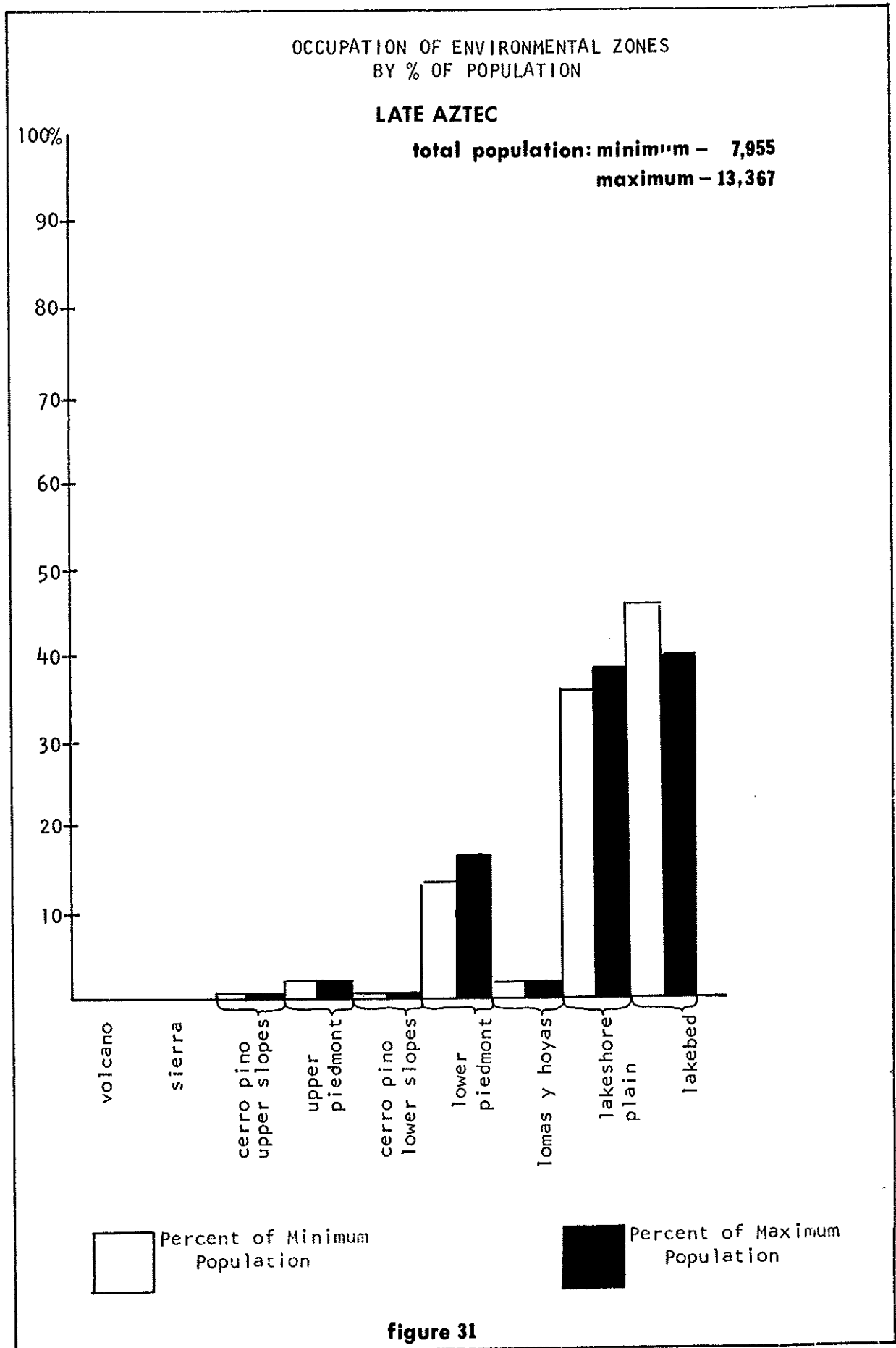


figure 30



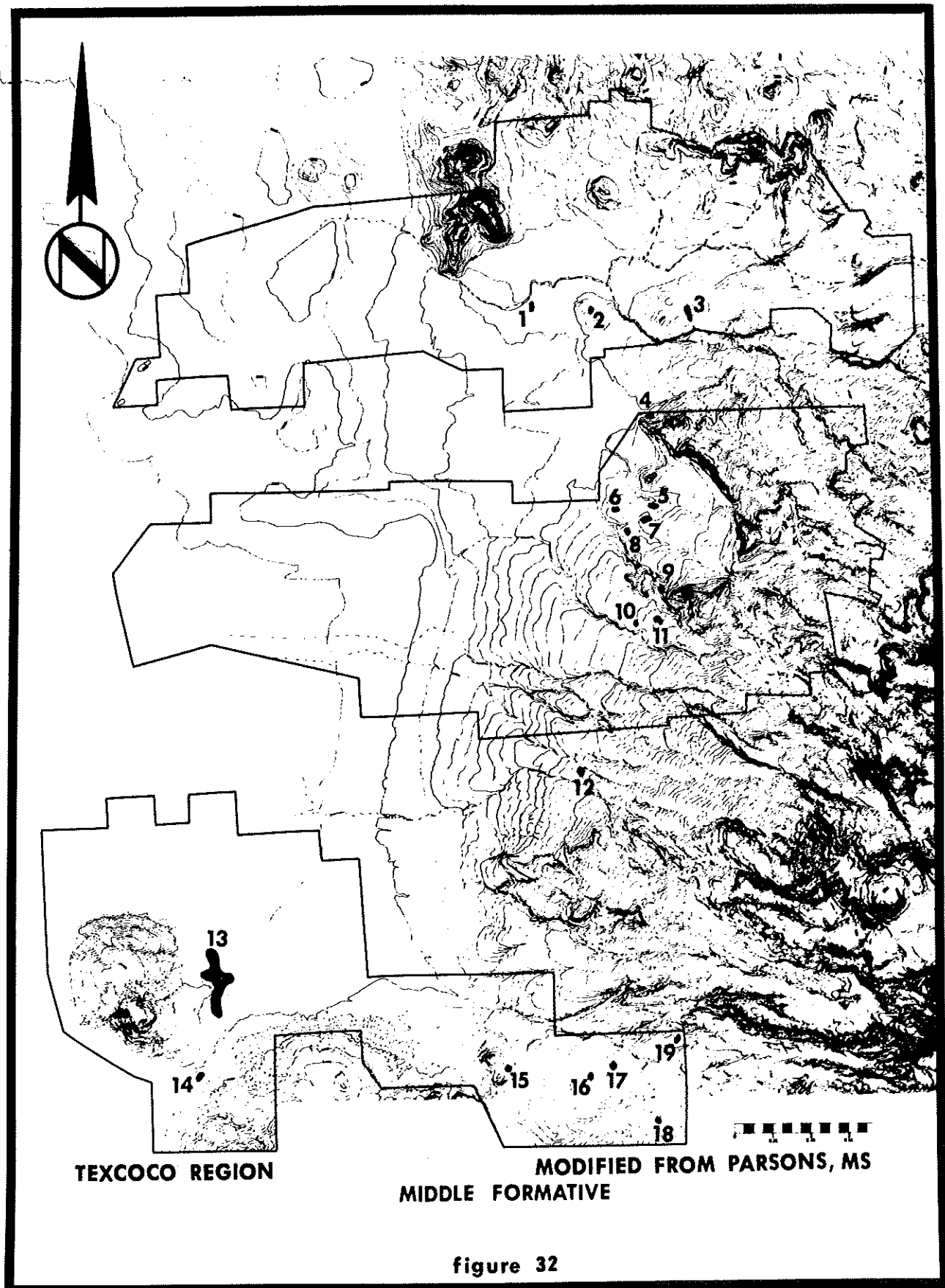
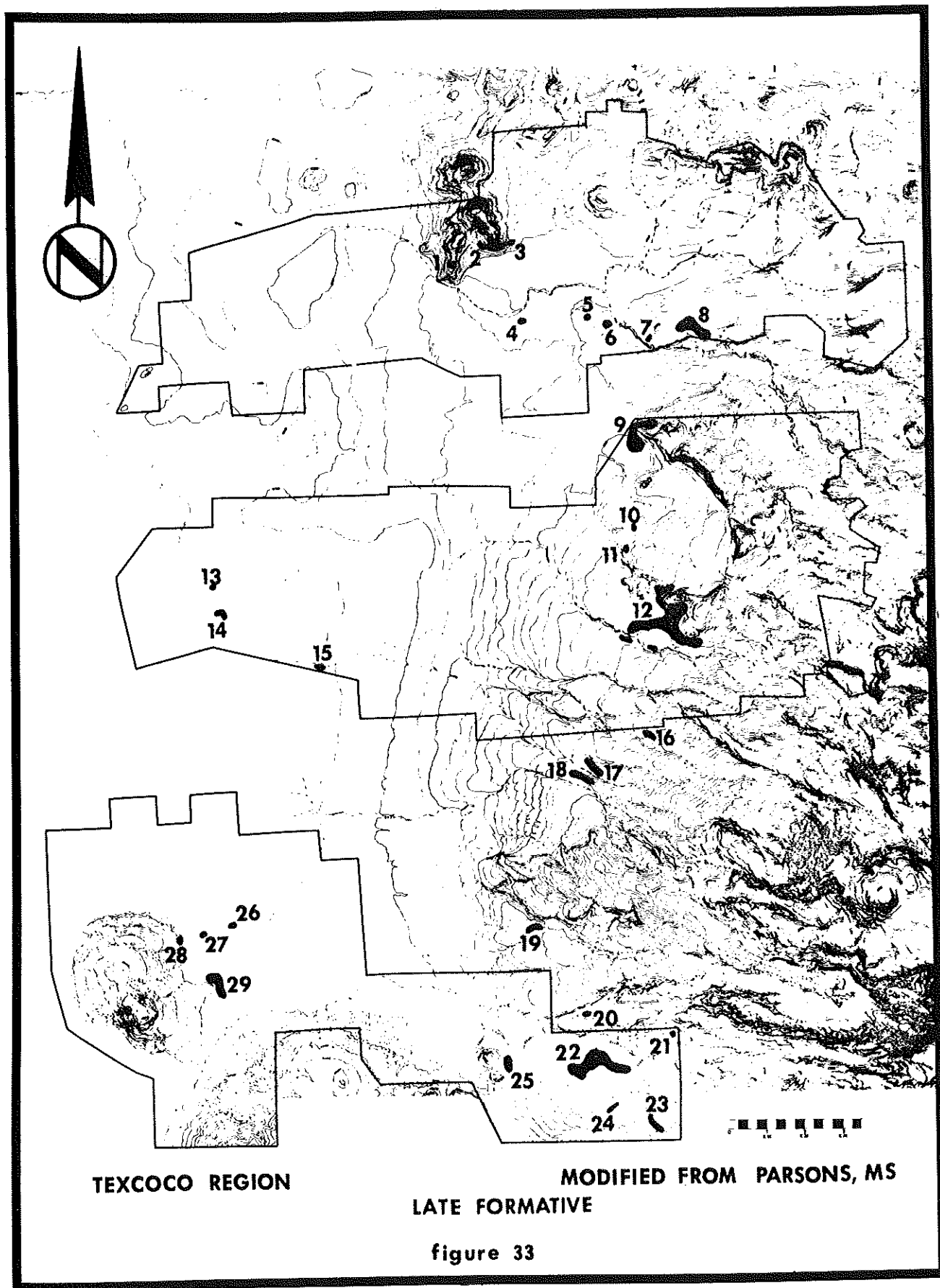
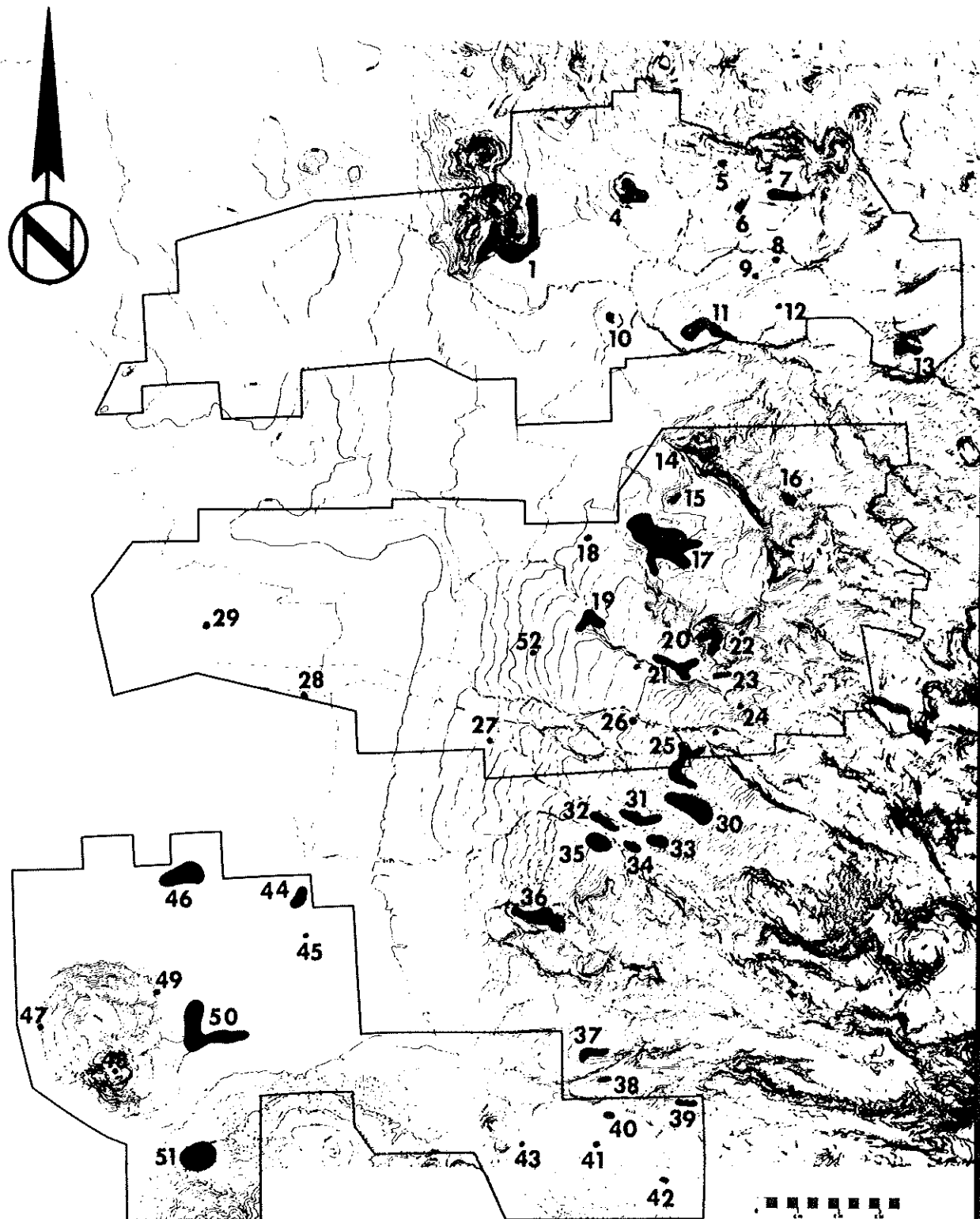


figure 32

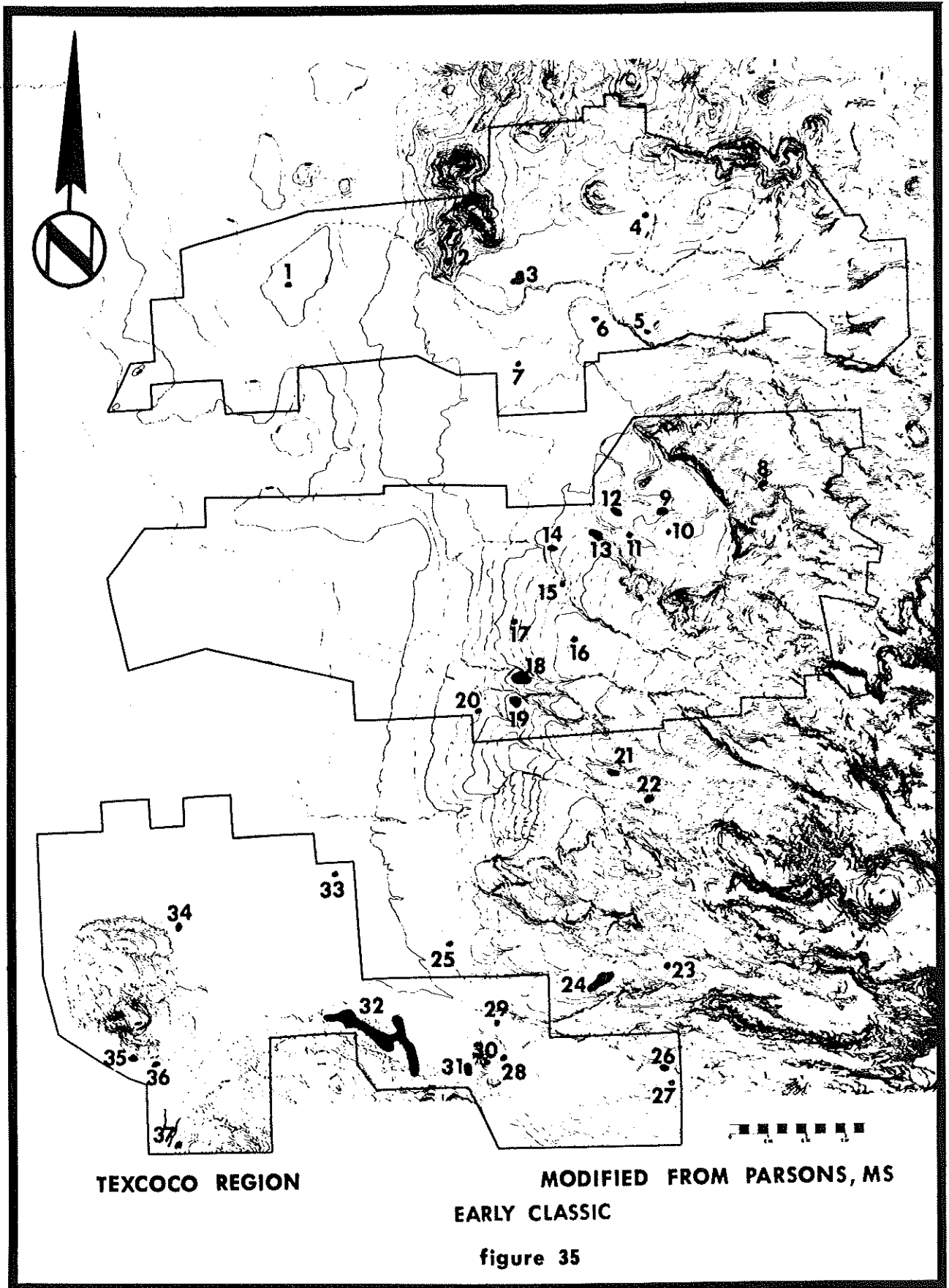


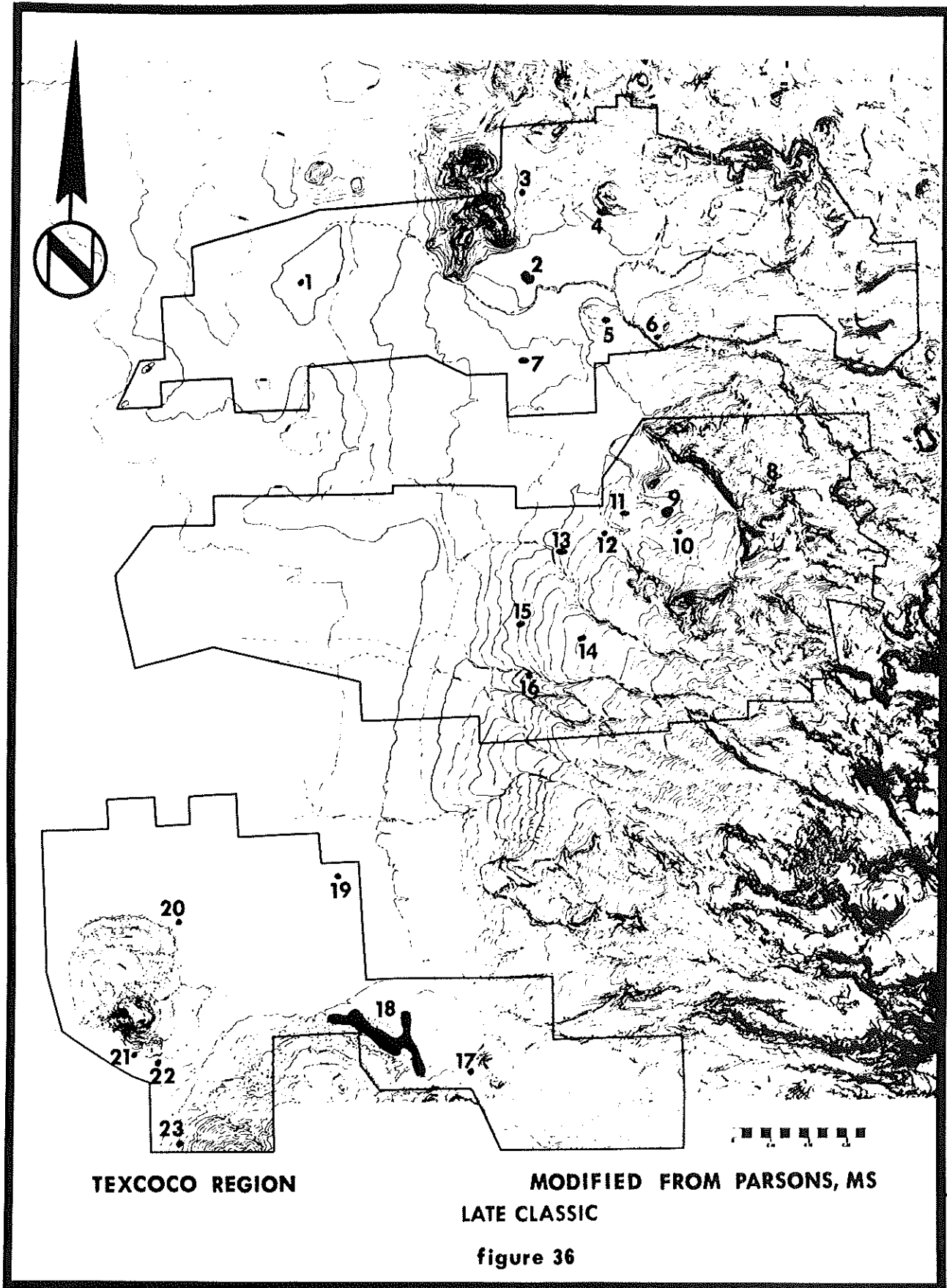


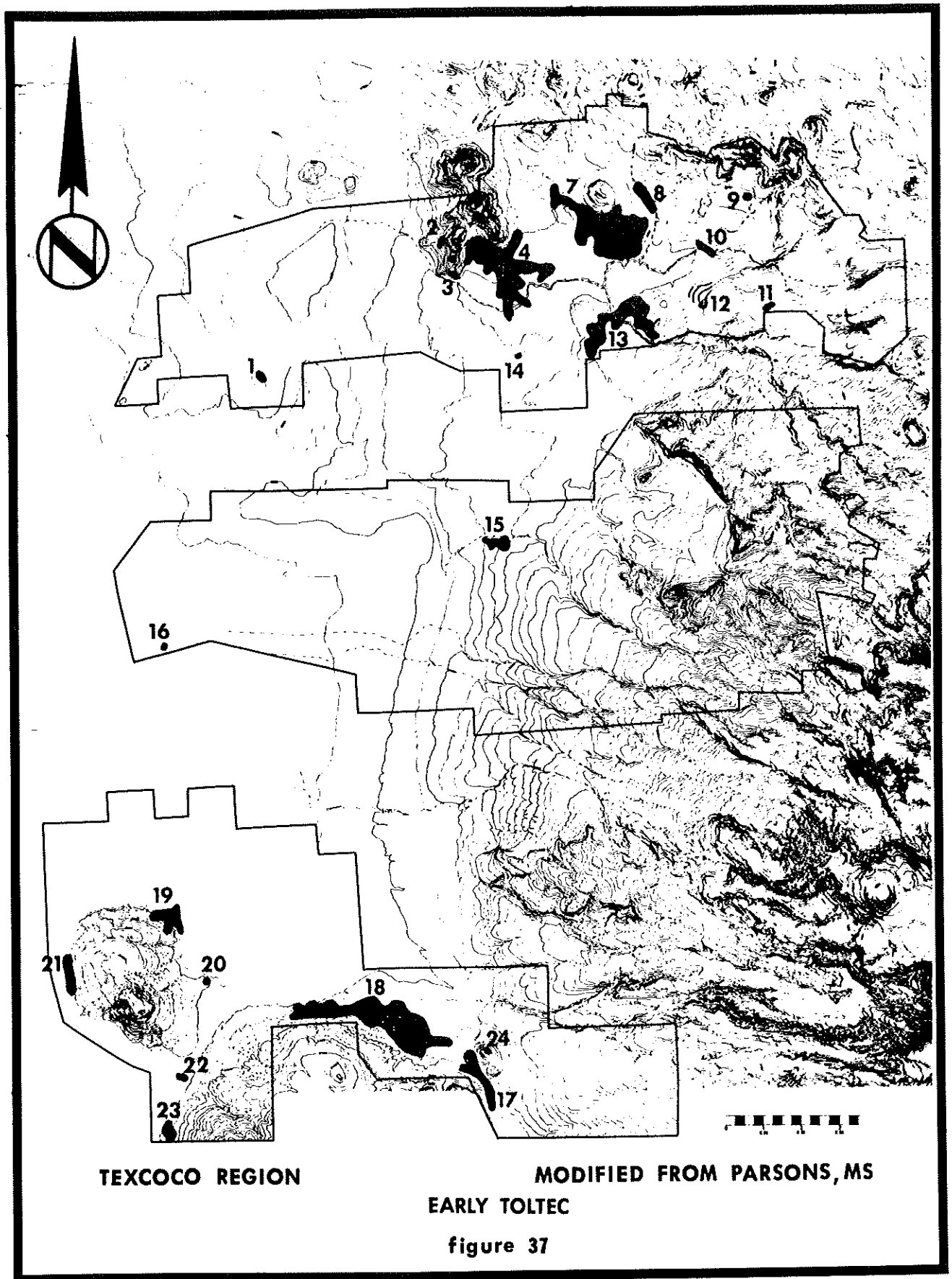
TEXCOCO REGION

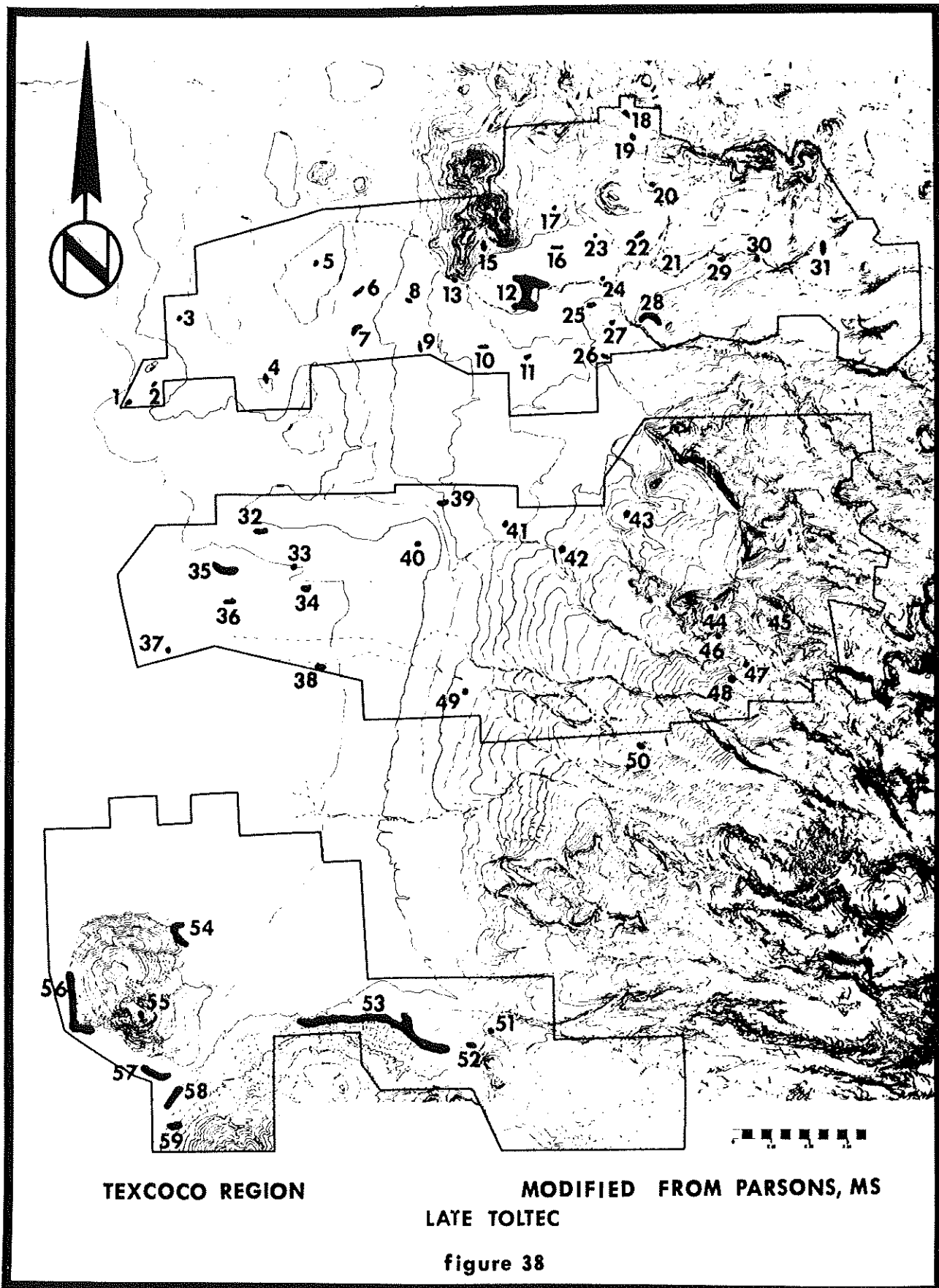
MODIFIED FROM PARSONS, MS
TERMINAL FORMATIVE

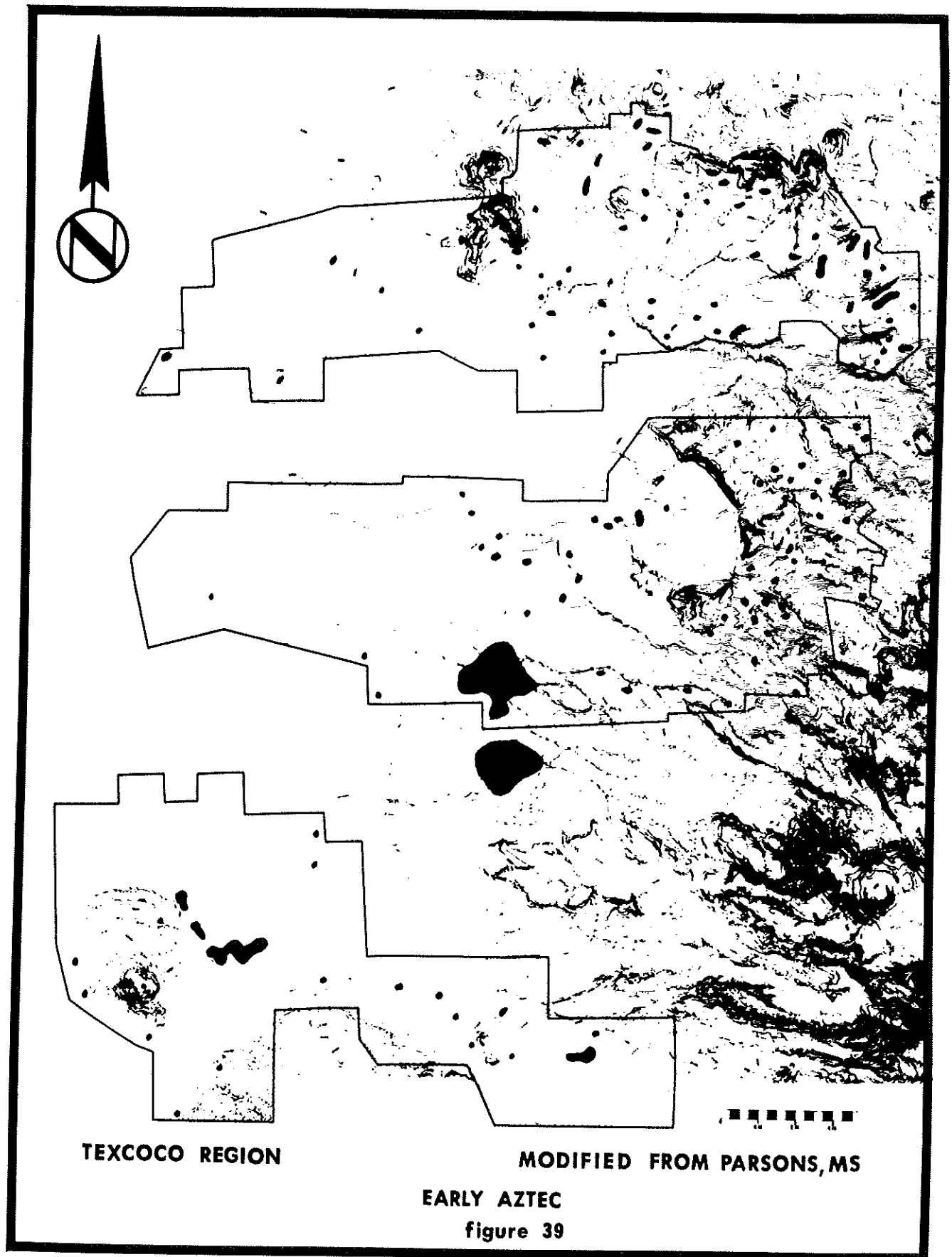
figure 34

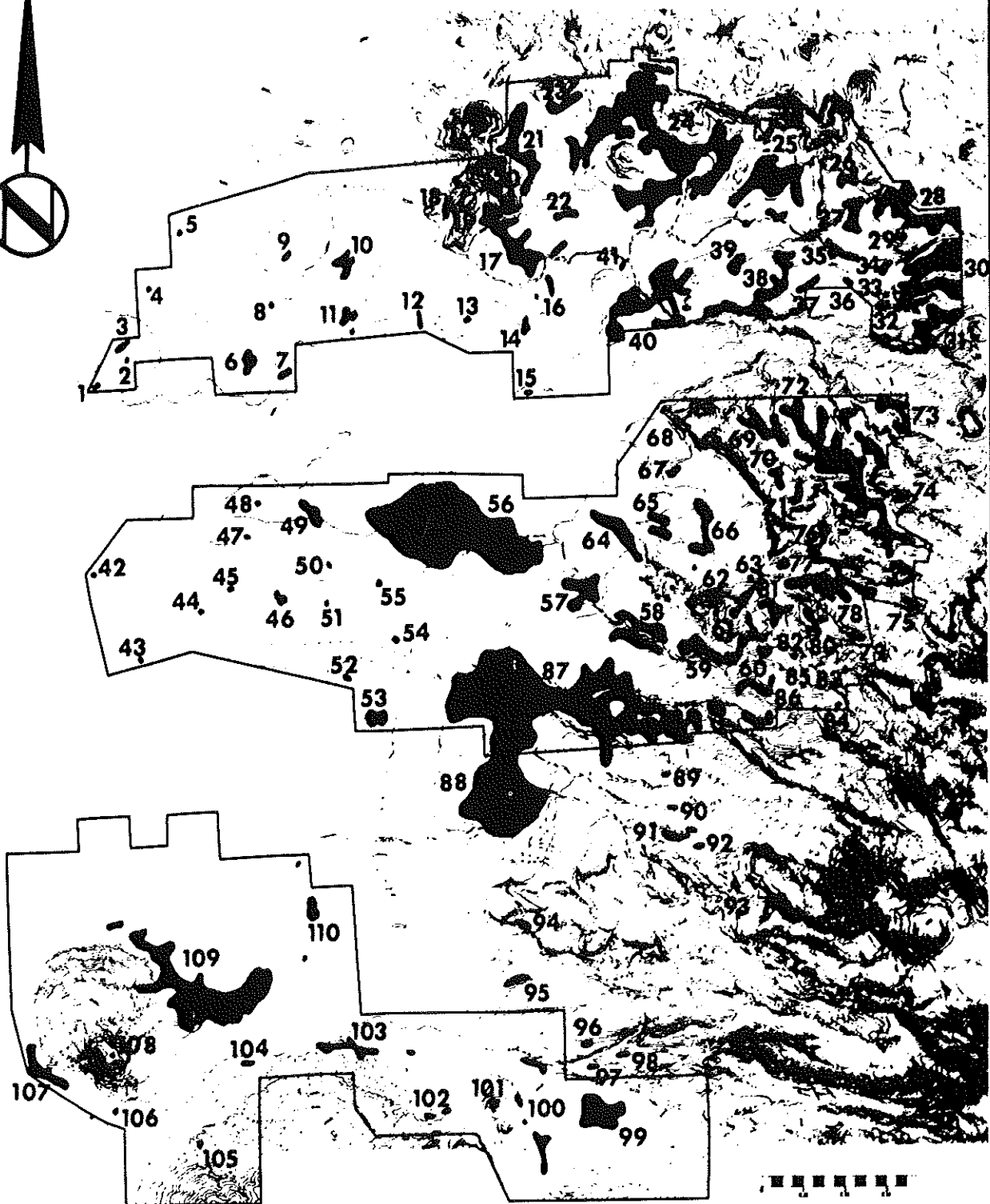
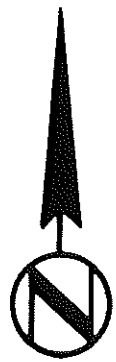












TEXCOCO REGION

MODIFIED FROM PARSONS, MS

LATE AZTEC
figure 40

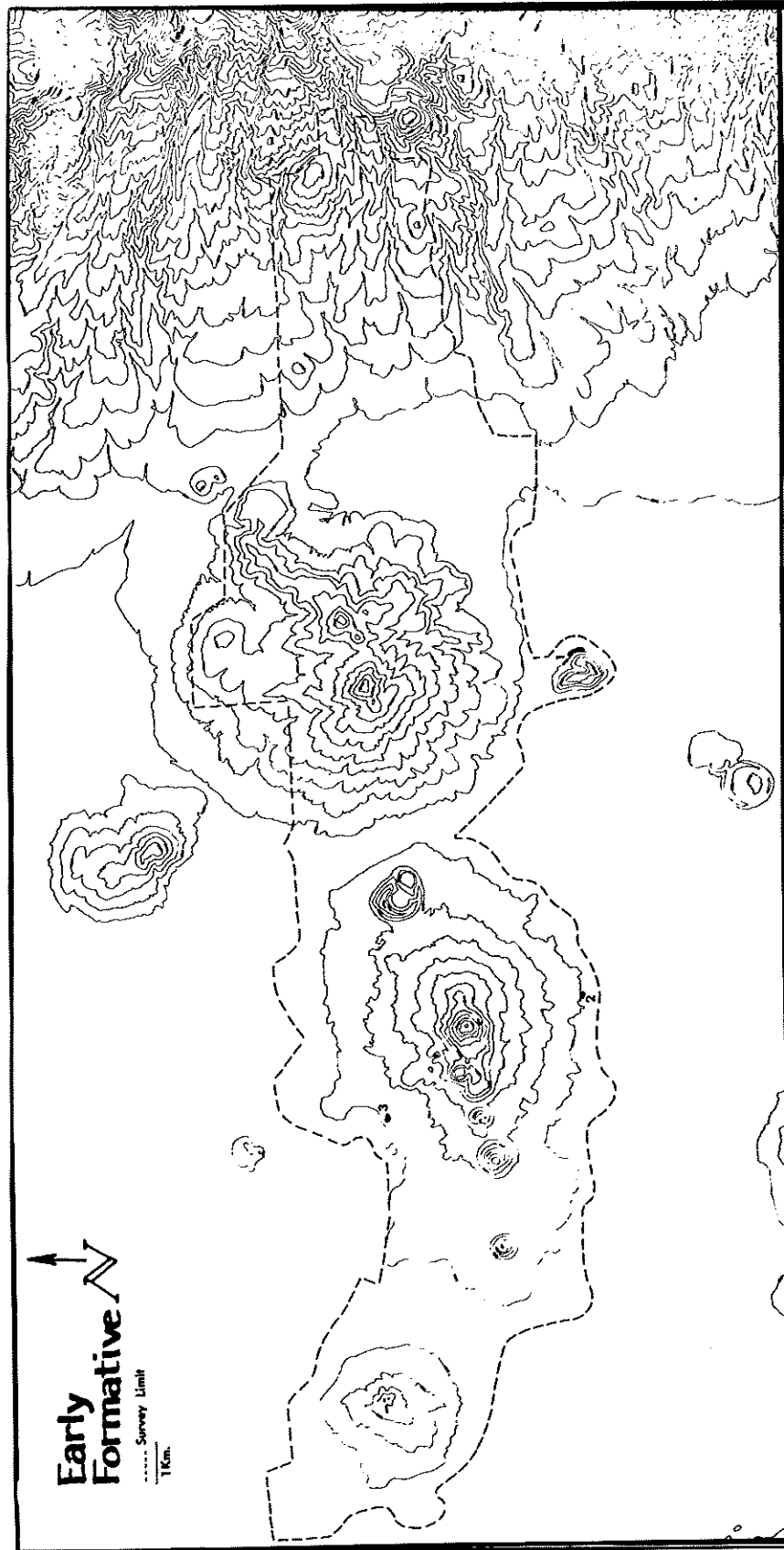


Figure 41

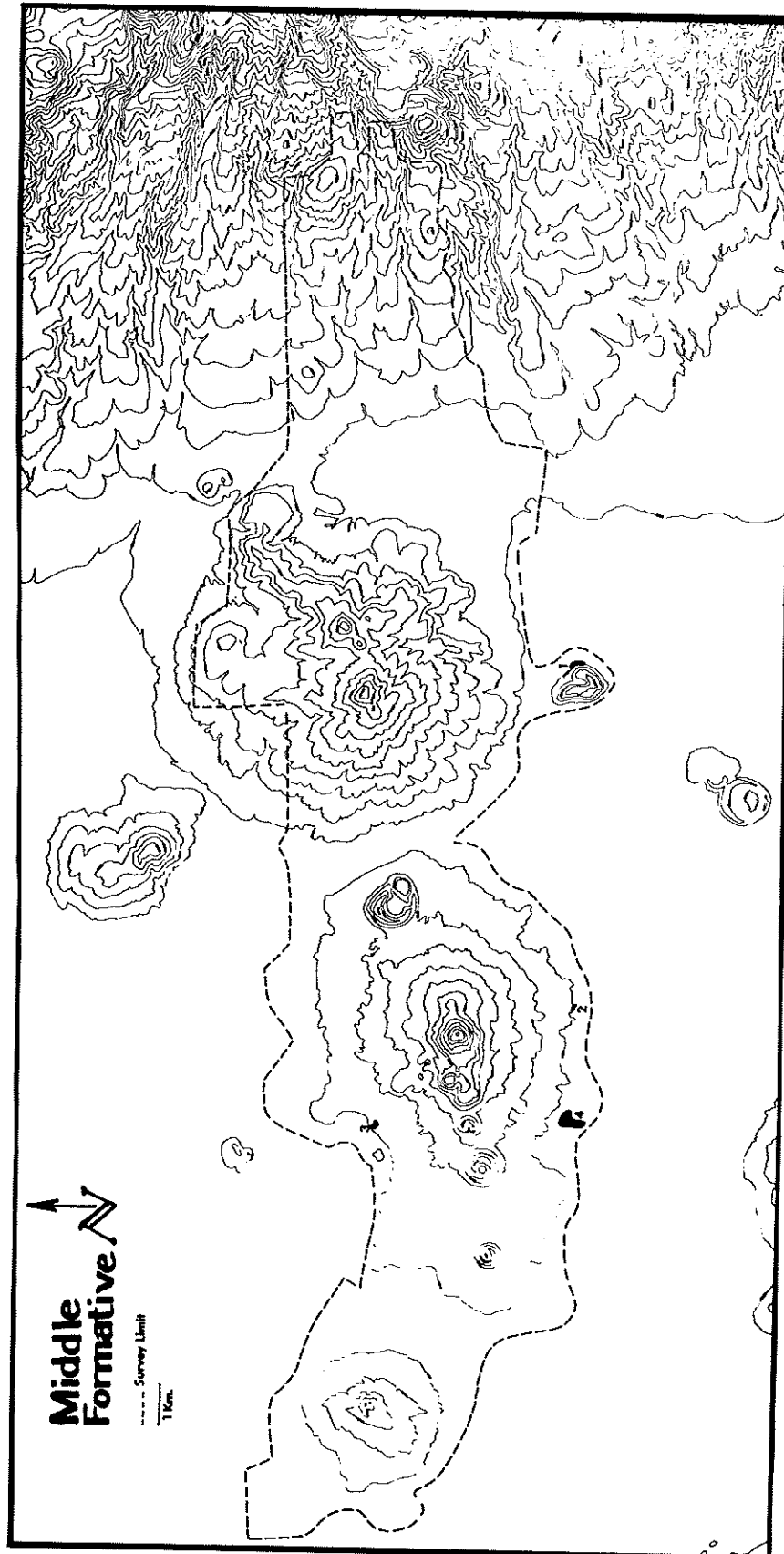


Figure 42

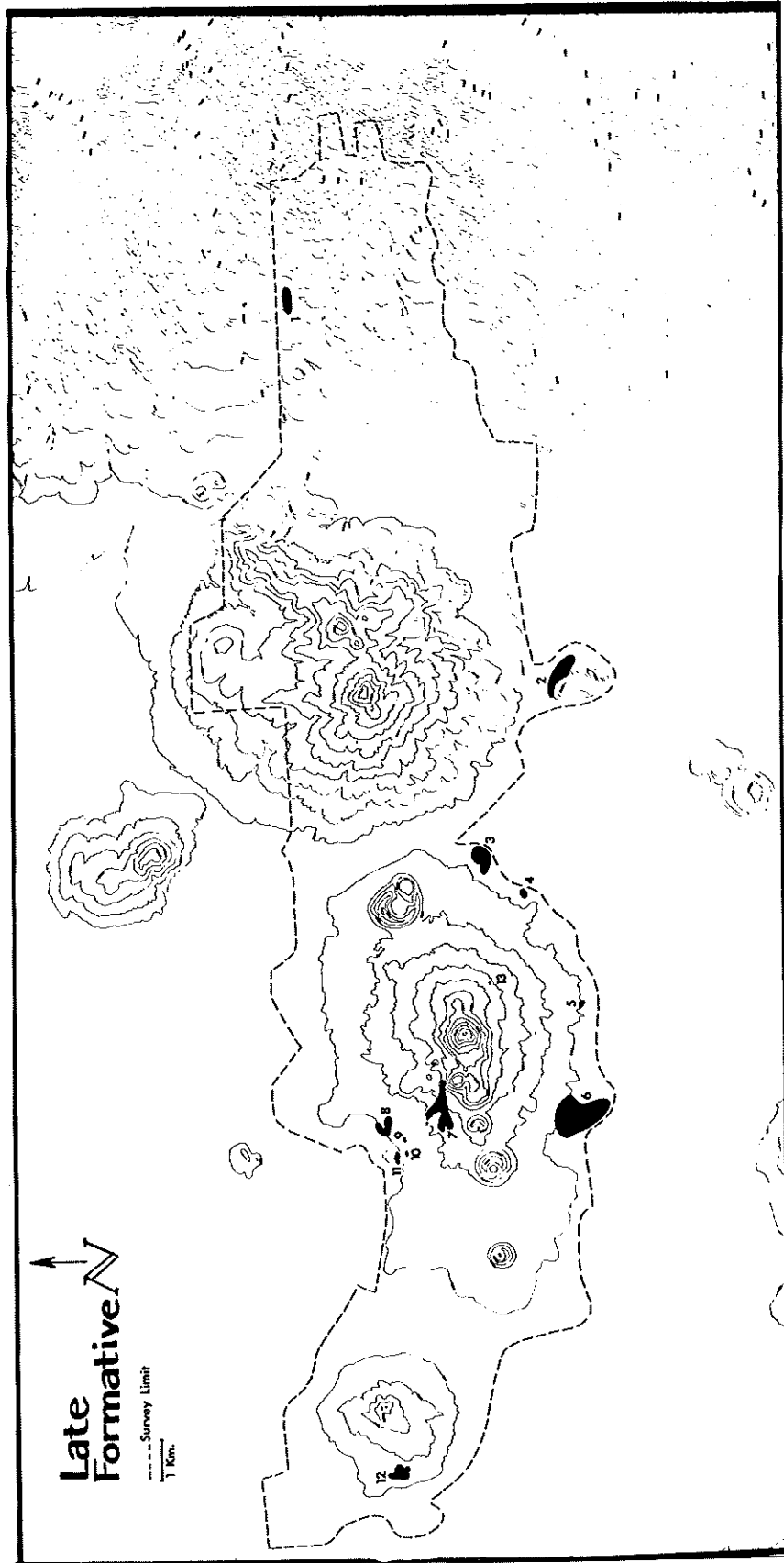


Figure 43

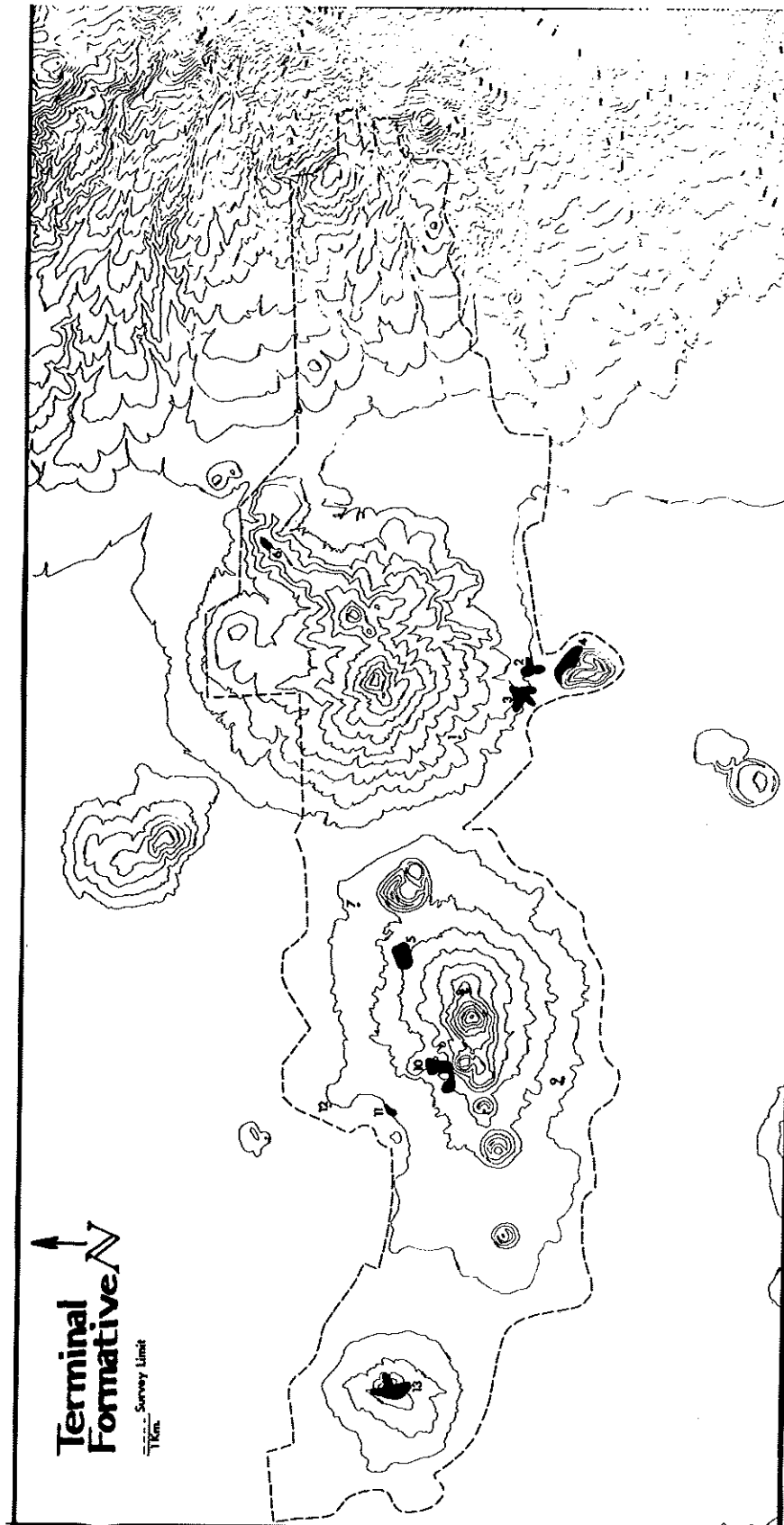


Figure 44

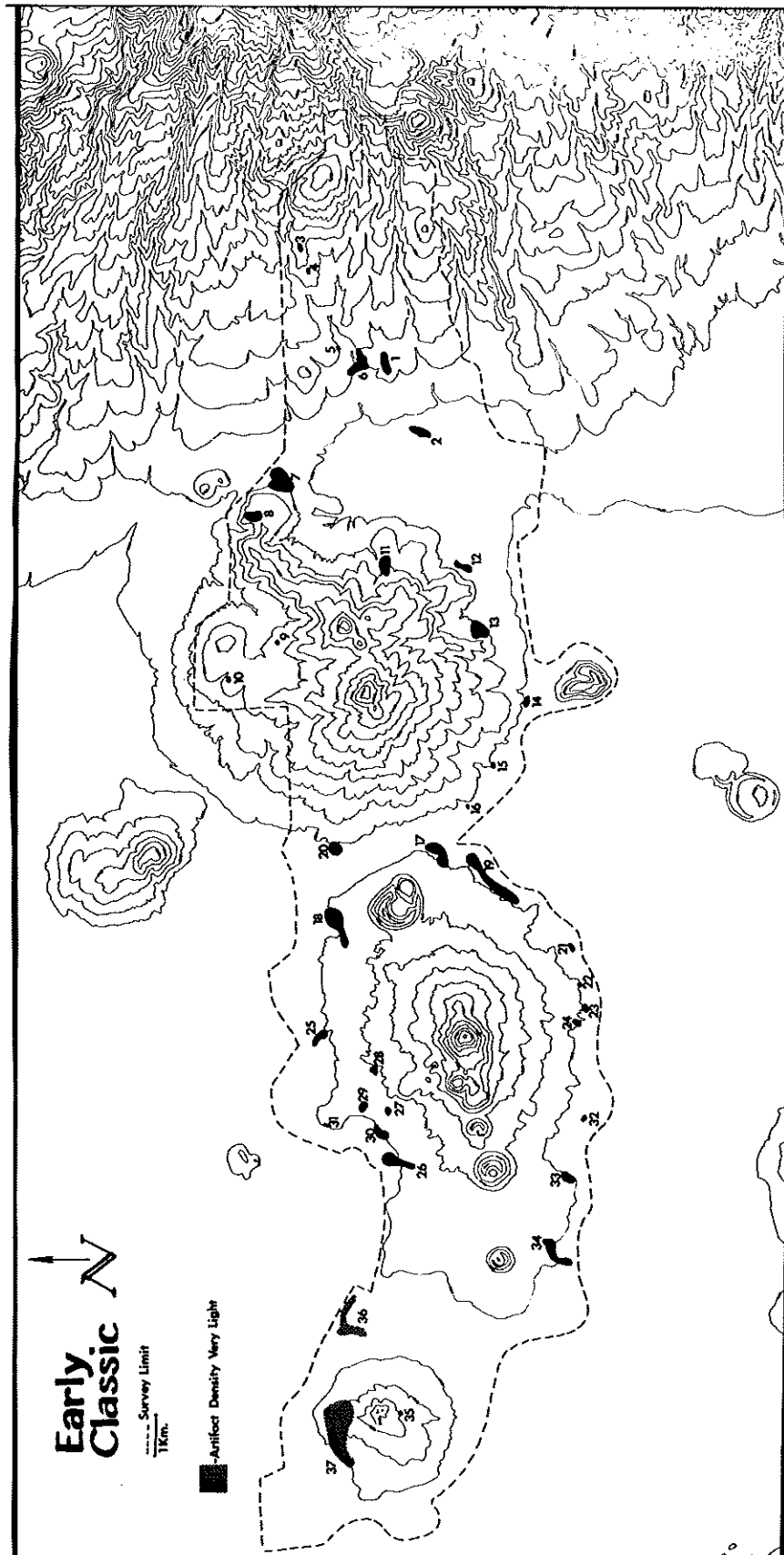


Figure 45

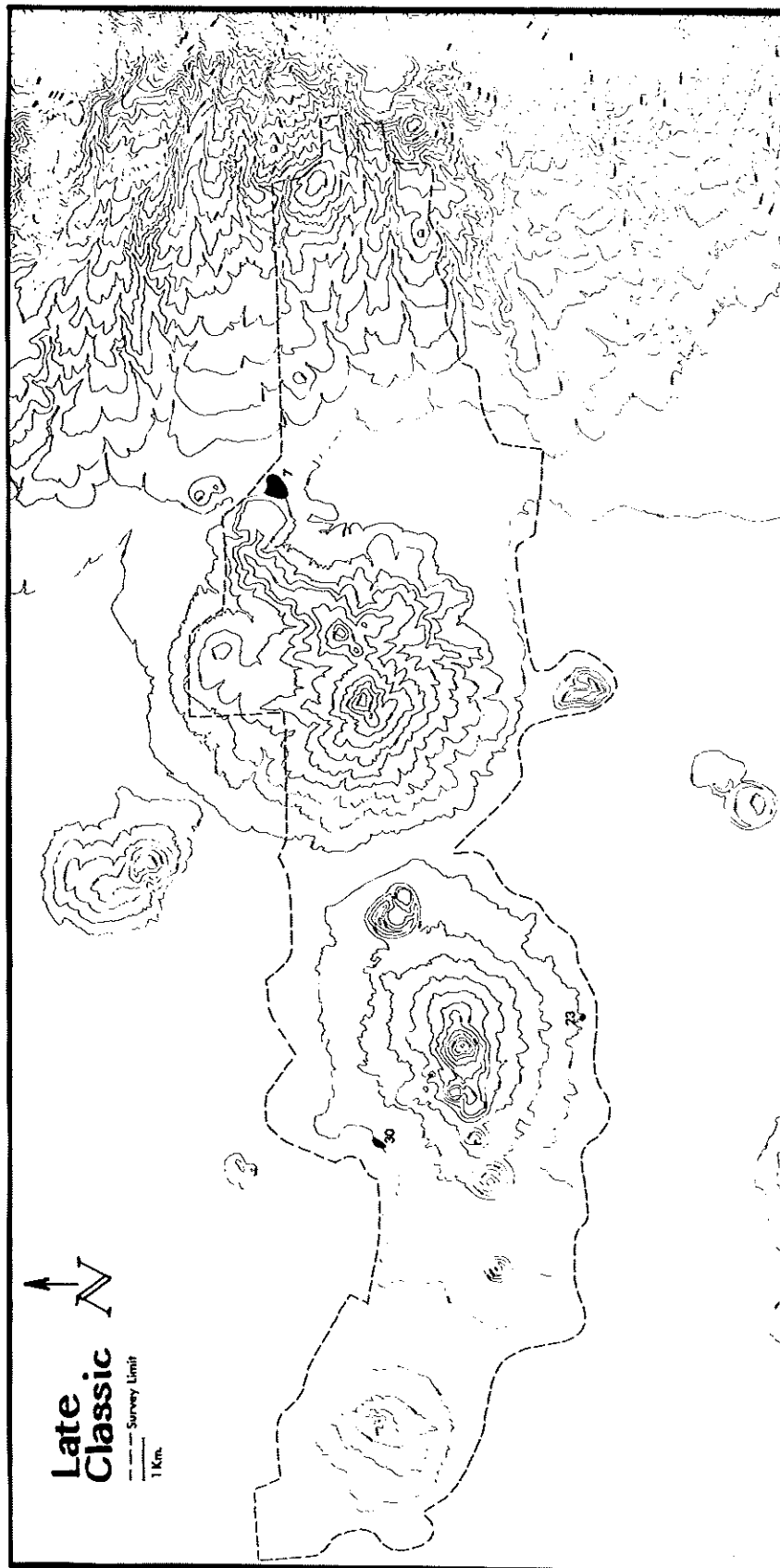


Figure 46

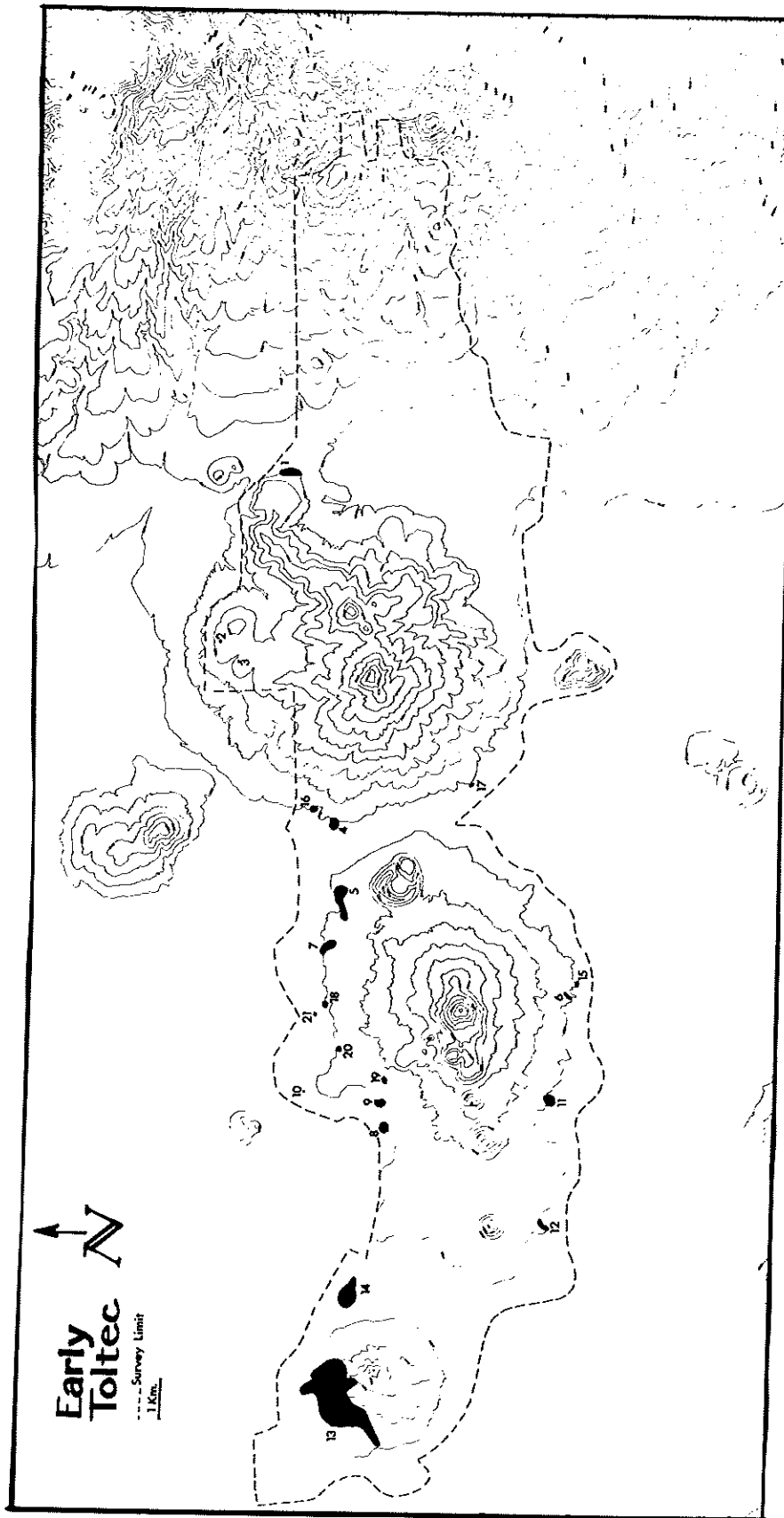


Figure 47

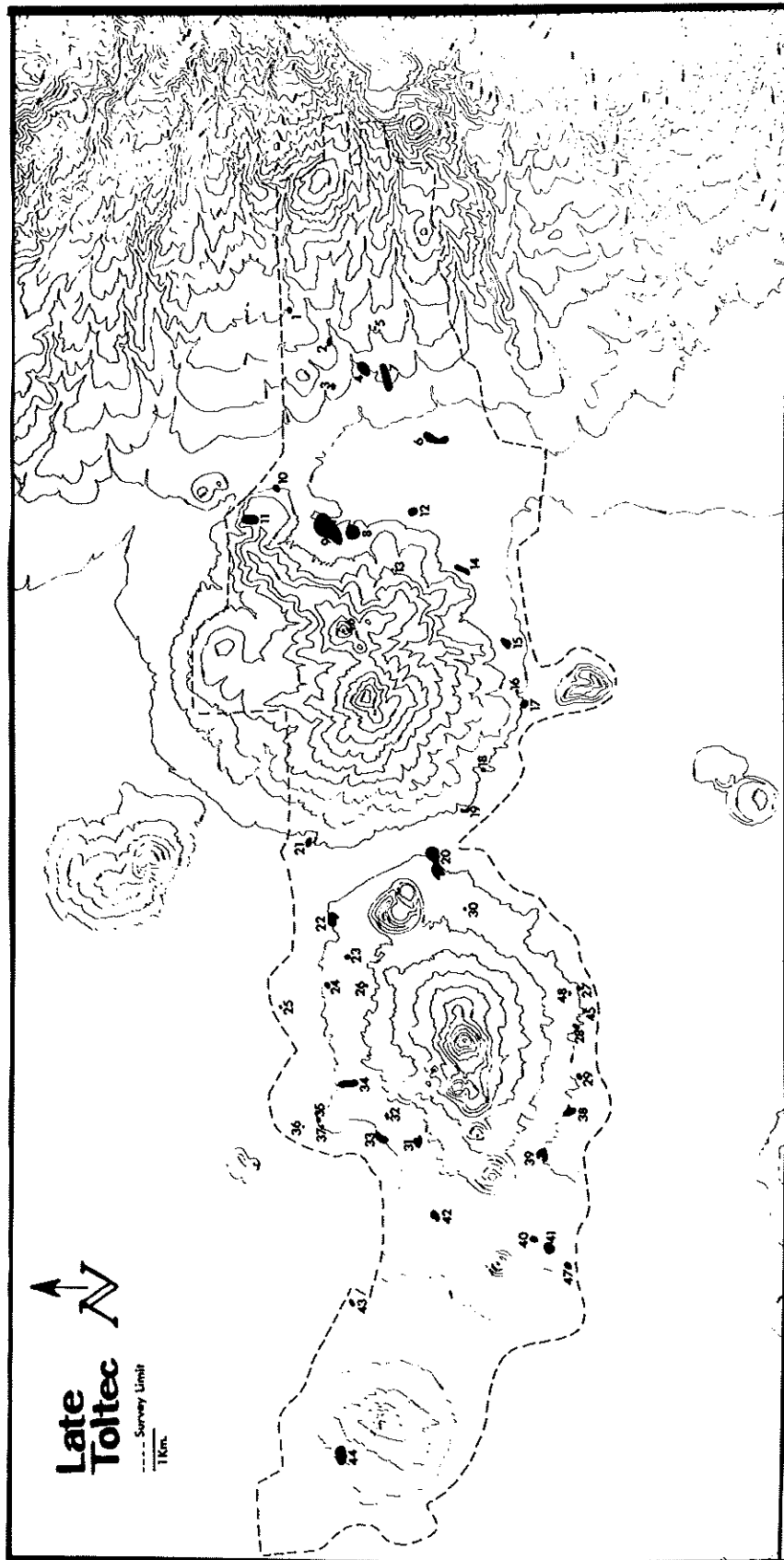


Figure 48

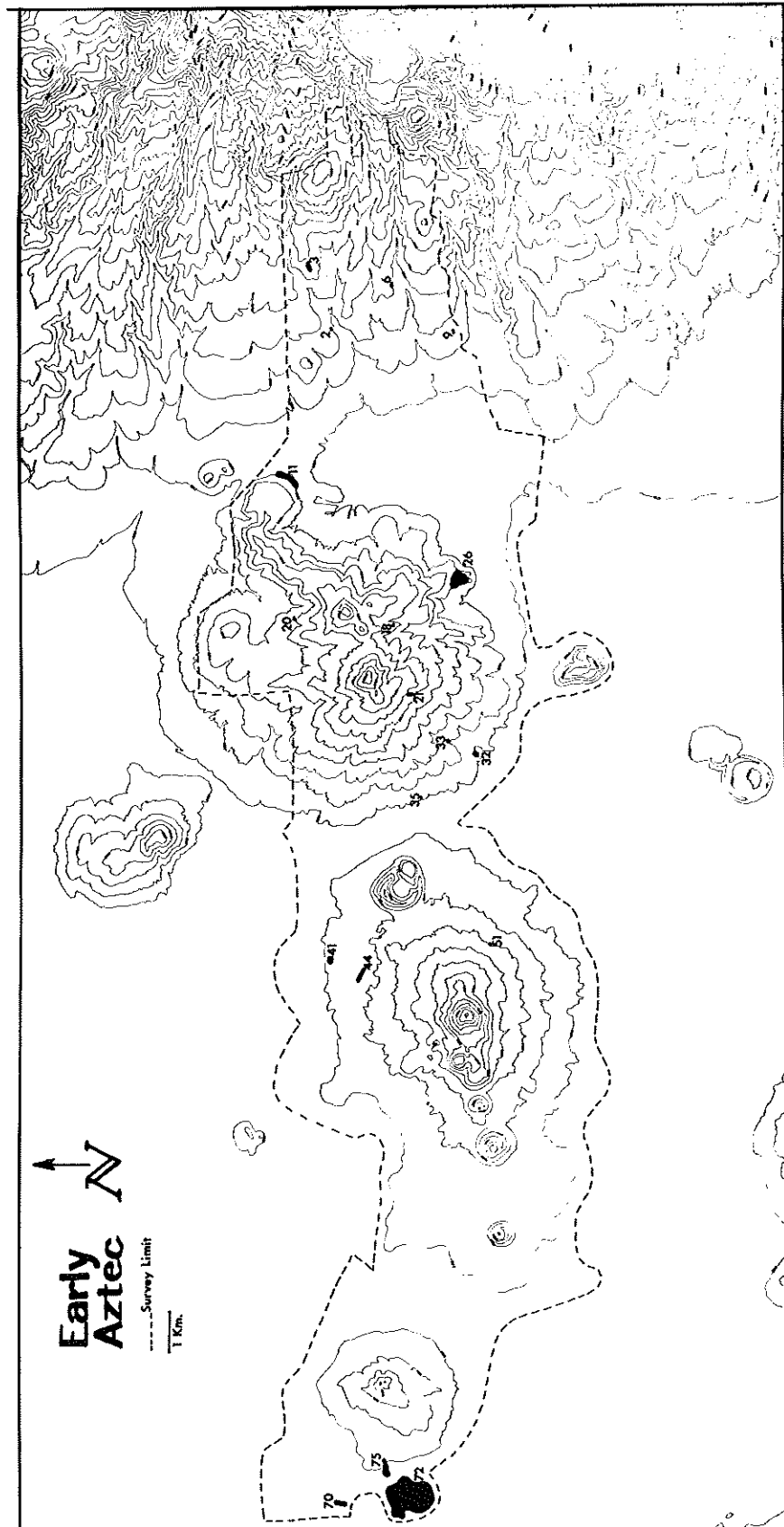


Figure 49

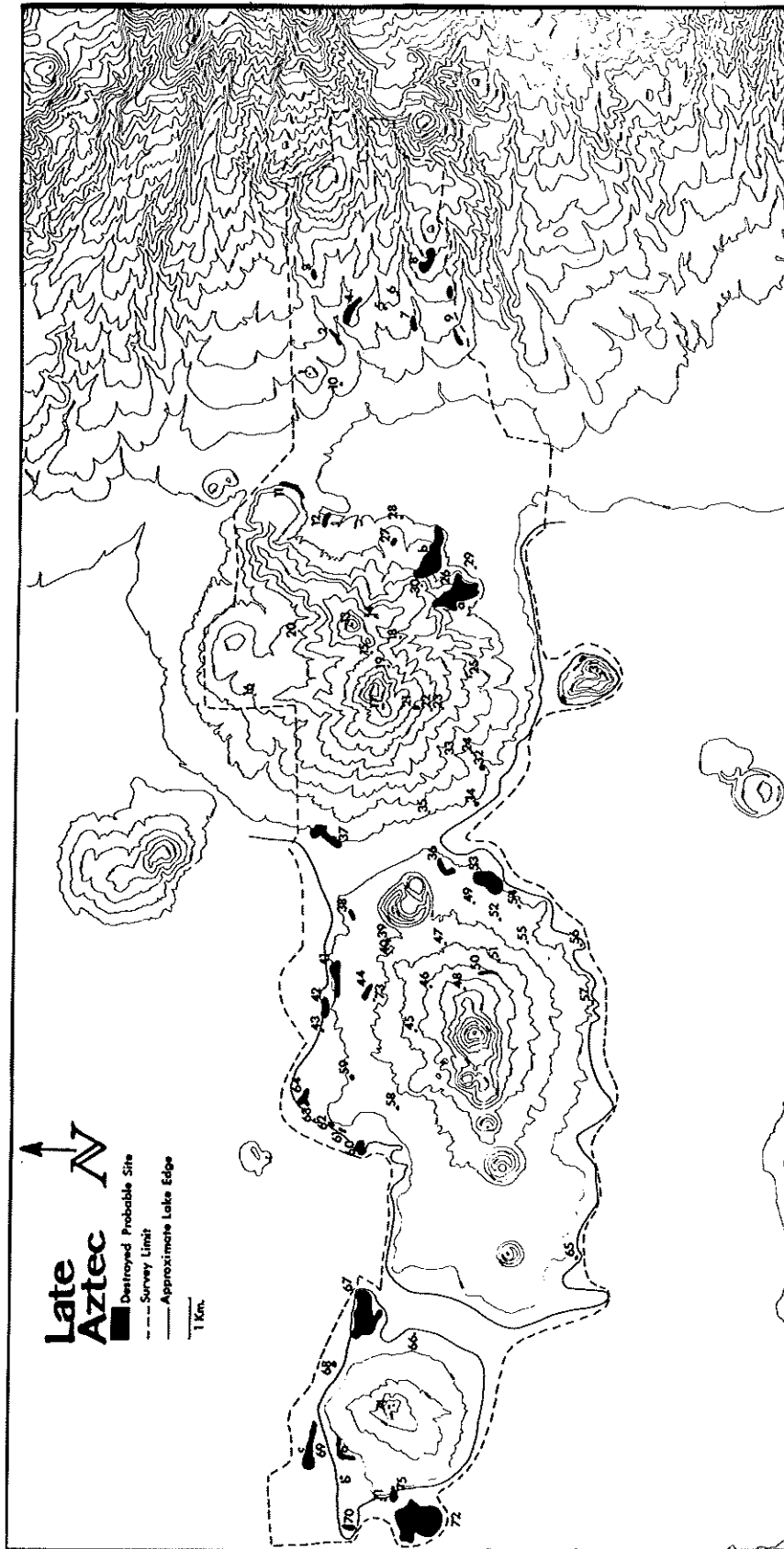


Figure 50

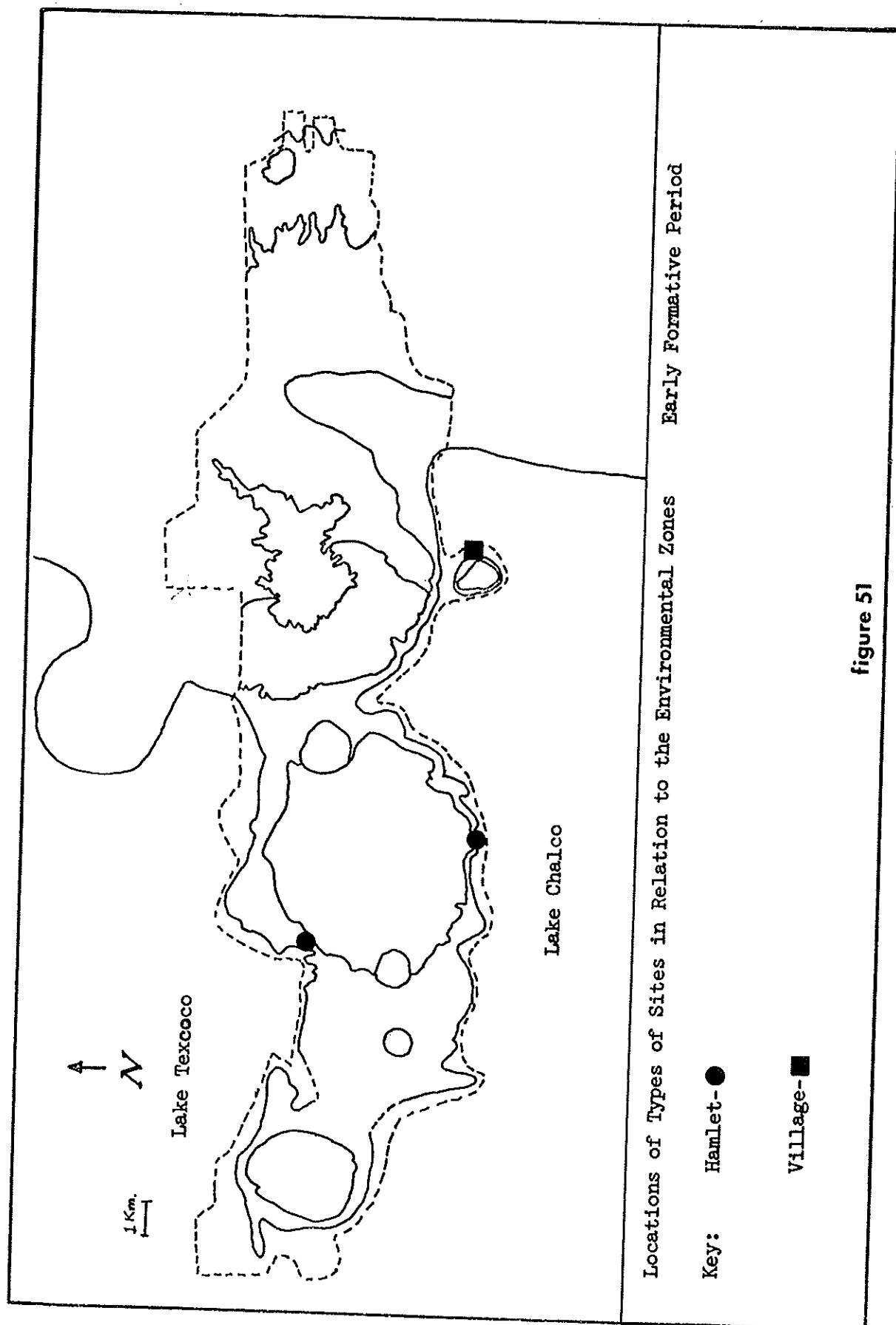


figure 51

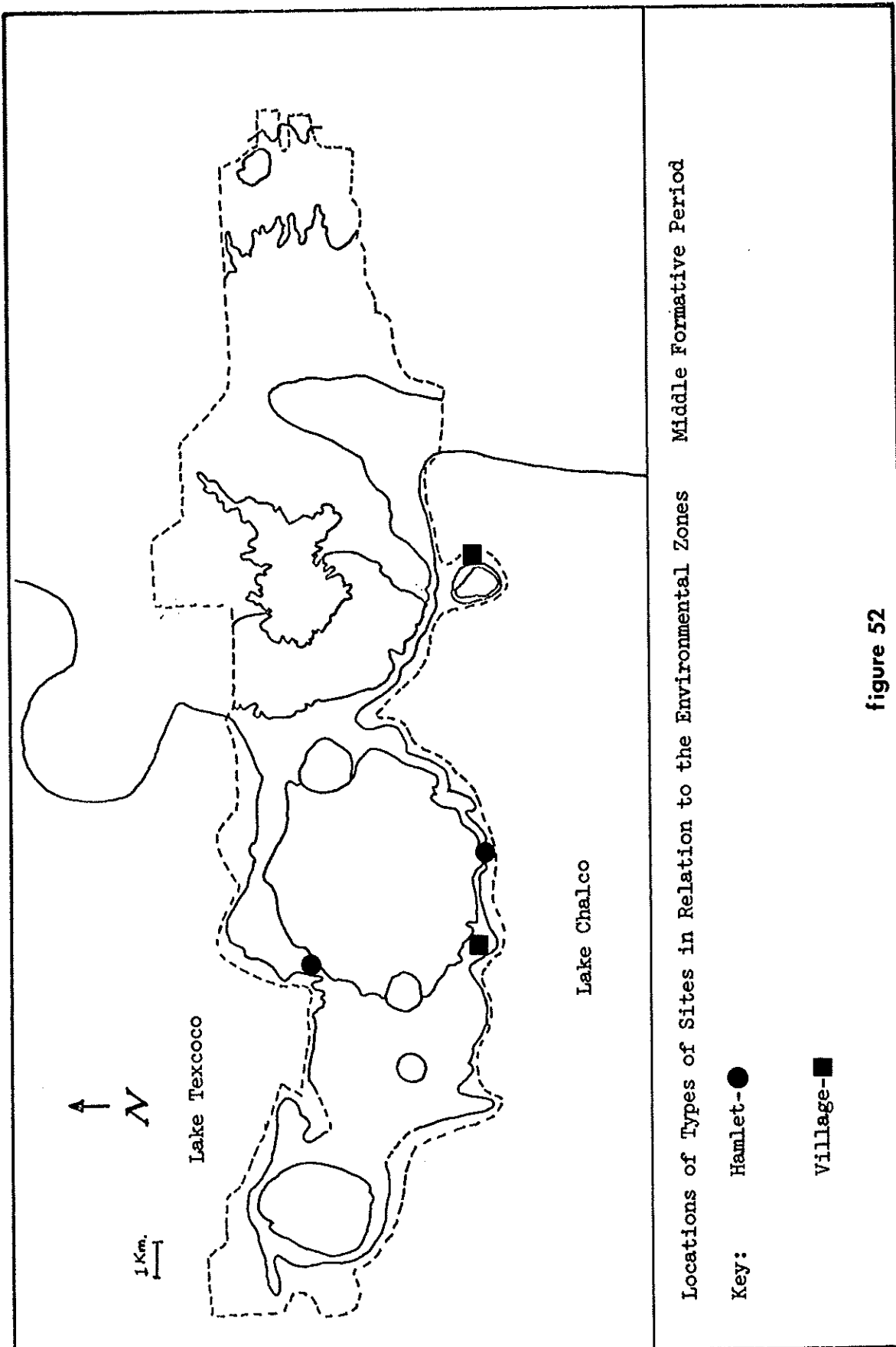


figure 52

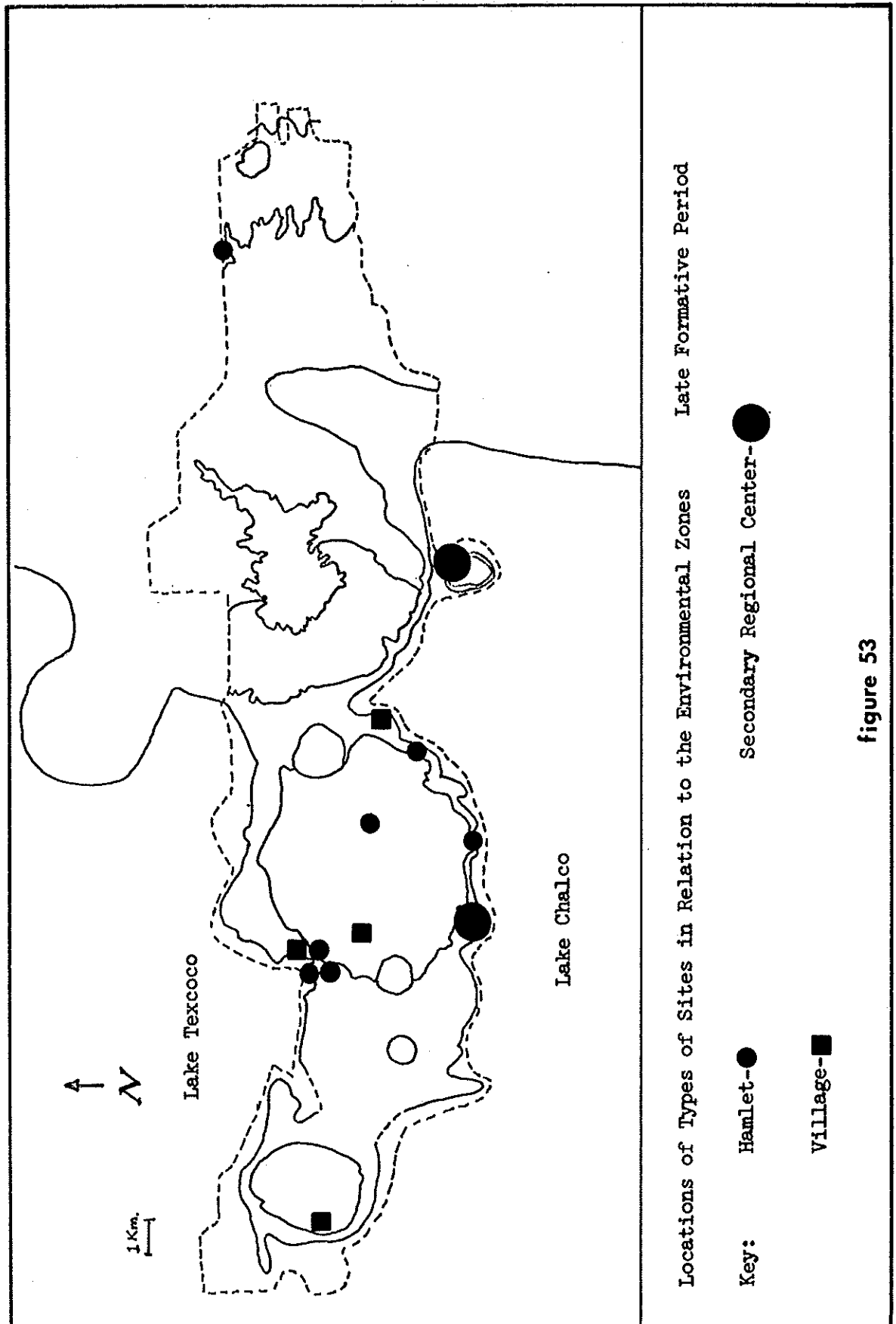
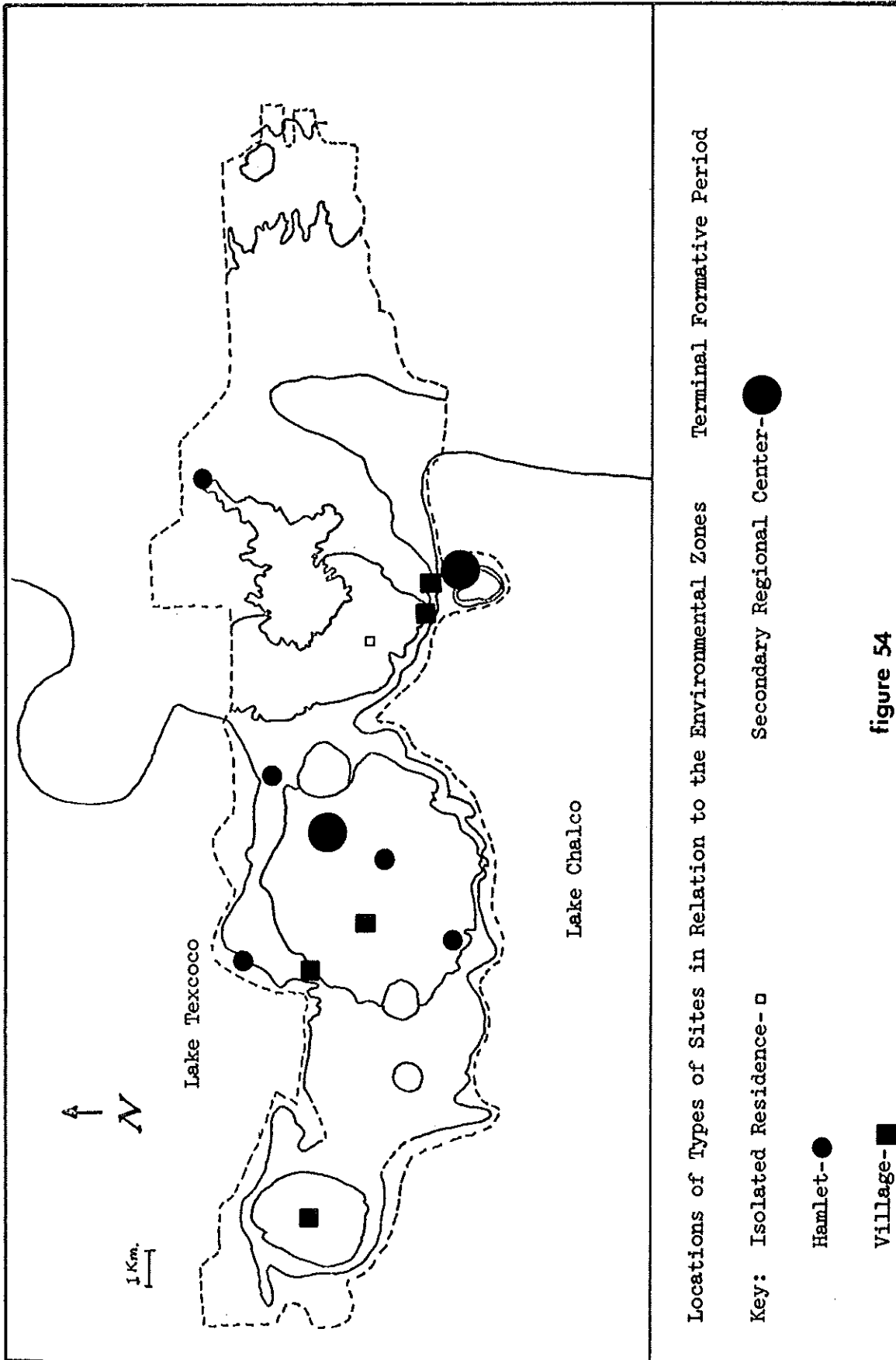
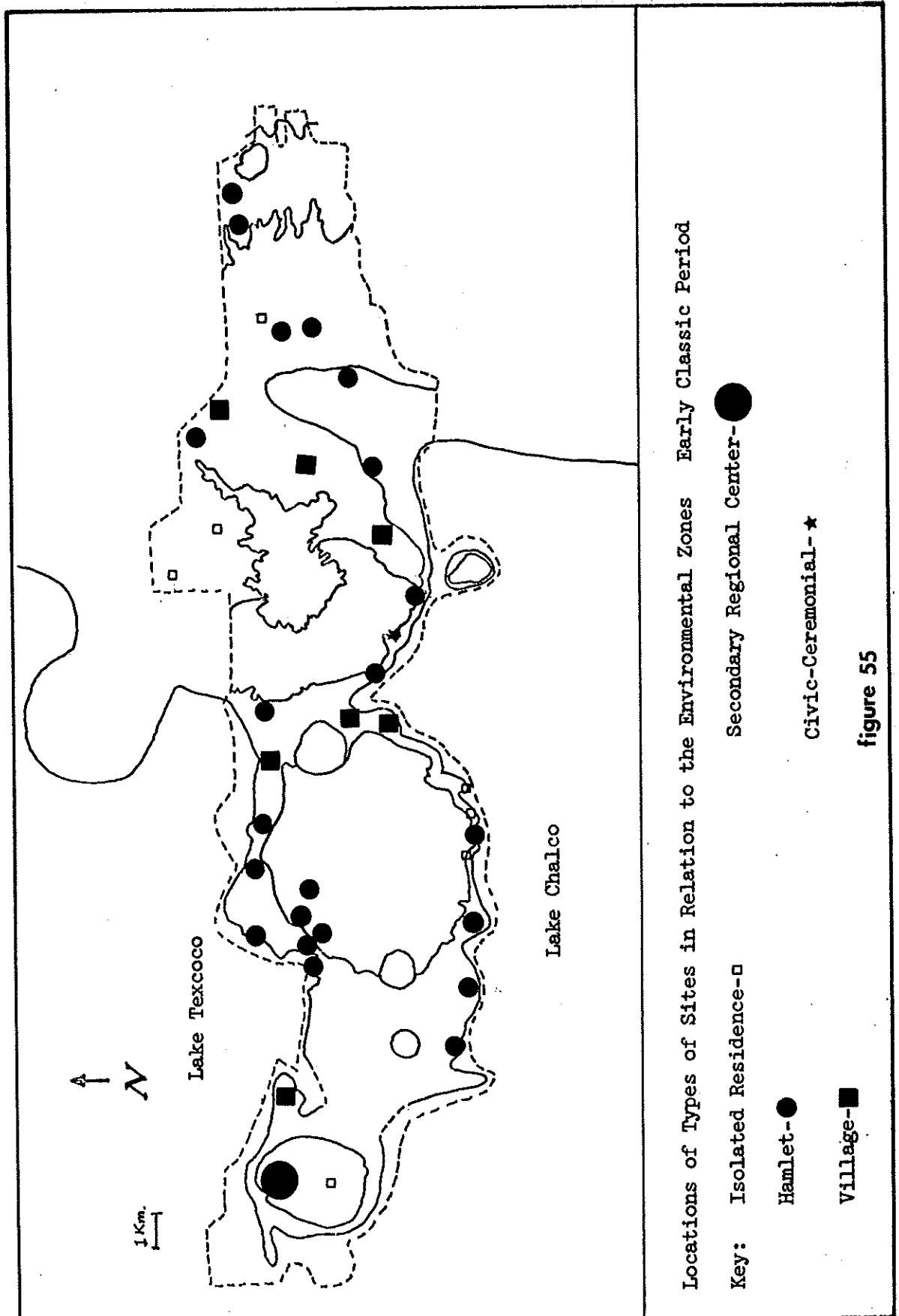


figure 53





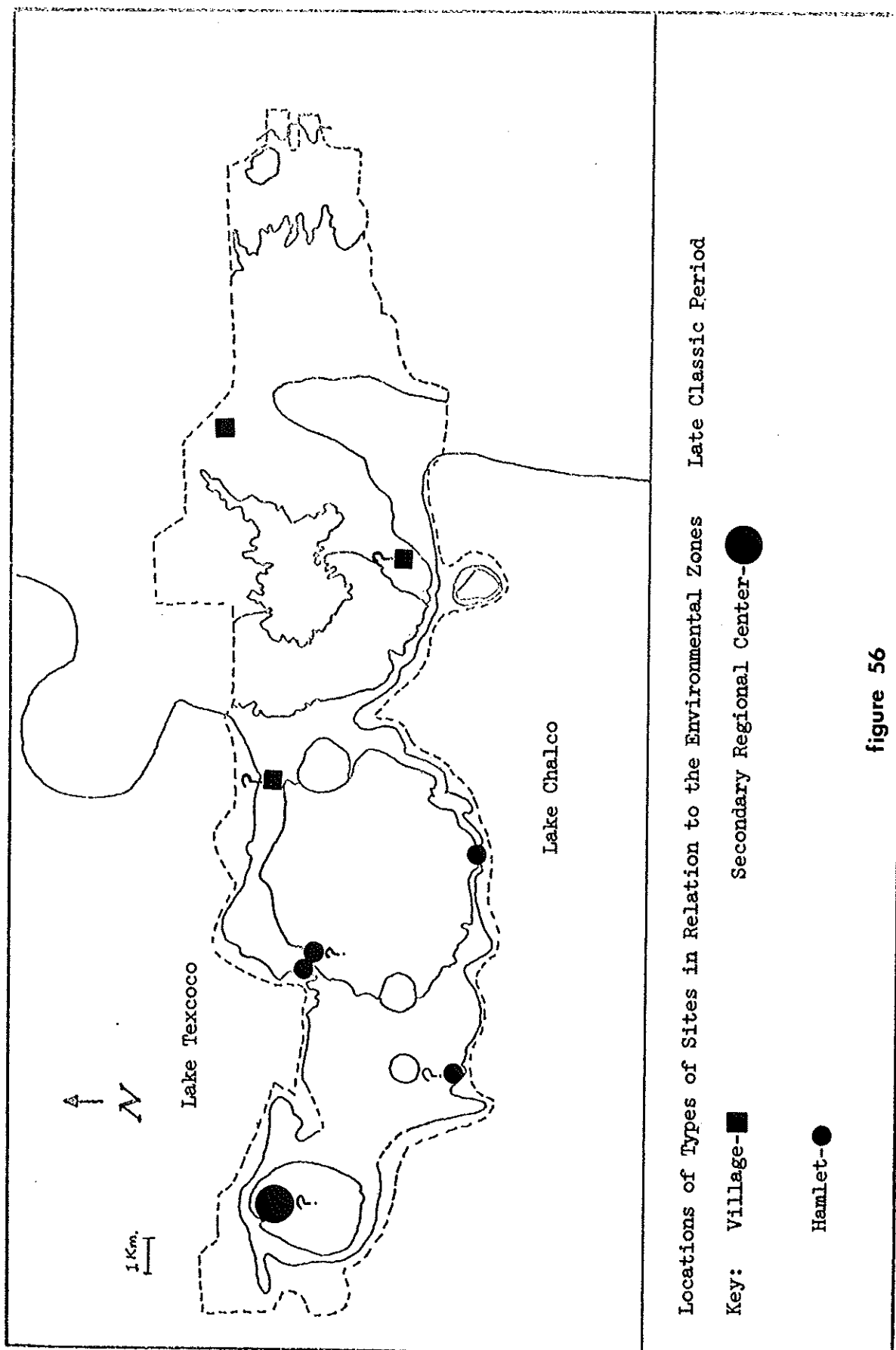


figure 56

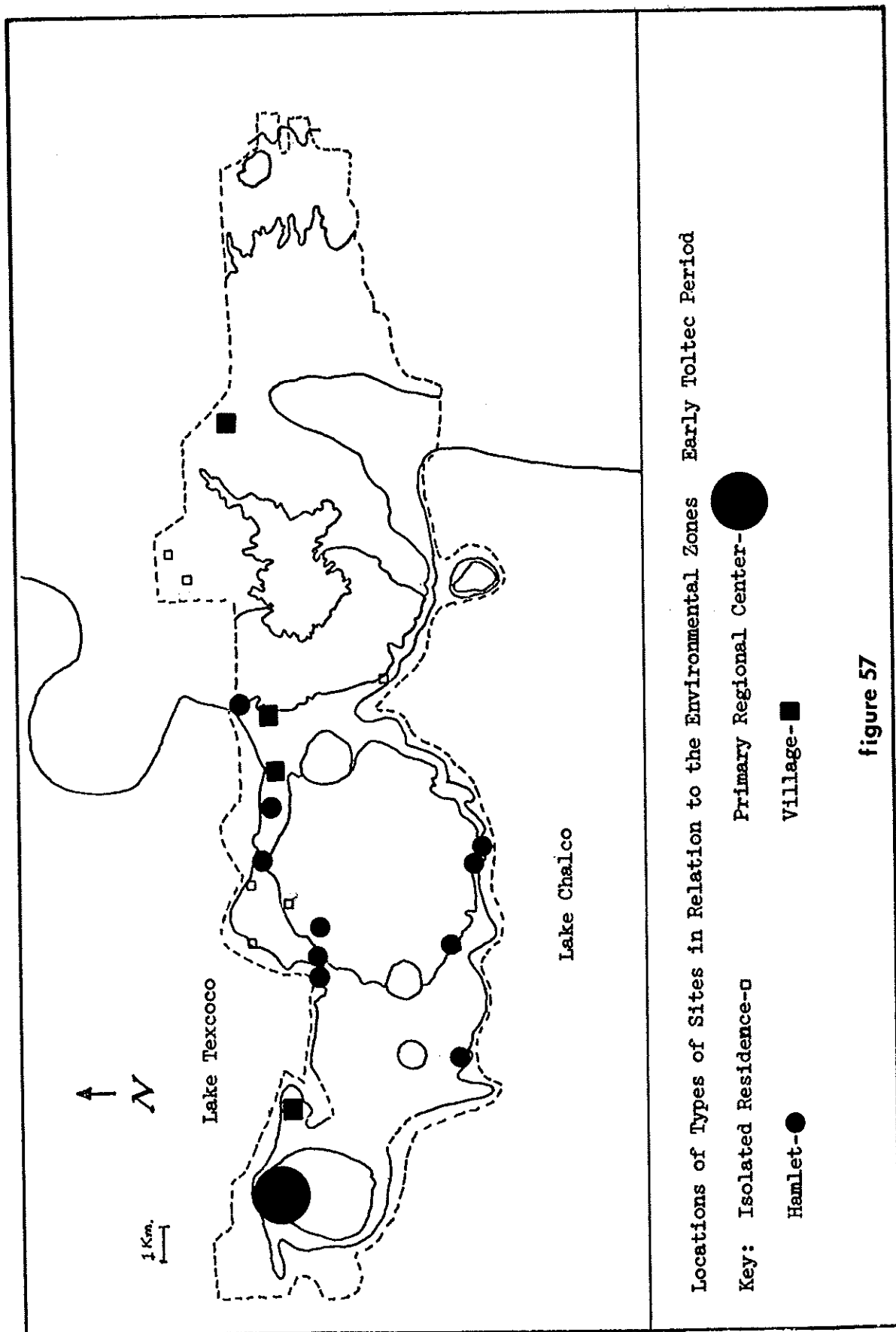
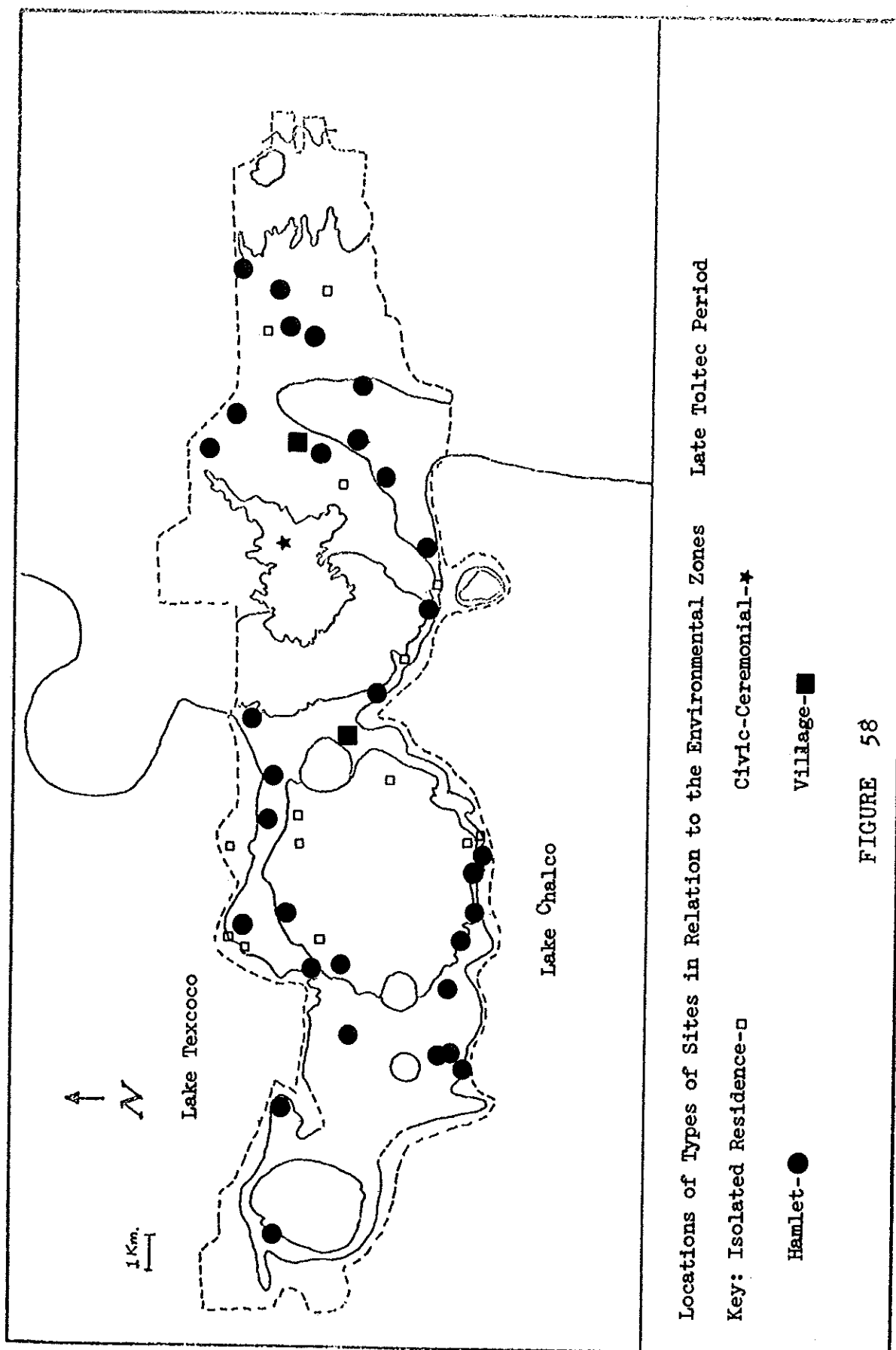


figure 57



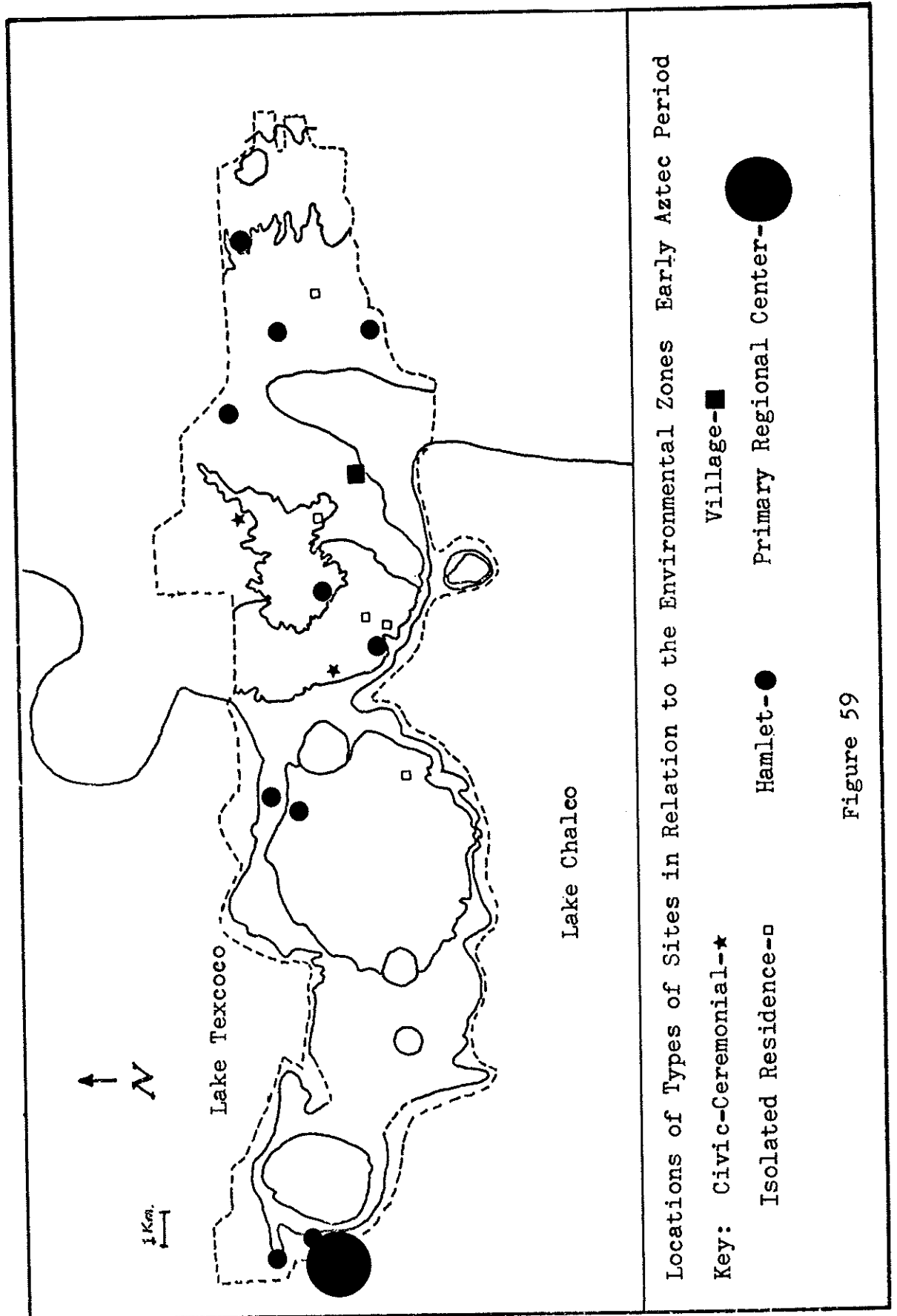


Figure 59

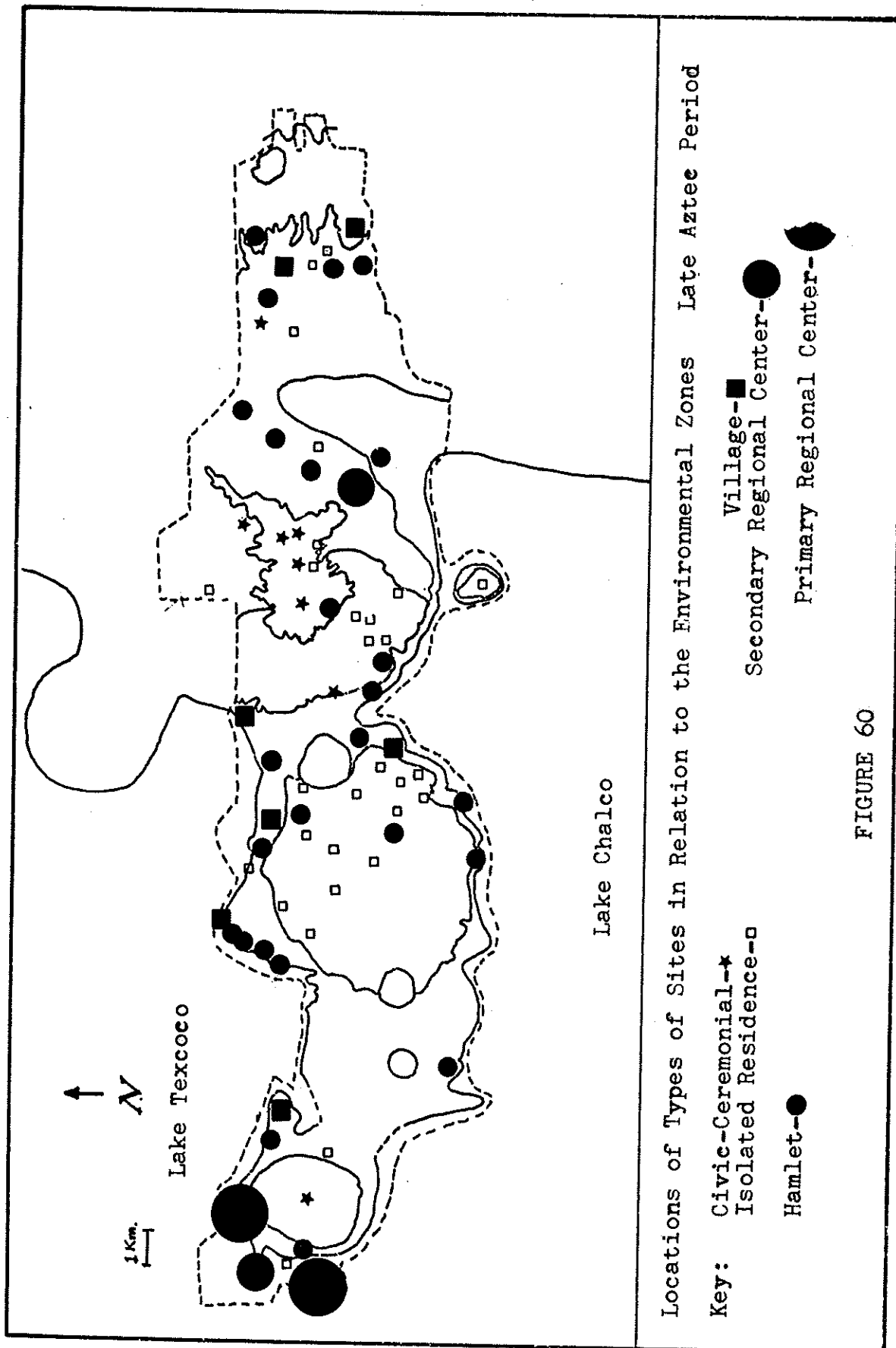


FIGURE 60

ESTIMATED POPULATION OF THE
IXTAPALAPA PENINSULA REGION FROM
EARLY FORMATIVE TO AZTEC

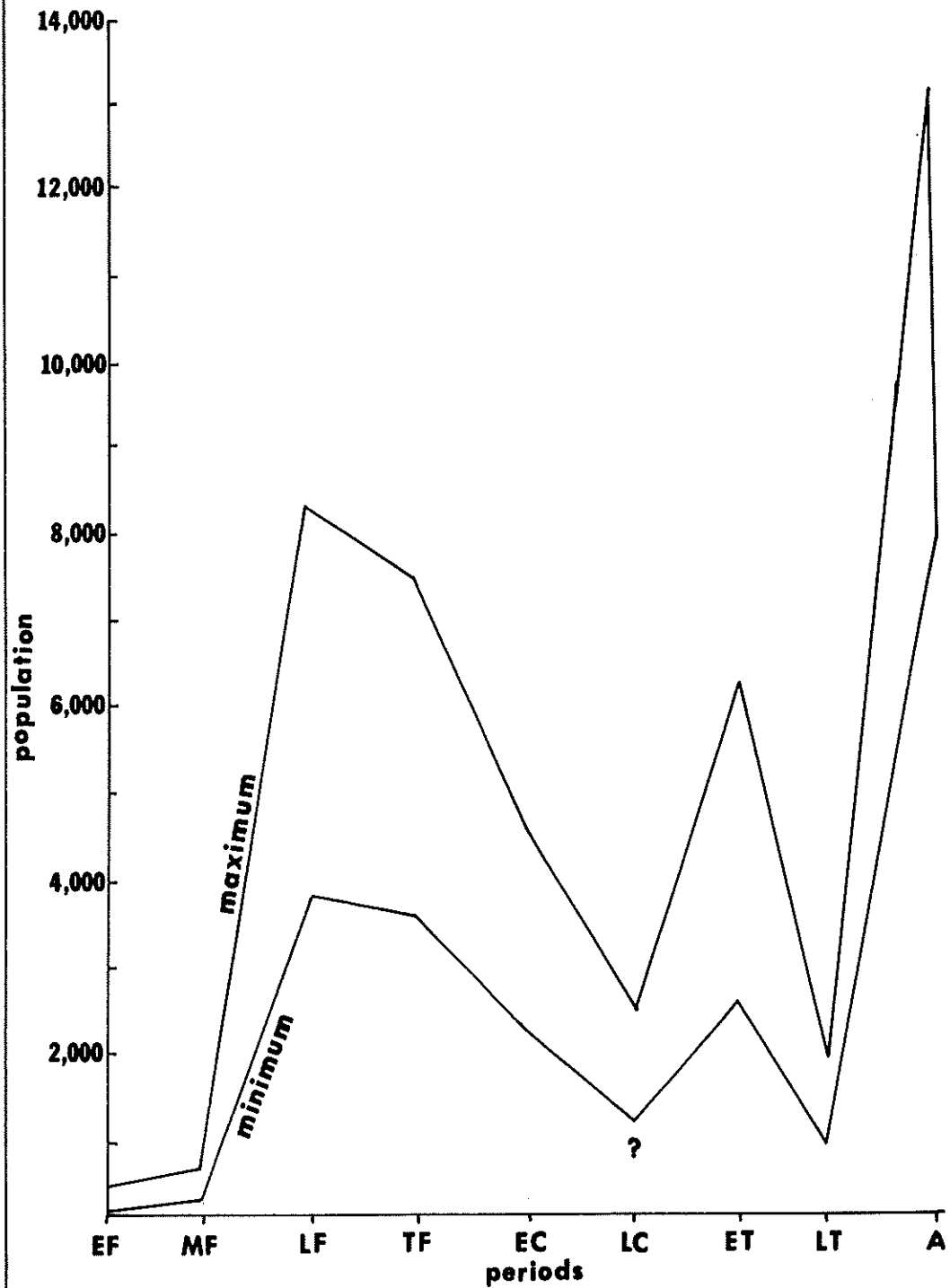
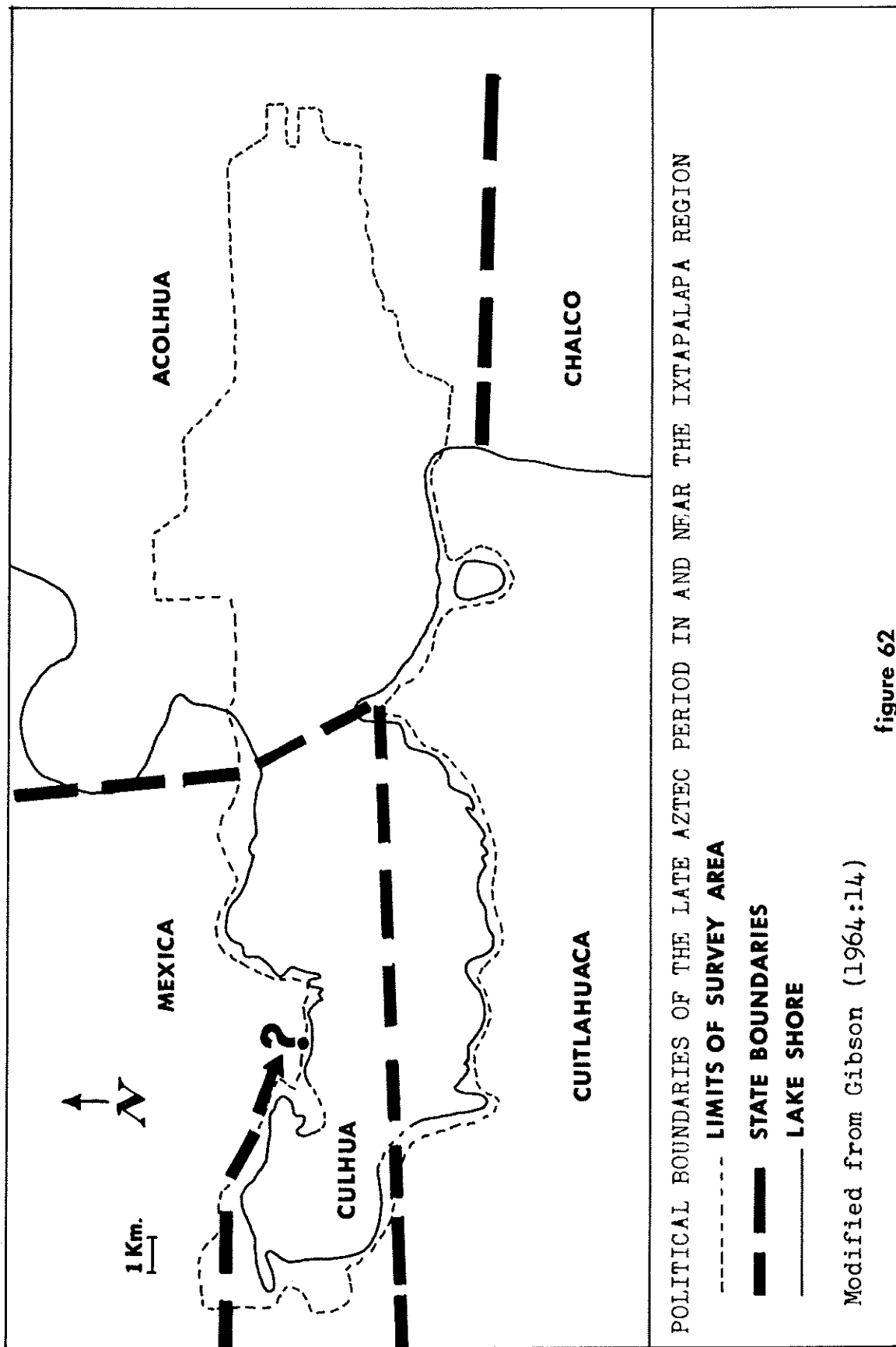


figure 61



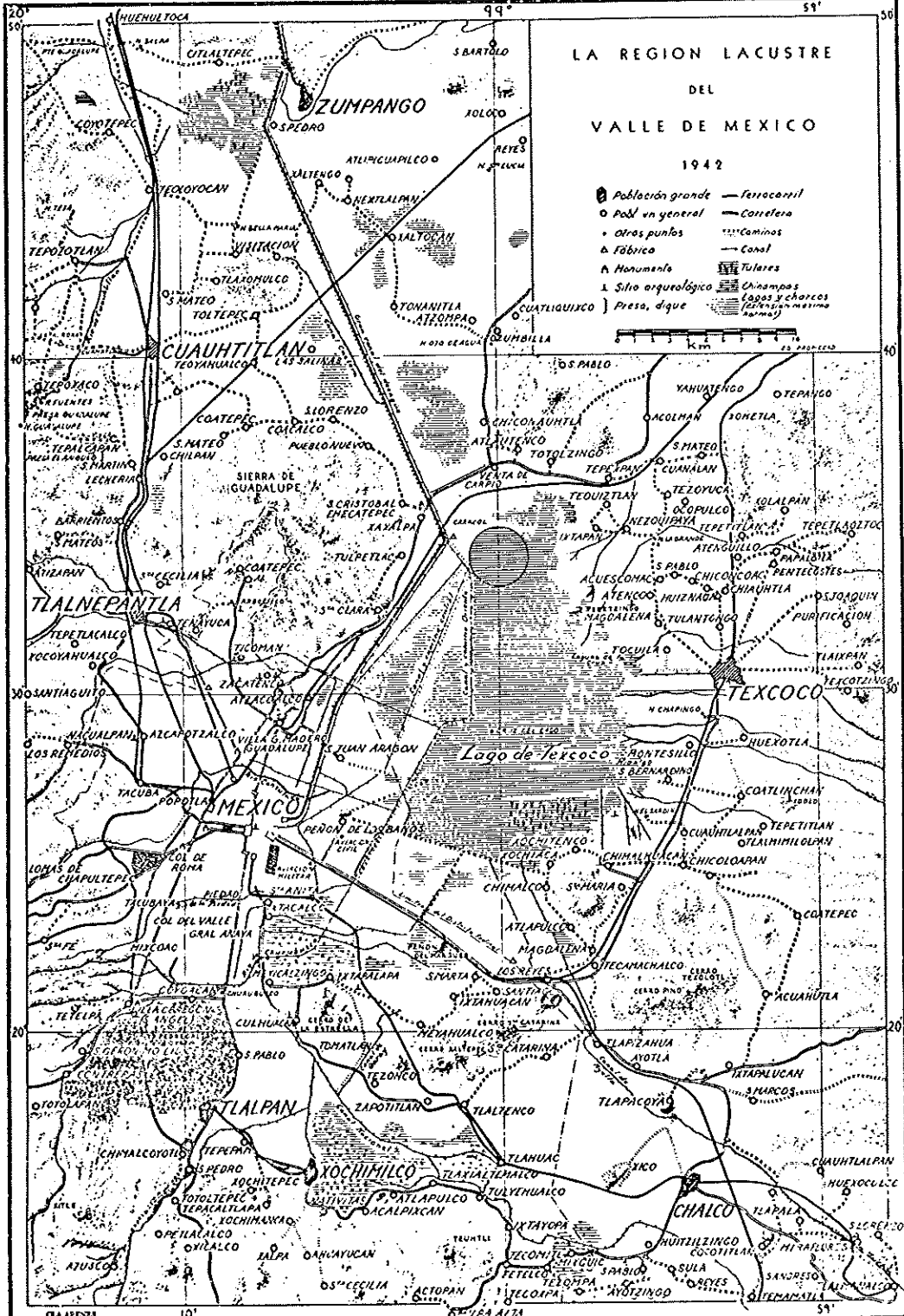


Figure 63: The Southern Valley of Mexico, by Ola Apenes (1942), in Linne (1948).

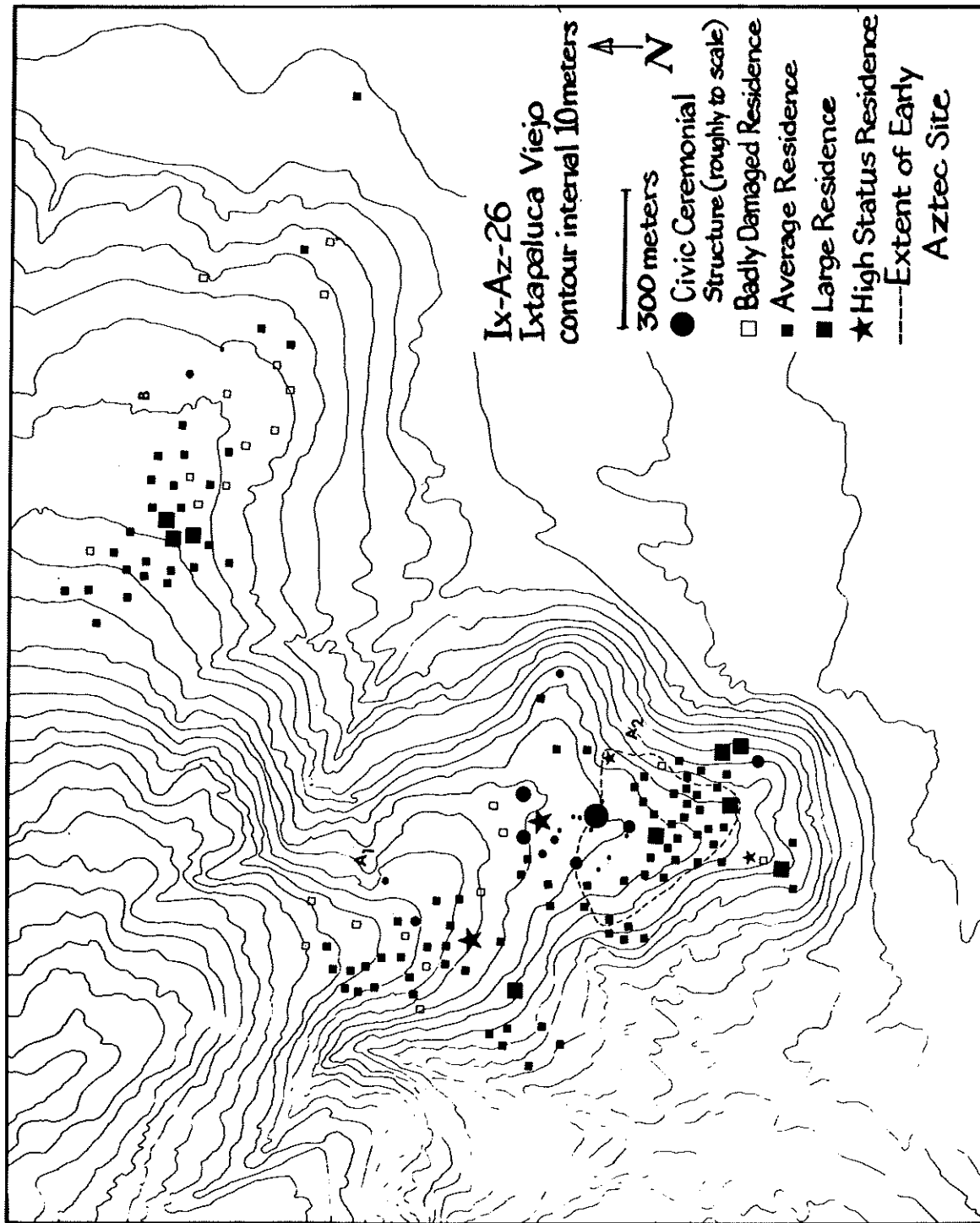


Figure 64

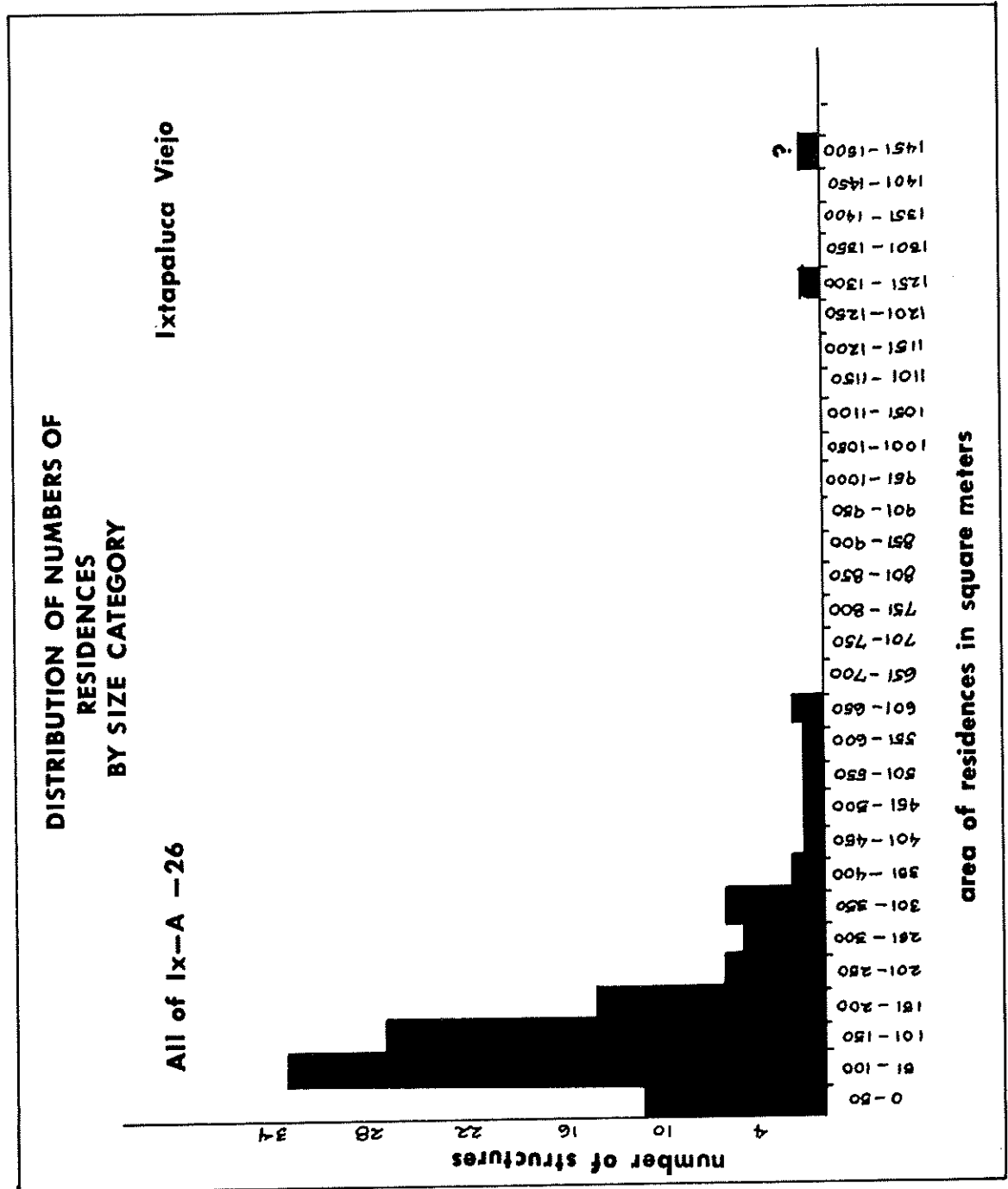
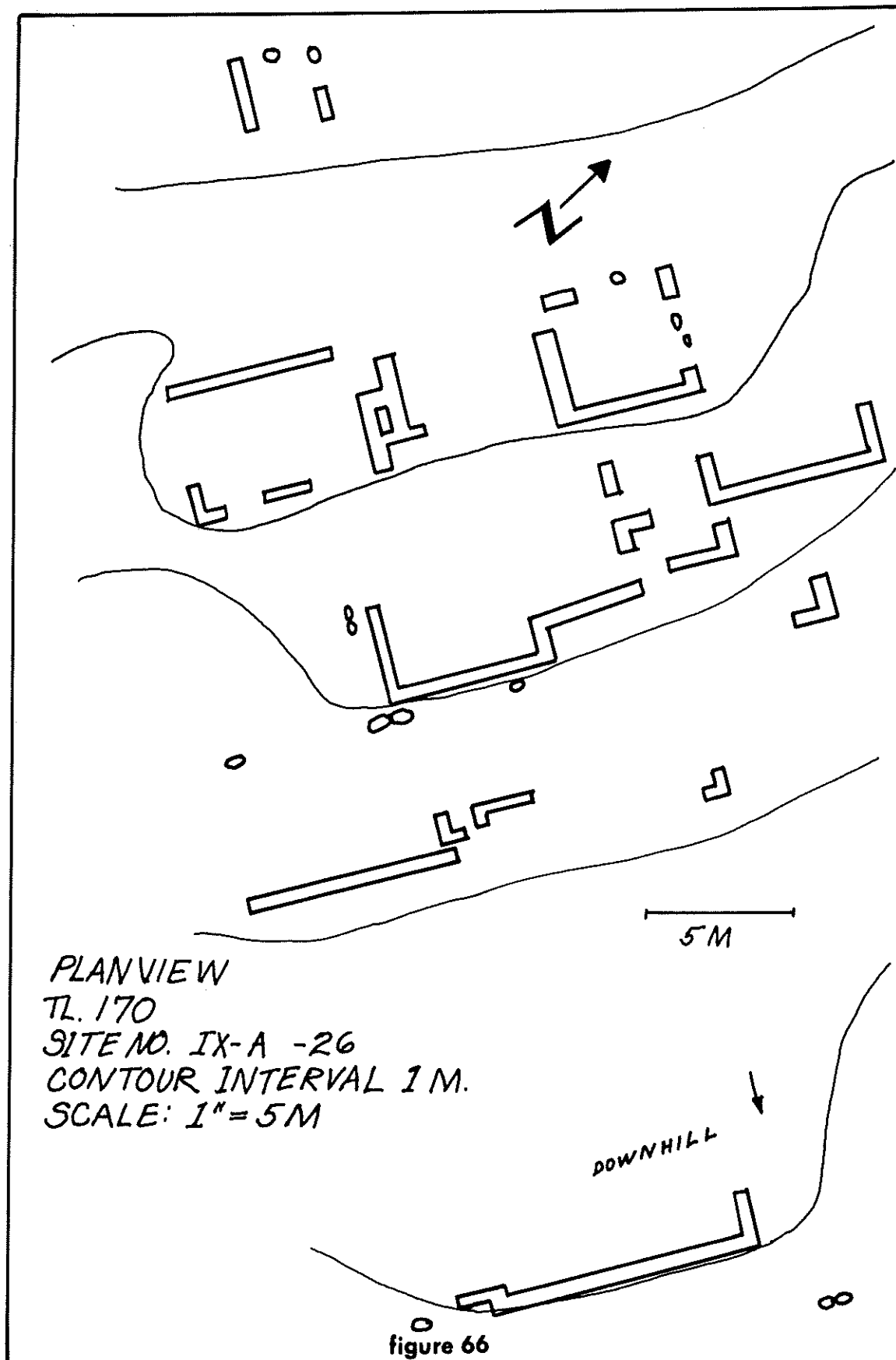


figure 65



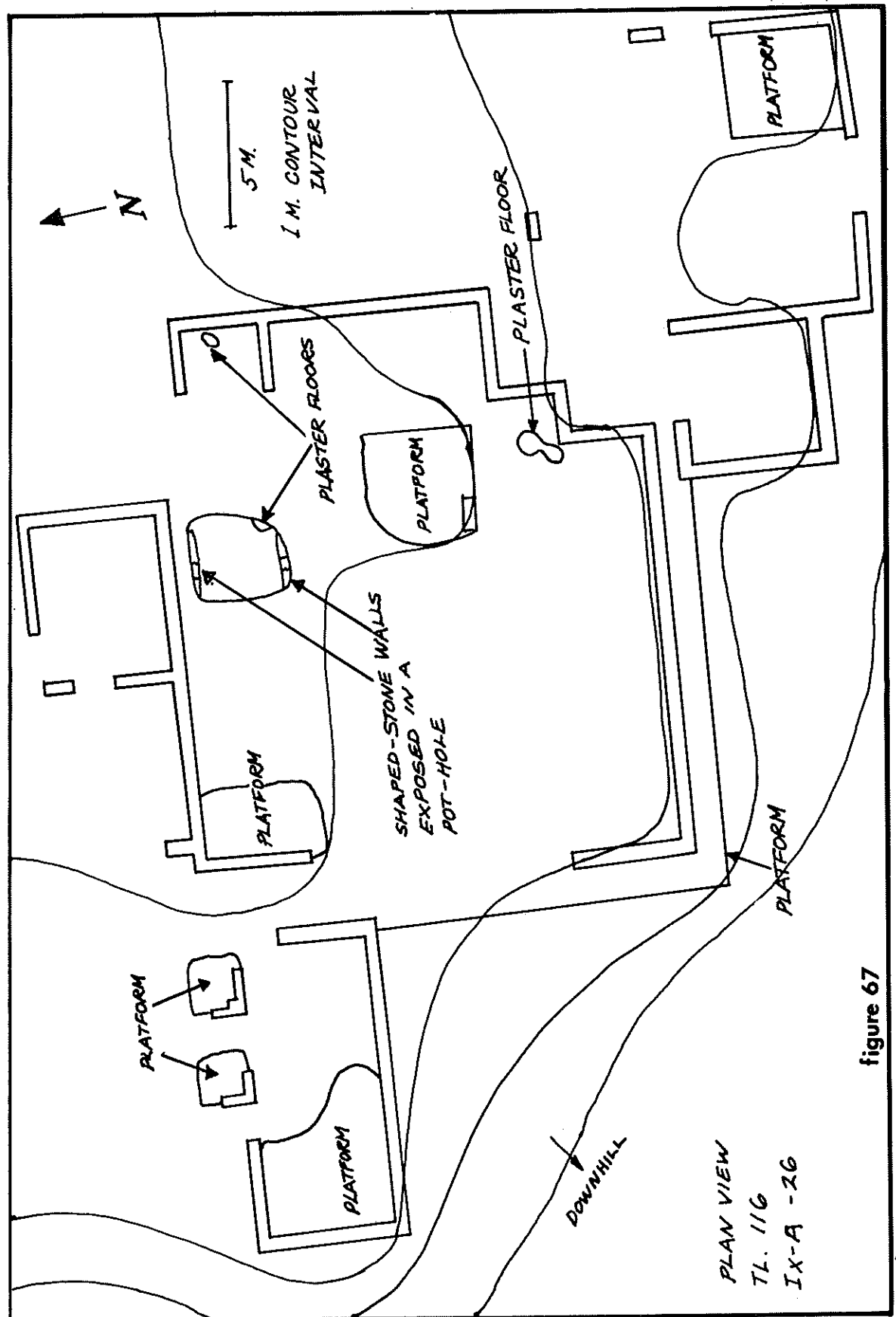
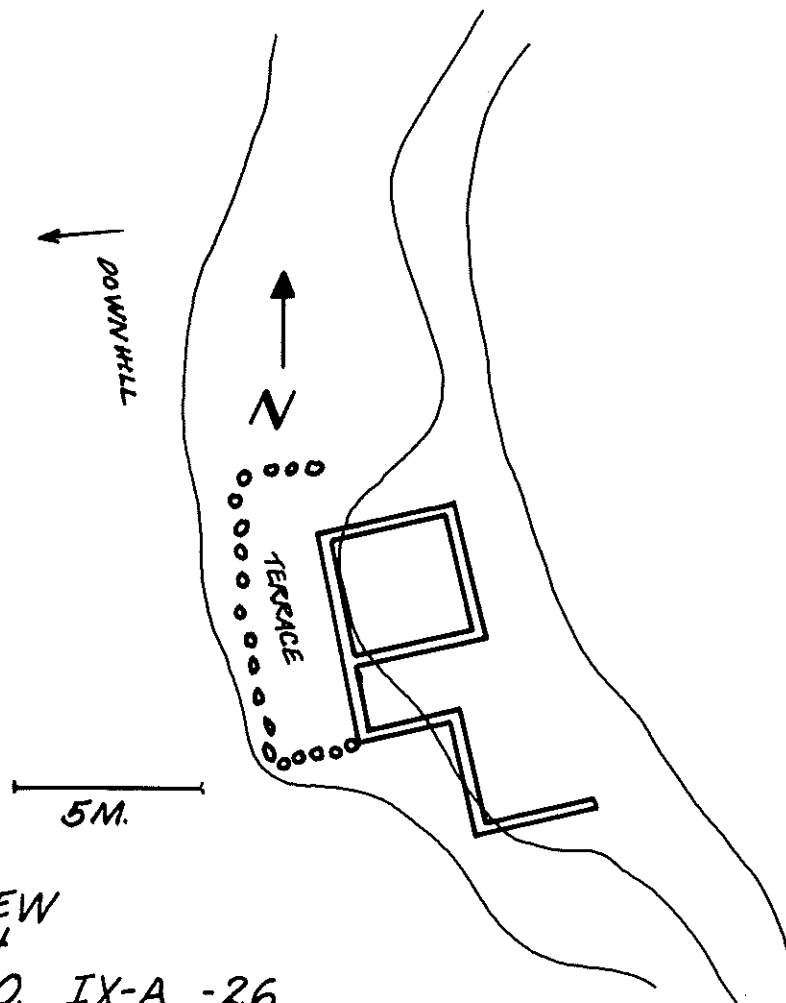
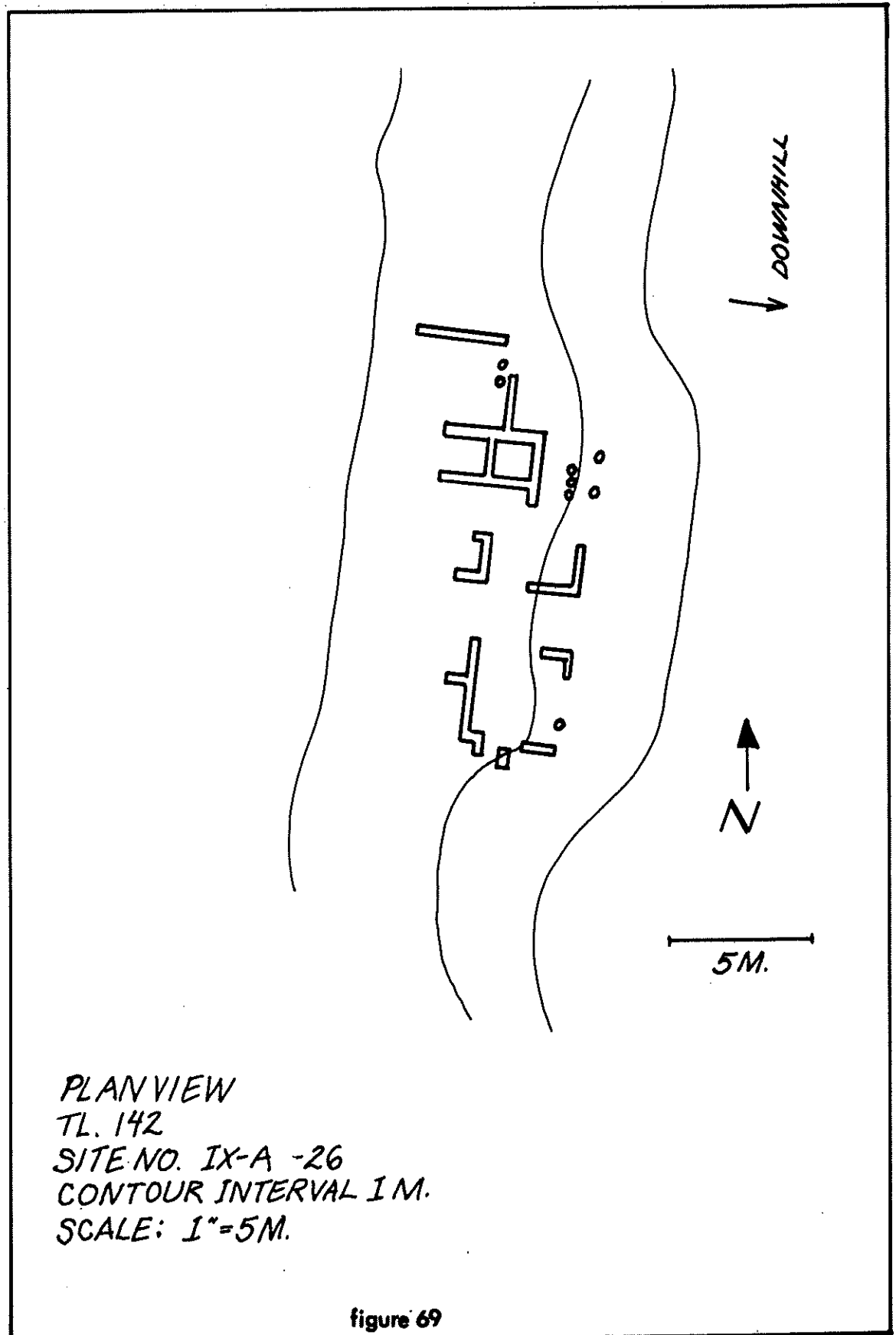


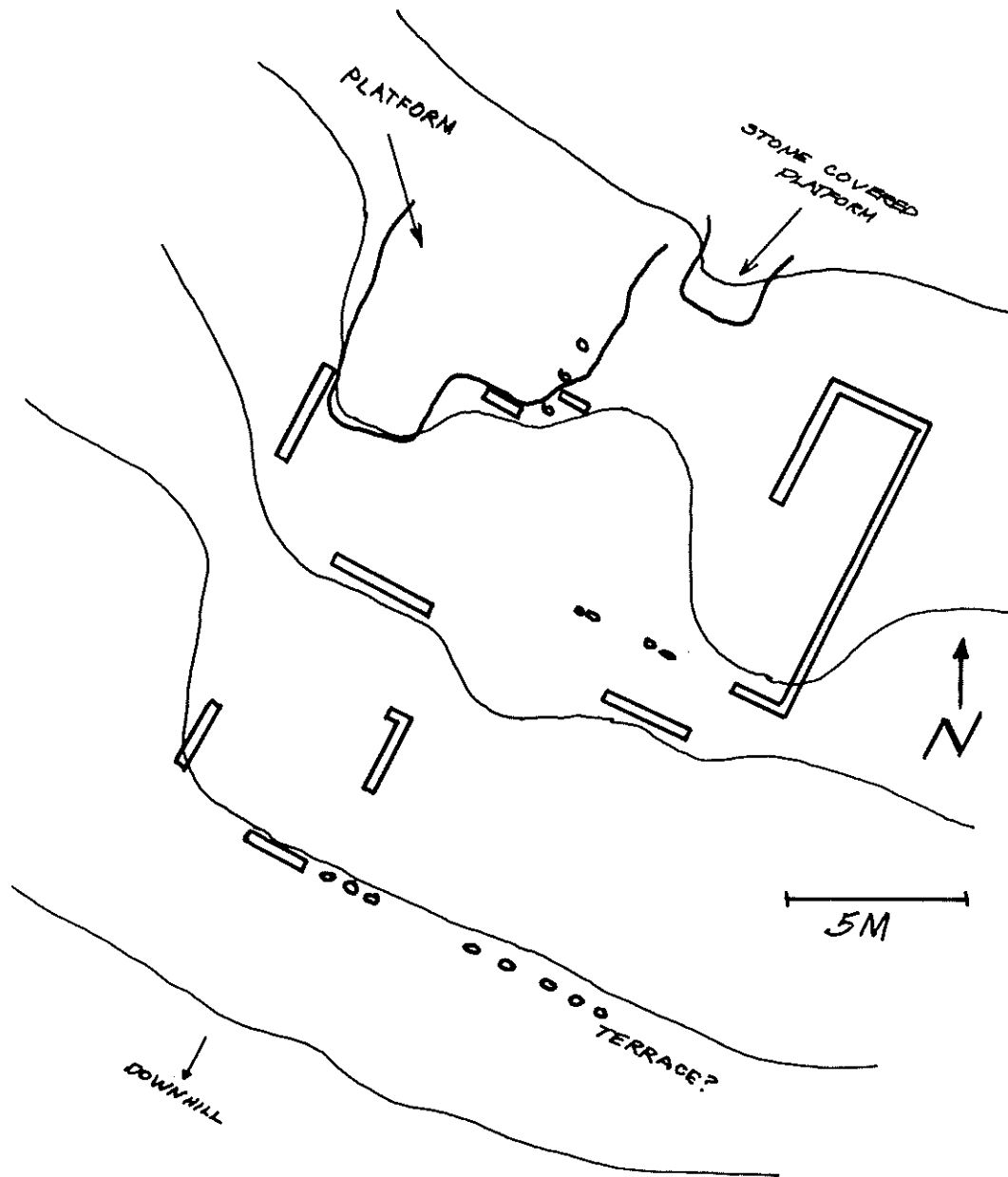
figure 67



PLAN VIEW
TL. 174
SITE NO. IX-A -26
CONTOUR INTERVAL 1M
SCALE: 1" = 5M

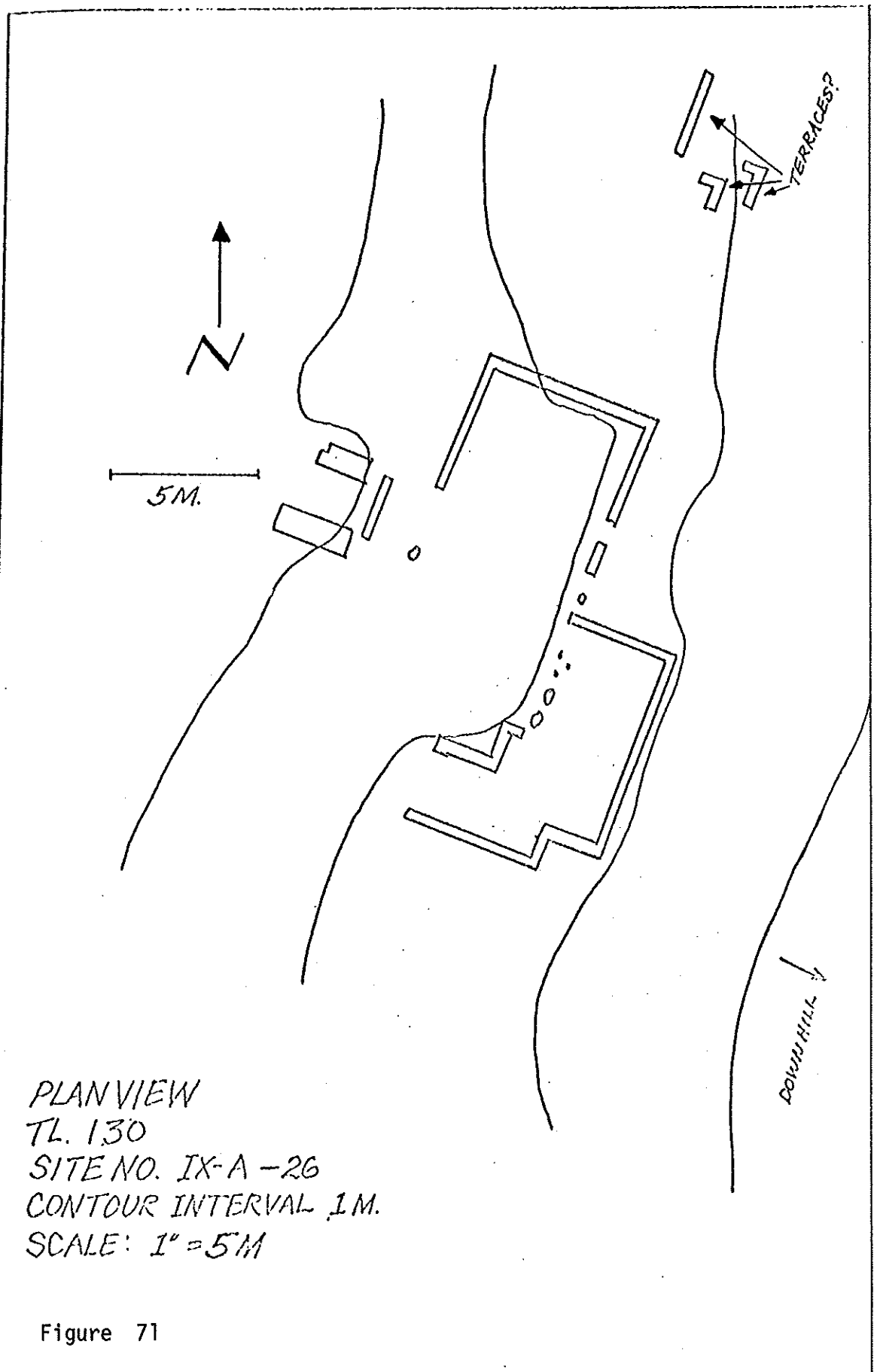
figure 68





PLAN VIEW
 TL. 186
 SITE NO. IX-A -26
 CONTOUR INTERVAL 1M
 SCALE: 1" = 5M

figure 70



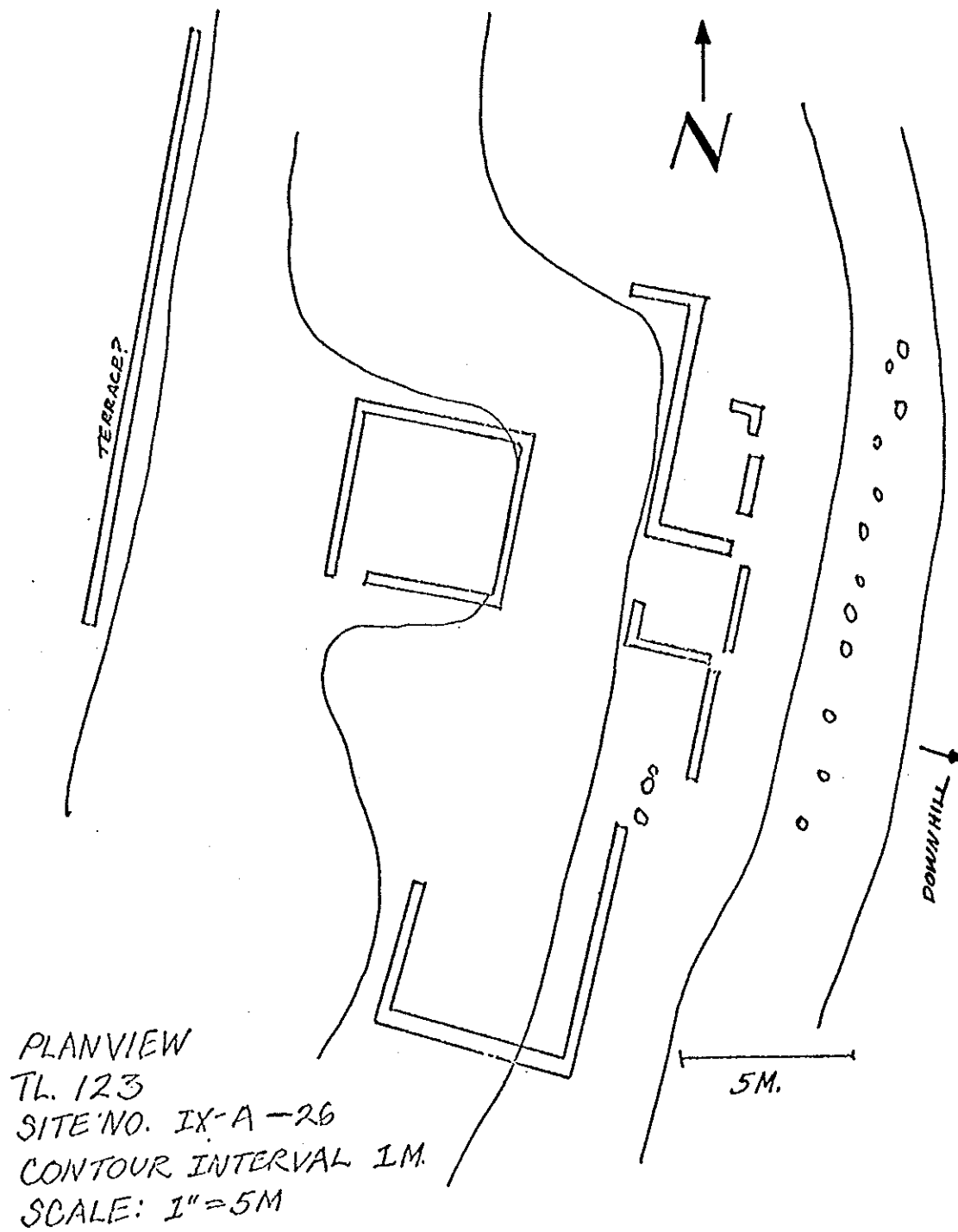


Figure 72

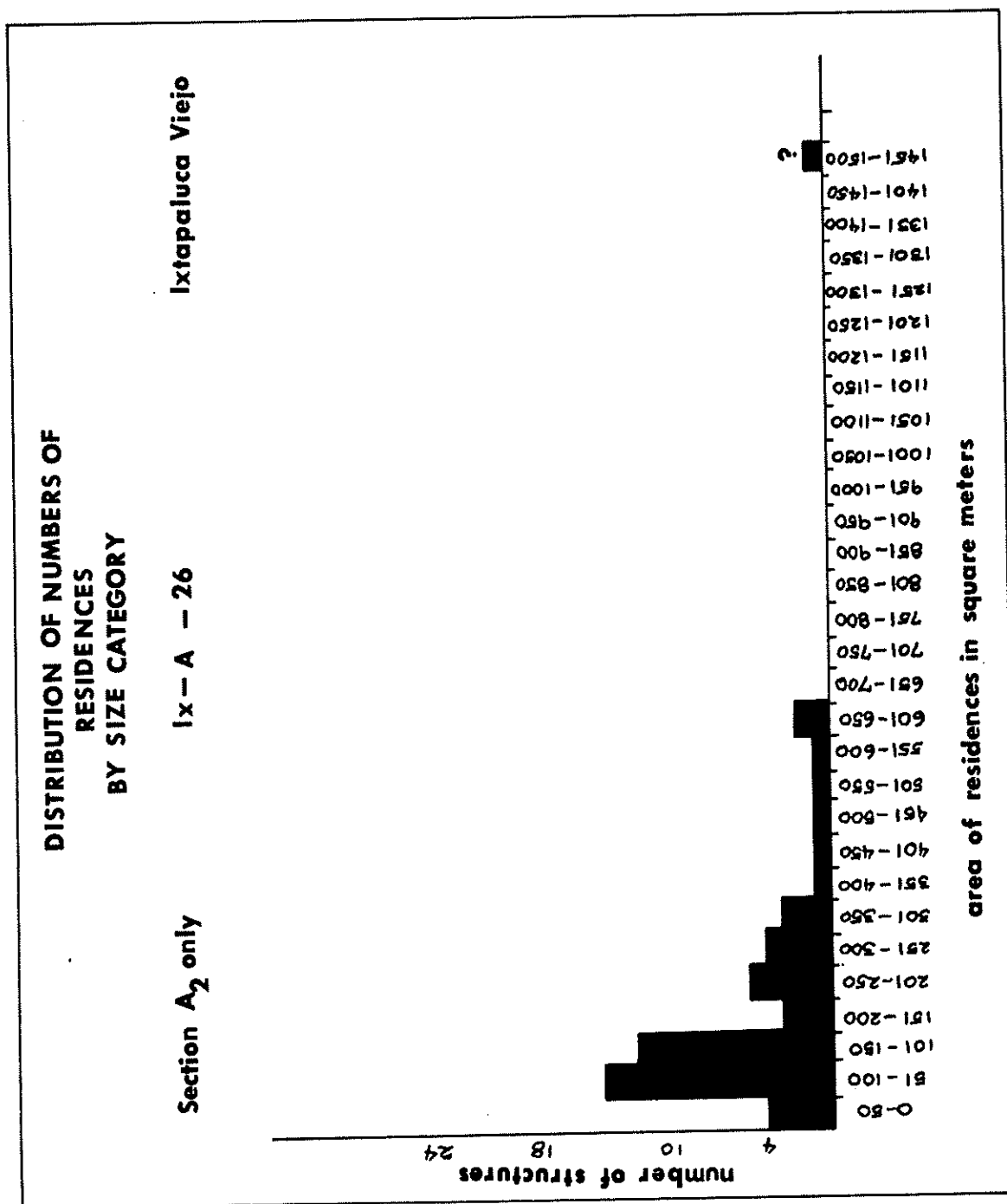


figure 73

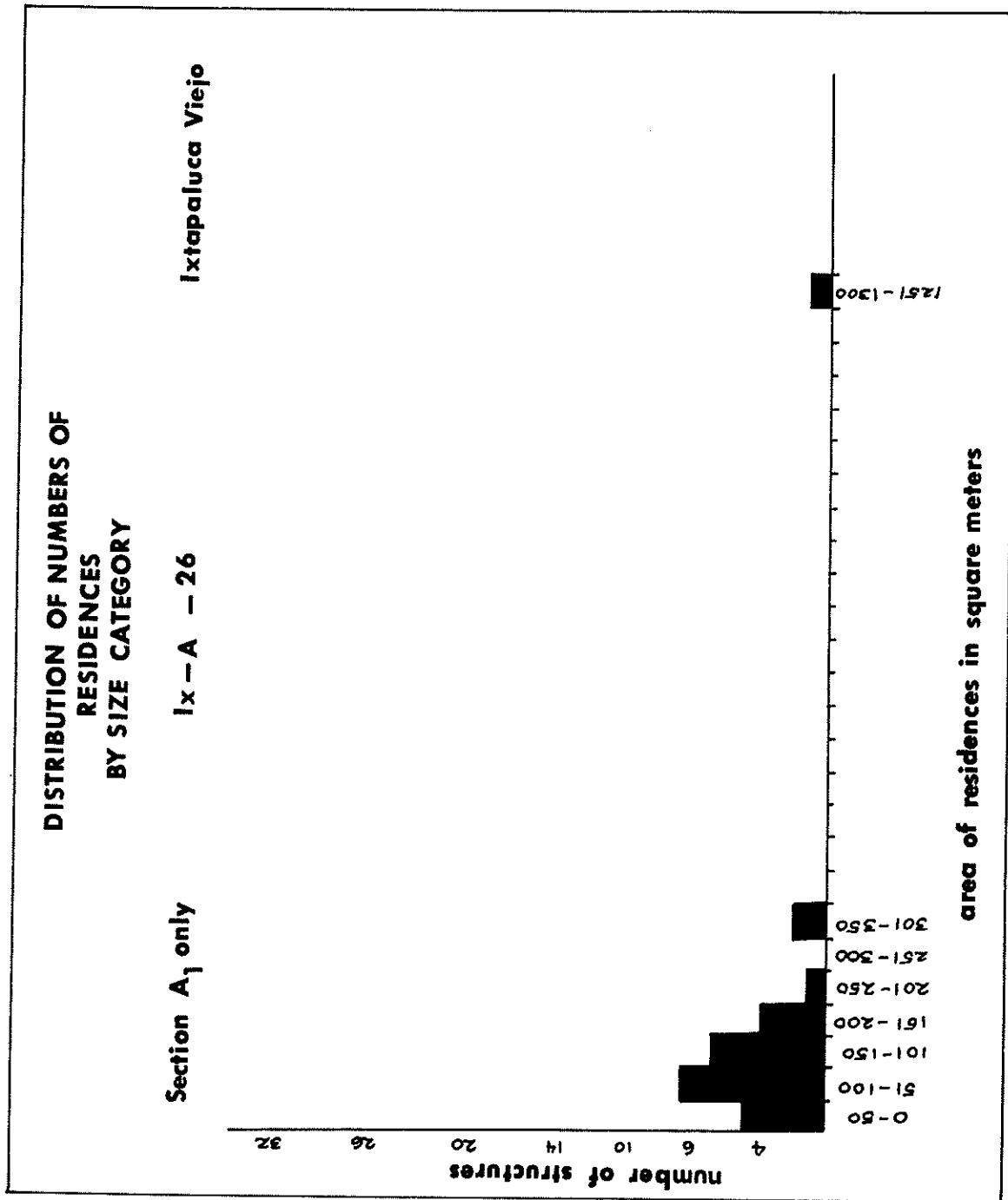


figure 74

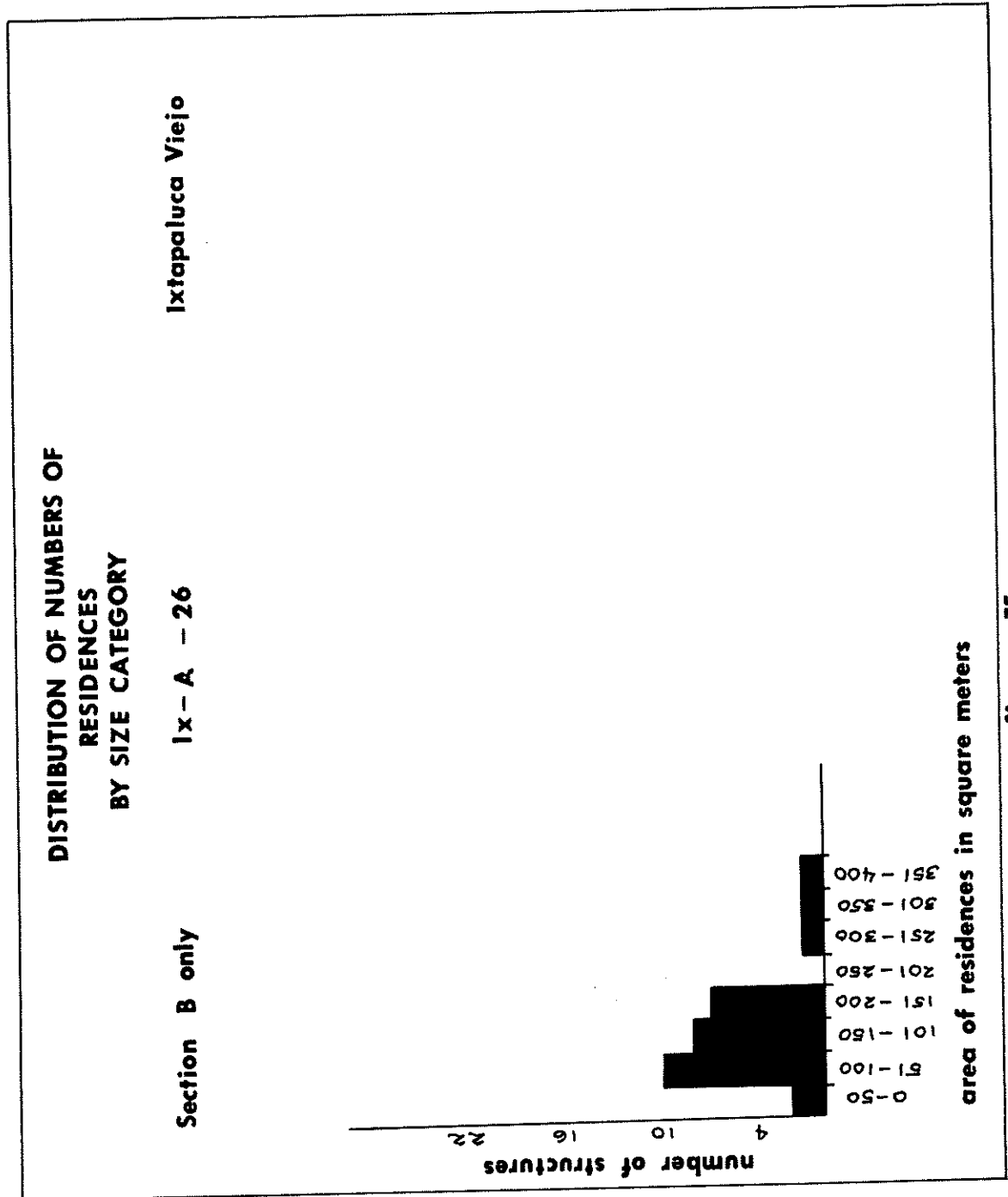


figure 75

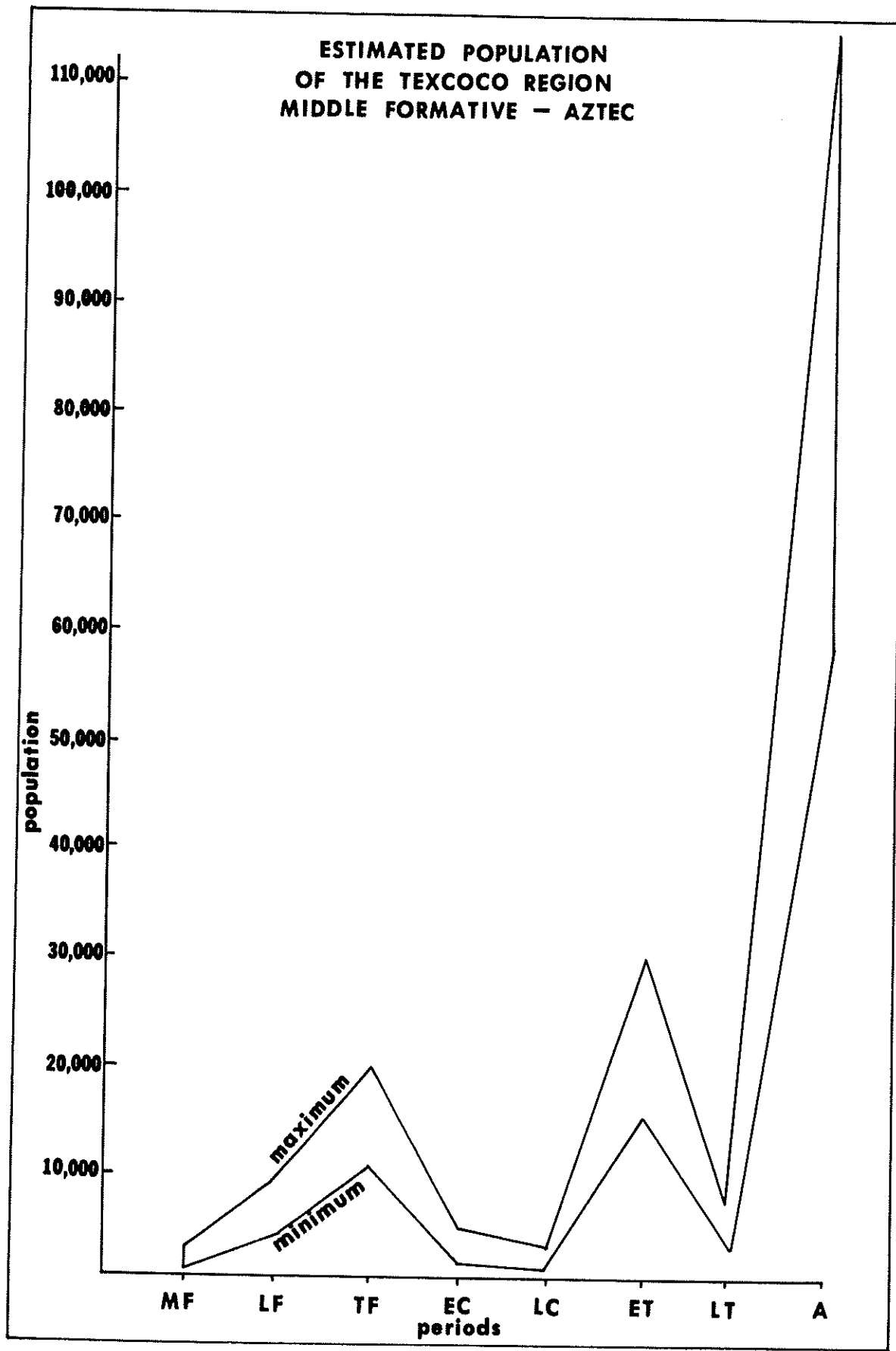


figure 76

POPULATION HISTORY OF THE TEOTIHUACAN VALLEY

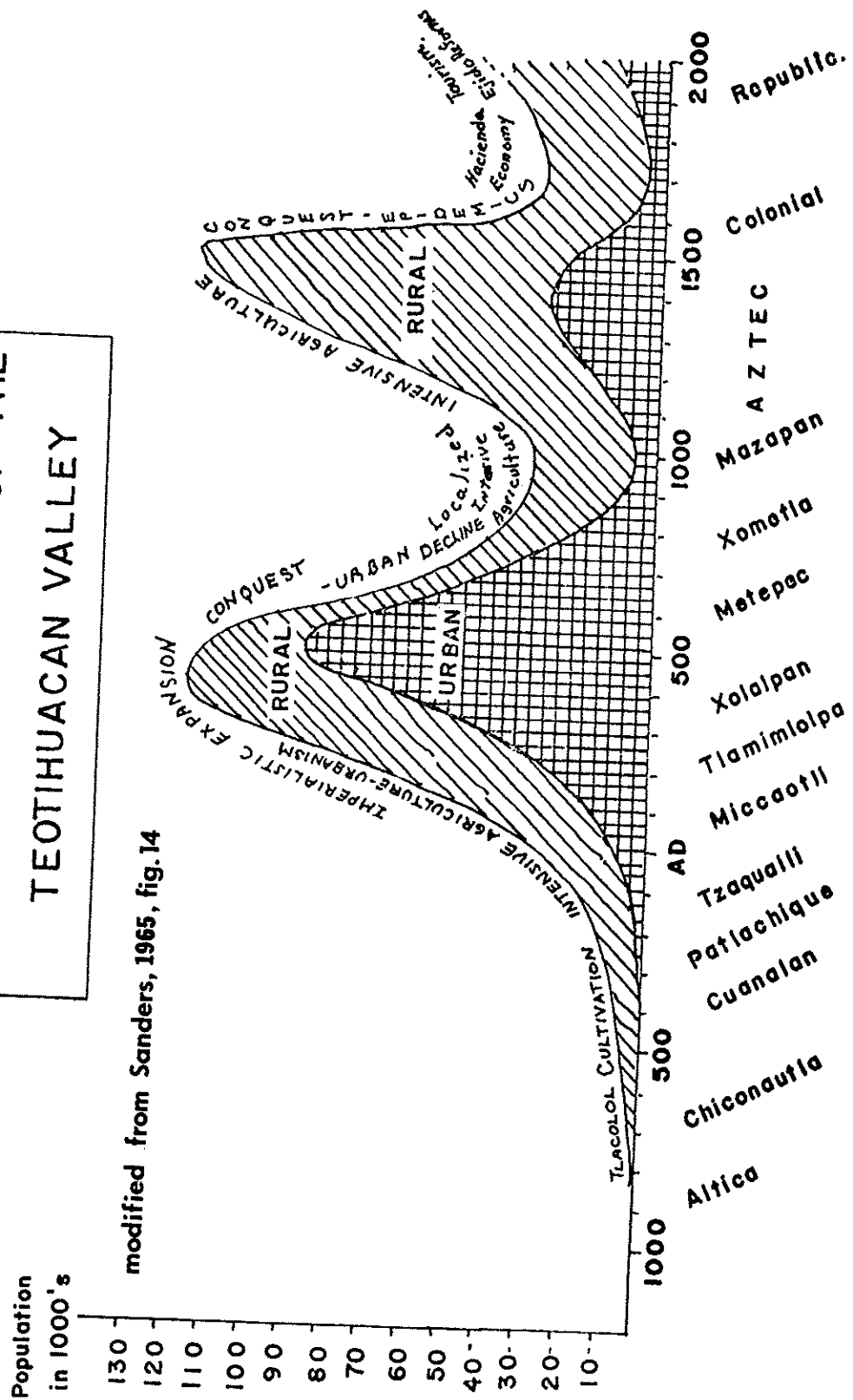


figure 77

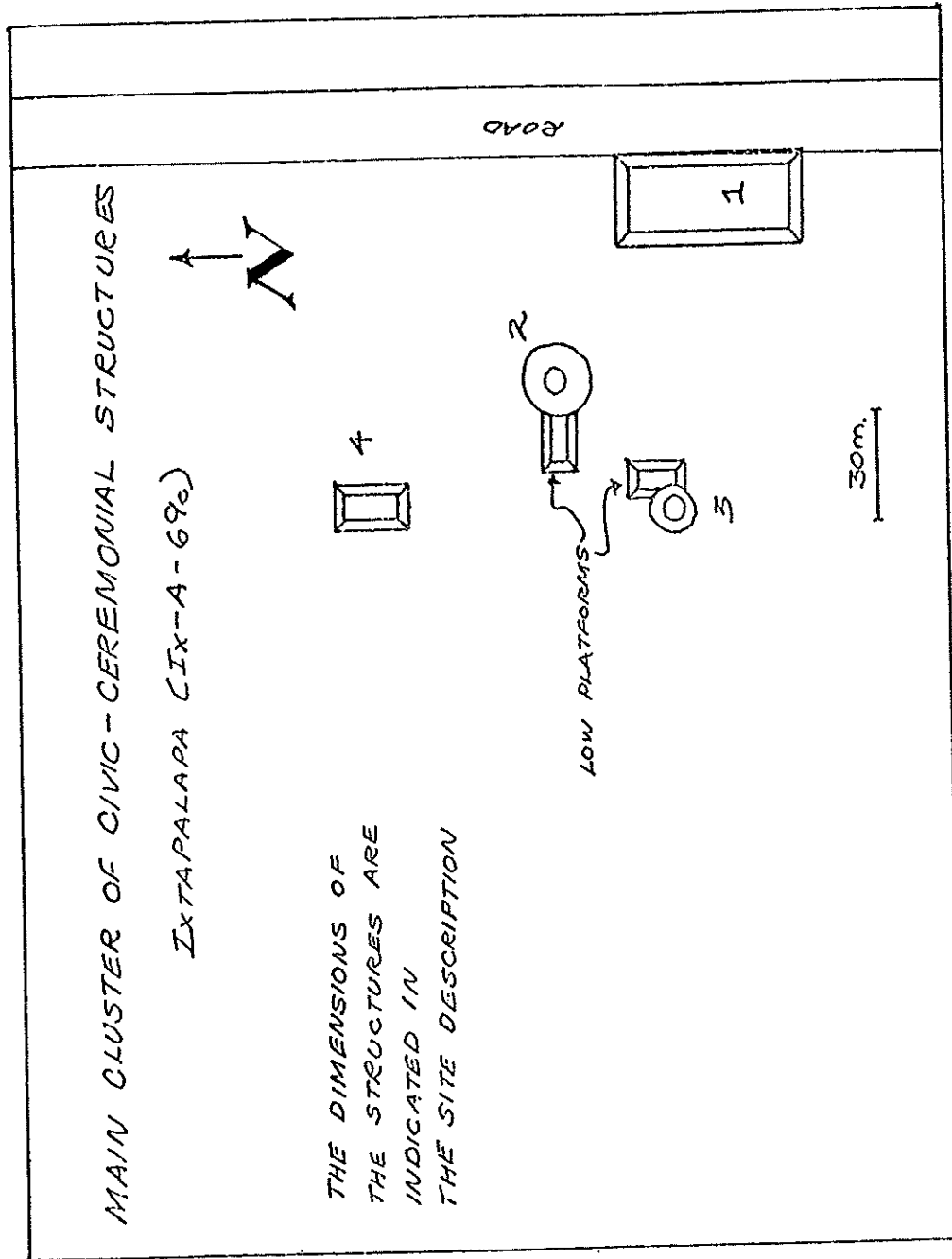


Figure 78



Plate 1: The slopes of the Upper Piedmont east of San Francisco Acuautla, showing the severe erosion.



Plate 3: The Cerro Pine massif, looking west across the Acuautla Plain.



Plate 2: In the Lower Piedmont zone east of San Francisco Acuatla.



Plate 4: Cerro de la Estrella, looking southeast. Lower Piedmont slopes are in the foreground.



Plate 5: Looking northwest from the summit of Cerro de la Estrella, looking toward Ixtapalapa.

Plate 6: The upper slopes of Tlapacoya Island, showing terrace remnants in the bottom half of the photograph.

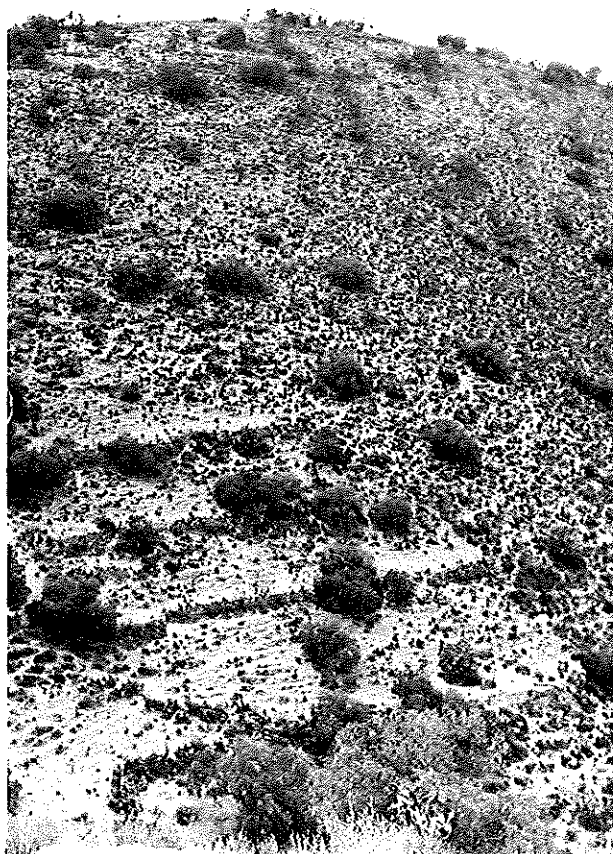


Plate 7: Tlapacoya Island, looking south from the Cerro Pino Lower Slopes.



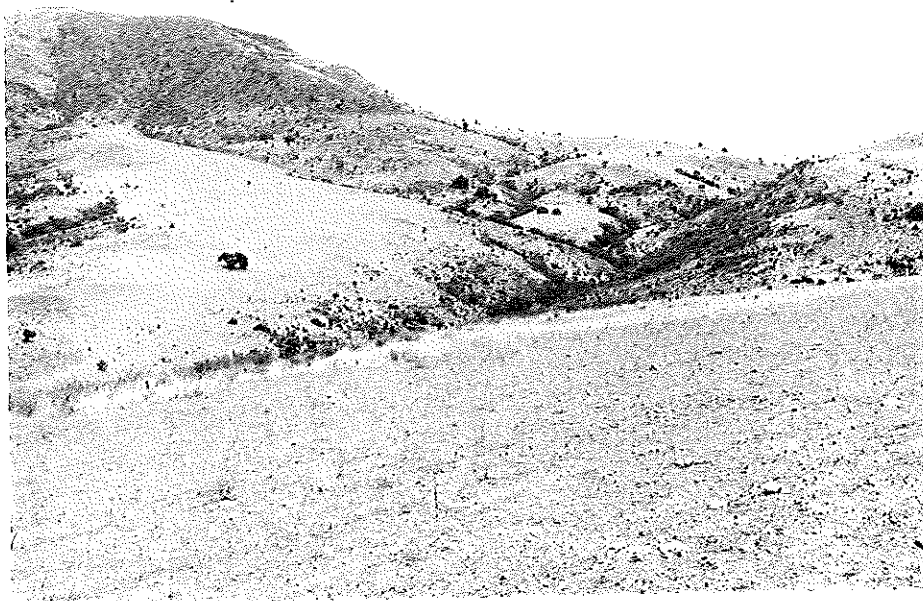


Plate 8: Cerro Pino Upper Slopes, looking north. Cerro Pino is on the left.



Plate 9: In the foreground, a portion of the Cerro Pino Lower Slopes. In the background, to the west, is the Cerro Sta. Catarina massif.

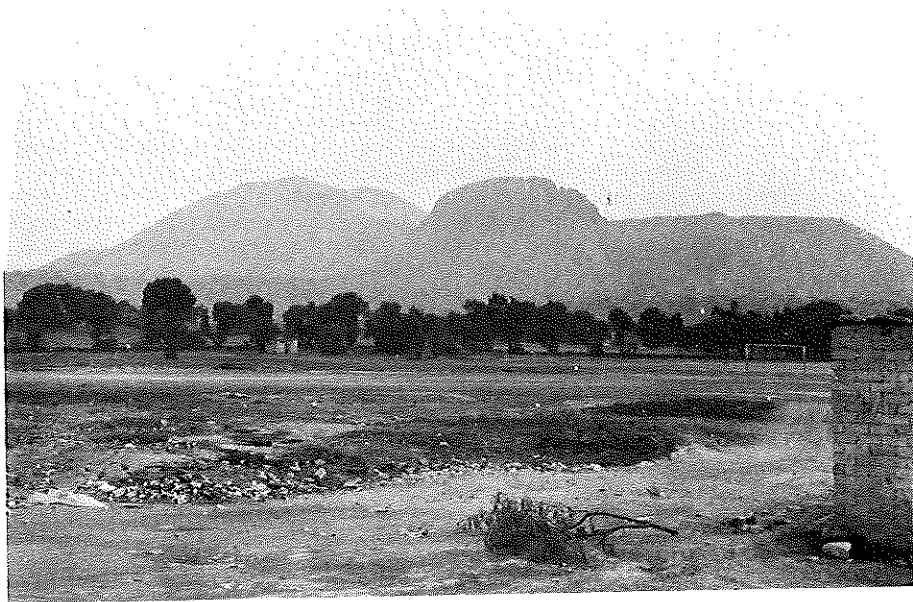


Plate 10. The Cerro Sta. Catarina massif (the Lomas and Hoyas zone), looking south from the bed of Lake Texcoco.



Plate 12: Rock pile in the Lomas and Hoyas zone, the result of clearing rocks from agricultural fields.

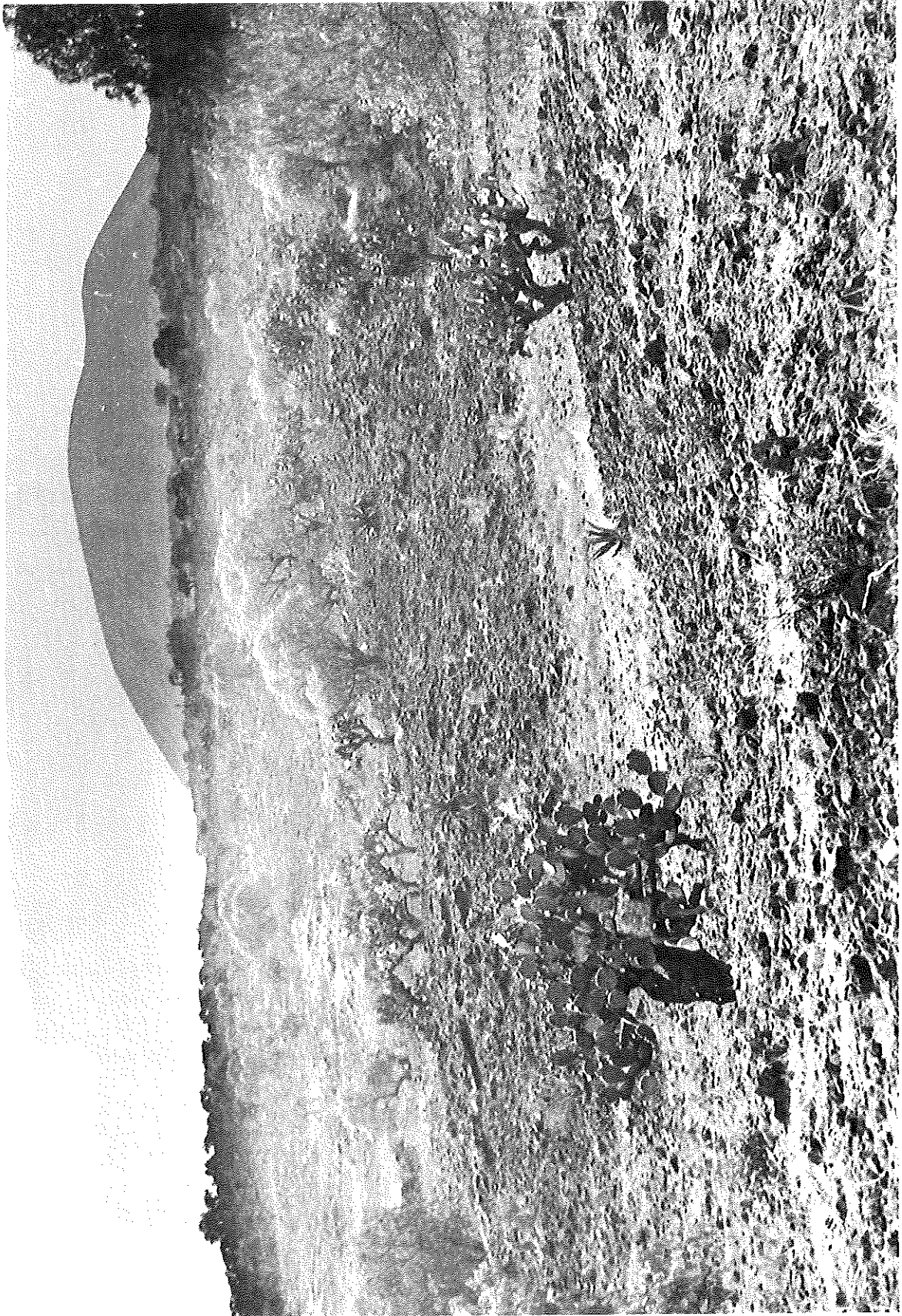


Plate 11: Example of rugged terrain in the Lomas and Hoyas zone.

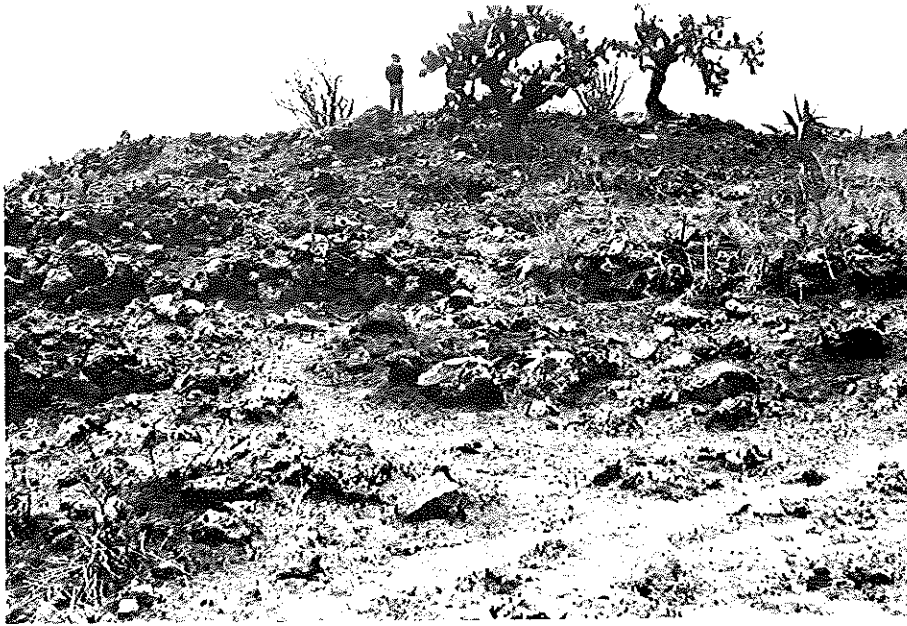


Plate 13: Ancient terraces (not now in use) in the Lomas and Hoyas zone.



Plate 14: Rock shelter in the Lomas and Hoyas zone.

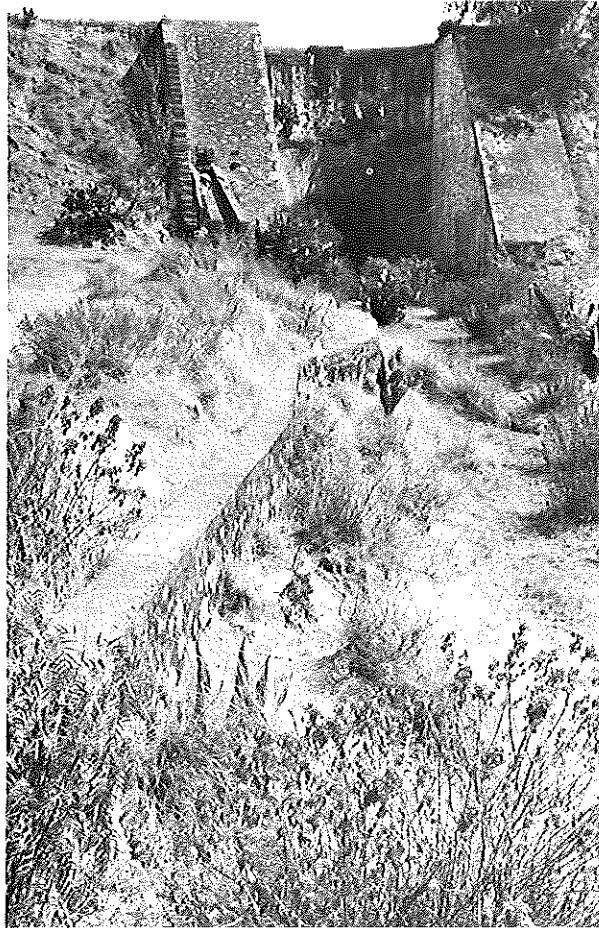


Plate 15: The 18th Century dam southwest of San Francisco Acuatla, looking east.



Plate 16: The Sierra zone, looking east from the Upper Piedmont.

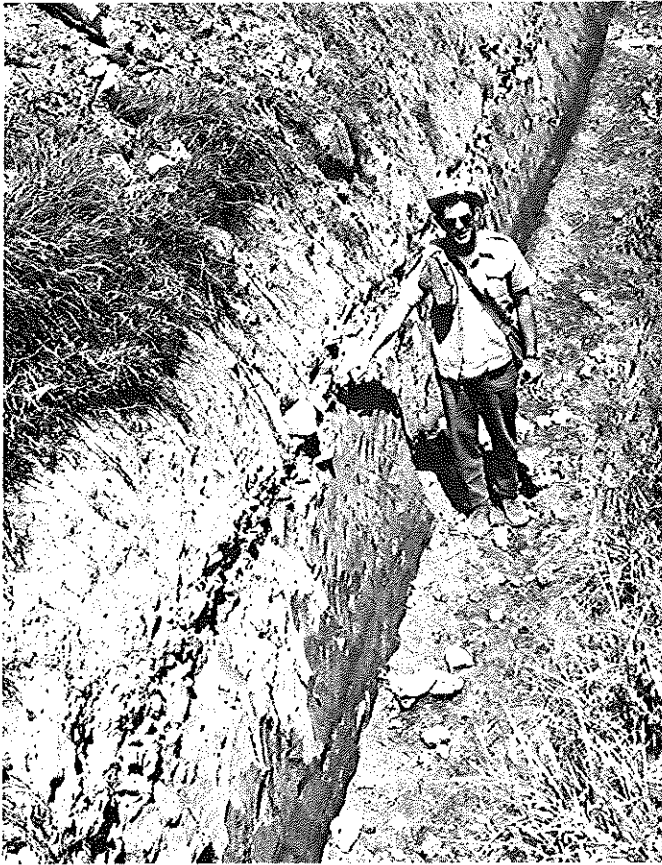


Plate 17: Barba's (1956) "Pozo 1". John Jordan is pointing to the late Formative level, which has dense pottery and stone debris.



Plate 18: The reconstructed pyramid at the Tlapacoya site, looking south.



Plate 19: The southwest corner of the reconstructed pyramid at the Tlapacoya site.



Plate 20: Terraces on steep slopes in the Lomas and Hoyas zone pertaining to Ix-LF-7 and/or IxTF-10.

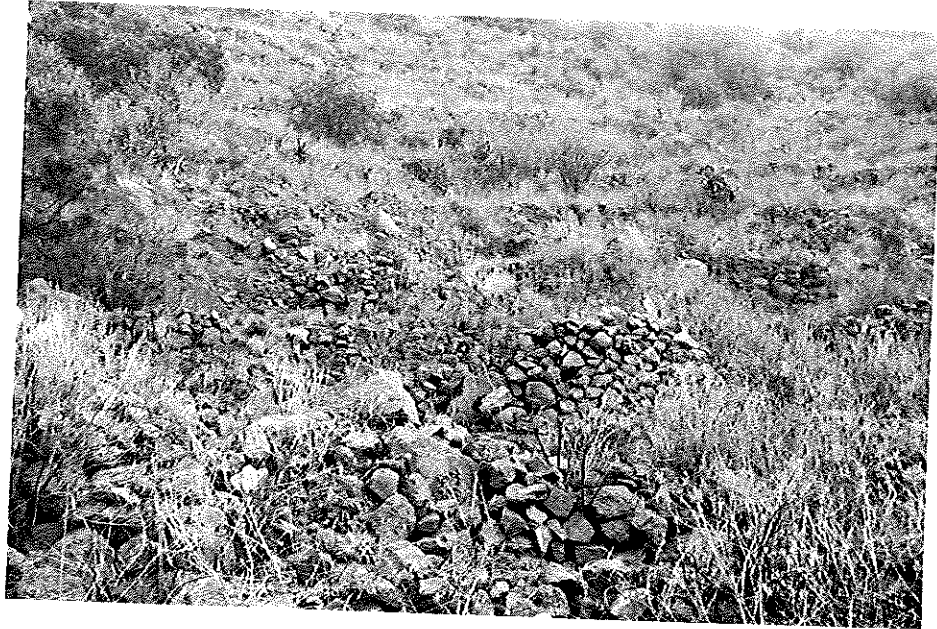


Plate 21: Close-up of terrace remnants in the Lomas and Hoyas zone which pertain to Ix-LF-7 and/or Ix-TF-10.

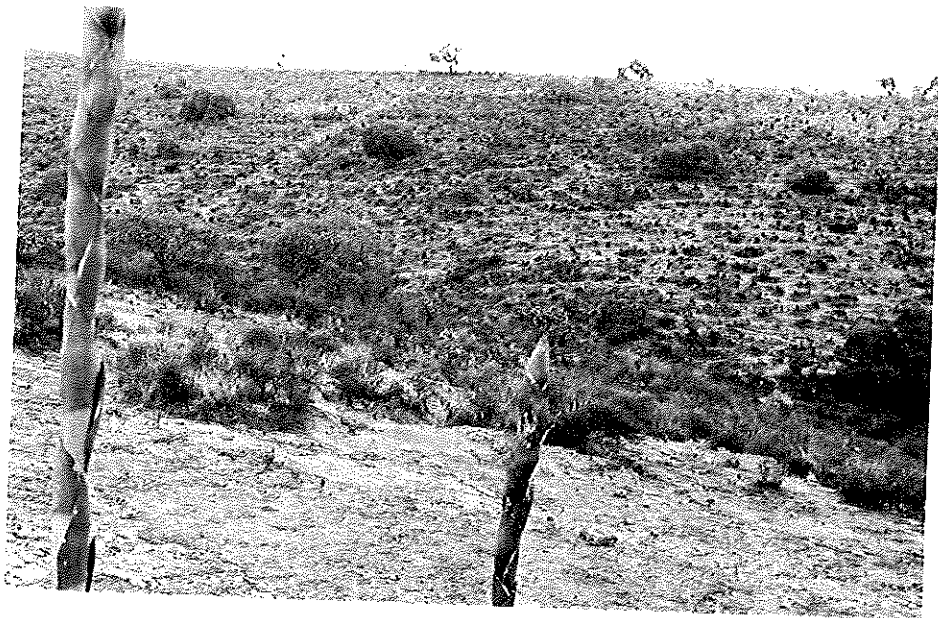


Plate 22: Earth terraces in the Cerro Pino Lower Slopes zone north of Tlapacoya Island, looking east.



Plate 23: Ix-Tf-2 and Ix-LT-16, looking northeast. The Seagram's distillery is in the background.



Plate 24: Ix-TF-5, showing two of the pyramid mounds.



Plate 25: Ix-EC-18, Ix-LC-3, Ix-ET-5, and Ix-LT-22, located just east of Los Reyes, looking north. The largest pyramid-mound on the site is near the top center of the photograph.



Plate 26: Ix-EC-37, Ix-LC-8, Ix-ET-13, showing terrace remnants on the opposite slope, looking east.



Plate 27: The "Templo Mayor" at Ixtapaluca Viejo (Ix-A-26a), looking north.



Plate 28: The "Templo Mayor" and other civic-ceremonial structures at Ix-A-26a, looking north.

Plate 29 (opposite): An aerial photograph of Ixtapalapa and the adjacent area. The Rio Churubusco runs southwest-northeast in the upper left corner of the photograph. The black lines north of Ixtapalapa are canals which carry water from the Rio Churubusco to ancient chinampas for irrigation agriculture. The numerous rectangular plots between the canals are the ancient chinampas, which were probably constructed during the Aztec period. The area to the right (east) of the chinampa plots is the open lake-bed of Lake Texcoco.





Plate 30: A small church built over an Aztec pyramid-platform at Culhuacan (Ix-A-72), looking southeast.



Plate 31: Remains of an Aztec plastered wall at the church of San Marcos Mexicaltzingo, part of Ix-A-70, looking west.

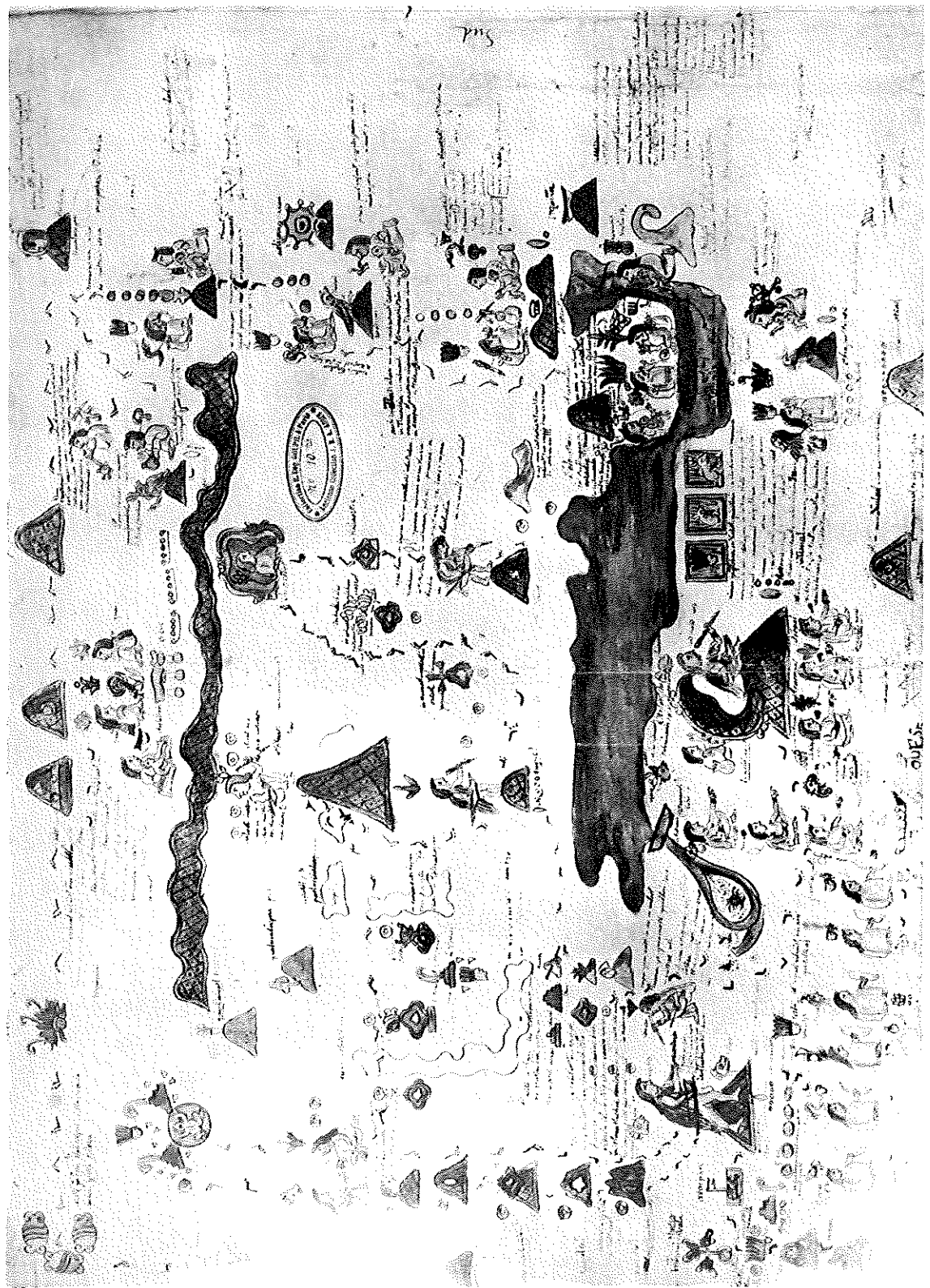


Plate 32: "Plancha I" from the Codex Xolotl (Dibble, 1951), Culhuacan is represented here (in the lower right of the plate surrounded by the dark area which represents the lake system) as the largest and most important community in the Valley of Mexico at the time of arrival of Xolotl and his "Chichimecs".



Plate 33: Plaster-covered wall exposed on the southeast corner of the Aztec pyramid at the summit of Cerro de la Estrella (Ix-A-74), looking northwest.

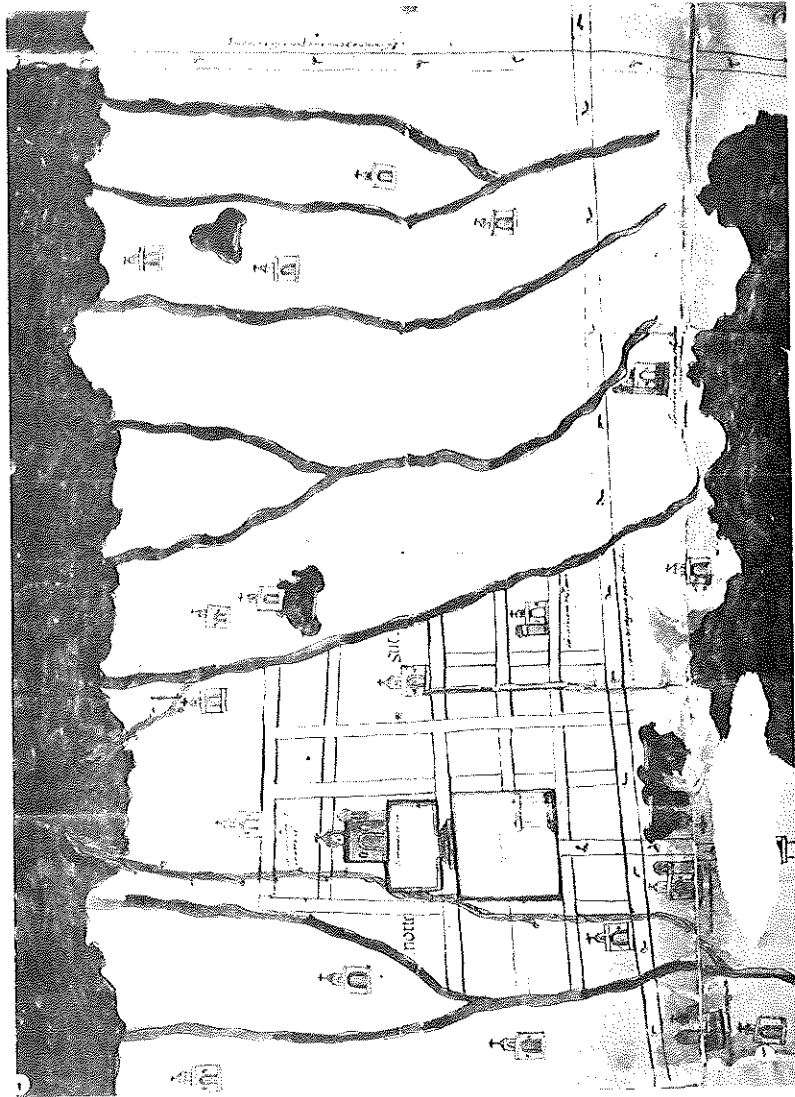


Plate 34: Sketch-map of the Coatepec and Acuatla area, from the "Relacion de Coatepec y su Partido," written in 1597 (Paso y Troncoso, 1905-48, vol. 6:39-65).

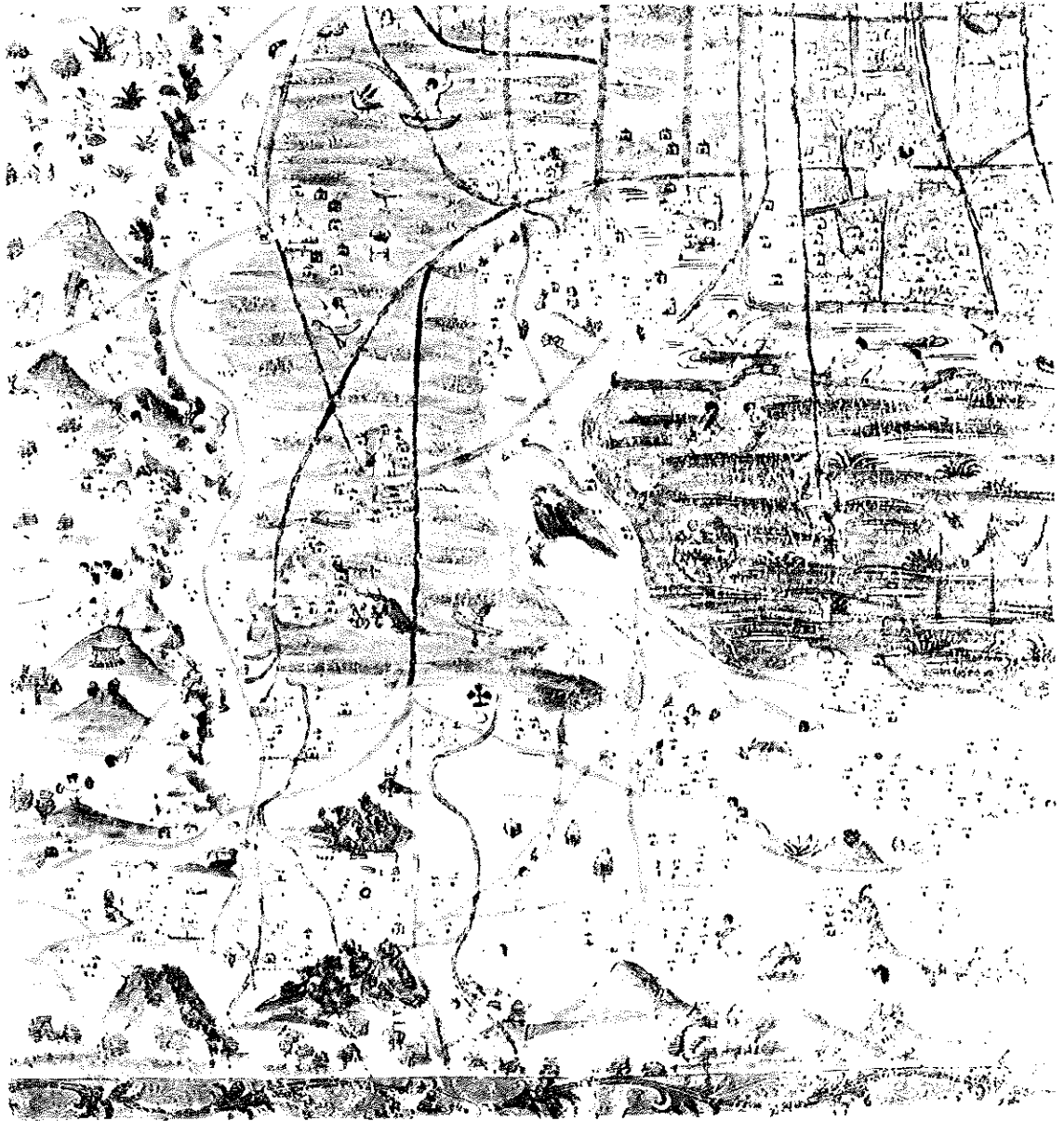


Plate 35: The southeastern corner of the Valley of Mexico in the Upsalla map of 1550 (Linne, 1948). West on the map is at the top of the page. The Ixtapalapa Peninsula divides Lake Chalco, on the left, from Lake Texcoco, on the right. Culhuacan (Ix-A-72) is shown near the tip of the Peninsula, near the top of the page, as an island in Lake Chalco.

Glossary and Abbreviations

Barranca	- Steep-sided ravine
Barrio	- Section of a community
Cacique	- Local chief or ruler
Calpulli	- Aztec territorial social unit
Calpultin	- Plural of calpulli
Calz.	- Abbreviation of Spanish word for avenue
Hoya	- Pit or depression
INAH	- Instituto Nacional de Antropologia E Historia
Jaguey	- Small earthen dam
Loma	- Small hill
Maguey	- Century plant
Nopal	- Cactus which gives a fruit called 'tuna'
Pozo	- Well or pit
RMEA	- Revista Mexicana de Estudios Antropologicos
Tepetate	- Yellow, compact subsoil in the Basin of Mexico
Tezontle	- Volcanic sand and gravel
Tlatel	- Prehispanic mound

APPENDIX

SITE DESCRIPTIONS

SITE #	HECTARES	Early Formative Period		CLASSIFICATION	OTHER COMPONENTS
		min. POPULATION	max.		
1	9	90	225	village	MF-1, LF-2, TF-4
2	3	30	75	hamlet	MF-2, LF-5, EC-23, LC-4, ET-15, LT-45, A-57
3	4	40	100	hamlet	MF-3, LF-8, TF-11, EC-30, LC-6, ET-9, LT-33
Totals	16	160	400		

Middle Formative Period

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	9	90	225	village	EF-1, LF-2, TF-4
2	3	30	75	hamlet	EF-2, LF-5, EC-23, LC-4, ET-15, LT-45, A-57
3	4	40	100	village	EF-3, LF-8, TF-11, EC-30, LC-6, ET-9, LT-33
4	12.5	125	313	village	LF-6, EC-32, LT-38
Totals	28.5	285	713		

Late Formative Period

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	2.2	22	55	hamlet	IT-1, Tx-LF-23
2	37	925	1850	secondary regional center	EF-1, TF-4, MF-1
3	20	400	1000	village	EC-19
4	2.5	50	100	hamlet	
5	3	30	75	hamlet	EF-2, MF-2, EC-23, LC-4, ET-15, LT-45, A-57
6	65	1625	3250	secondary regional center	MF-4, EC-32, ET-11, LT-38
7	30	600	1200	village	TF-10
8	7	70	175	village	EF-3, MF-3, TF-11, EC-30, LC-6, ET-9, LT-33
9	*	10	25	hamlet	
10	*	10	25	hamlet	
11	2.6	26	65	hamlet	EC-26
12	15	150	375	village	ET-13
13	*	10	25	hamlet	
Totals	184.3	3,928	8,220		

*Less than one hectare.

SITE #	HECTARES	Terminal Formative Period POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	*	5	10	isolated residence	
2	16	160	400	village	LT-16
3	20	200	500	village	
4	37	925	1850	secondary regional center	EF-1, MF-1, LF-2
5	32	800	1600	secondary regional center	
6	4	40	100	hamlet	
7	*	20	50	hamlet	
8	2	20	50	hamlet	
9	2	20	50	hamlet	
10	32	800	1600	village	LF-7
11	6	60	150	village	EF-3, MF-3, EC-30, LC-6, ET-9, LT-33
12	*	10	20	hamlet	
13	41	410	1025	village	EC-35, EC-37, LC-8, ET-13, A-76
Totals	192	3470	7405		

*Less than one hectare

Early Classic Period					
SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	8	40	80	hamlet	LT-7
2	8	40	80	hamlet	LT-6
3	2.2	11	22	hamlet	
4	*	5	10	isolated residence	
5	*	5	10	isolated residence	
6	10	50	100	hamlet	LT-4
7	36	360	900	part of the secondary regional center at Cerro Portezuelo	LC-1, ET-1, LT-10, A-11
8	7	35	70	hamlet	LT-11
9	*	5	10	isolated residence	
10	*	5	10	isolated residence	ET-3
11	11	110	275	village	
12	3	15	30	hamlet	
13	17	85	170	village	LC-2
14	2.5	13	25	hamlet	TF-3, LT-17
15	*	none		isolated civic-ceremonial	
16	*	5	10	isolated residence	ET-17, LT-19, A-34

*Less than one hectare

Early Classic Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
17	15	75	150	village	LT-20
18	22	220	550	village	LC-3, ET-5, LT-22, A-38
19	33	165	330	village	LF-3, A-53
20	5	25	50	hamlet	ET-4, LT-21, A-37
21	1	5	10	isolated residence	A-56
22	*	5	10	isolated residence	LT-27
23	3	15	30	hamlet	EF-2, MF-2, LF-5, LC-4, ET-15, LT-45, A-57
24	1	5	10	isolated residence	ET-6, LT-28
25	3.5	18	35	hamlet	A-43
26	10	50	100	hamlet	ET-8, LF-11
27	3	15	30	hamlet	LC-5, ET-19, LT-32, A-58
28	2	10	20	hamlet	
29	4.5	23	45	hamlet	
30	8	40	80	hamlet	EF-3, MF-3, LF-8, TF-11, LC-6, ET-9, LT-33
31	*	5	10	hamlet	LT-37, A-61

*Less than one hectare

Early Classic Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
32	2.5	13	25	hamlet	MF-4, LF-6
33	10	50	100	hamlet	
34	12	60	120	hamlet	LC-7, ET-12, LT-41, A-65
35	1	5	10	isolated residence	TF-13
36	33	165	330	village	ET-14, LT-43, A-67
37	76	380	760	secondary regional center	LC-8, ET-13, LT-44, A-69a
Totals:	350.2	2,133	4,607		

Late Classic Period

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	36	360	900	part of the secondary regional center at Cerro Portezuelo	EC-7, ET-1, LT-10, A-11
2	17	85	170	village	EC-13
3	22	220	550	village	EC-18, ET-5, LT-22, A-38
4	3	15	30	hamlet	EF-2, MF-2, LF-5, EC-23, ET-15, LT-45, A-57
5	3	15	30	hamlet	EC-27, ET-19, LT-32, A-58
6	8	40	80	hamlet	EF-3, MF-3, LF-8, TF-11, EC-30, ET-9, LT-33
7	12	60	120	hamlet	EC-34, ET-12, LT-41, A-65
8	76	380	760	secondary regional center	EC-37, ET-13, LT-44, A-69a
Totals:	177	1175	2640		

Early Toltec Period					
SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	3	30	75	village	EC-7, LC-1, LT-10, A-11
2	*	5	10	isolated residence	
3	*	5	10	isolated residence	EC-10
4	3.5	35	88	village	EC-20, LT-21, A-37
5	28	280	700	village	EC-18, LC-3, LT-22, A-38
6	2	10	20	hamlet	EC-24, LT-28
7	5	50	125	hamlet	LT-24, A-41
8	5	50	125	hamlet	EC-26
9	4	20	40	hamlet	EF-3, MF-3, LF-8, TF-11, EC-30, LC-6, LT-33
10	*	5	10	isolated residence	LT-36, A-63
11	5	50	125	hamlet	LF-6
12	5	25	50	hamlet	EC-34, LC-7, LT-41, A-65
13	169	1690	4225	primary regional center	EC-37, LC-8, LT-44, A-69a
14	22	220	550	village	EC-36, A-67
15	2	10	20	hamlet	EF-2, MF-2, LF-5, EC-23, LC-4, LT-45, A-57

*Less than one hectare

Early Toltec (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
16	2	10	20	hamlet	LT-21, A-37
17	*	5	10	isolated residence	LT-19, A-34
18	3	15	30	hamlet	EC-25, A-43
19	3	15	30	hamlet	EC-27, LC-5, LT-32
20	*	5	10	isolated residence	LT-34, A-59
21	*	5	10	isolated residence	A-43
Totals:	267.5	2,540	6,283		

*Less than one hectare

Late Toltec Period					
SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
1	1	5	20	hamlet	LF-1
2	2.5	10	25	hamlet	A-2
3	*	5	10	isolated residence	A-10
4	6.5	30	65	hamlet	EC-6
5	*	5	10	isolated residence	
6	14	30	80	hamlet	EC-2
7	14	50	100	hamlet	EC-1
8	11	25	50	hamlet	
9	29	75	150	village	A-12
10	2.5	10	30	hamlet	EC-7, LC-1, ET-1, A-11
11	2	10	20	hamlet	EC-8
12	3.5	15	30	hamlet	
13	*	5	10	isolated residence	
14	2.5	10	25	hamlet	EC-12
15	4.5	20	40	hamlet	
16	*	5	10	isolated residence	TF-2
17	4	20	40	hamlet	EC-14, TF-3
18	*	5	10	isolated residence	
19	3	15	30	hamlet	EC-16, ET-17, A-34
20	18	90	180	village	A-36, EC-17

*Less than one hectare

Late Toltec (continued)

SITE#	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
21	4	20	40	hamlet	ET-16, A-37
22	9	45	90	hamlet	ET-5, EC-18, LC-3
23	*	5	10	isolated residence	
24	1.5	10	20	hamlet	
25	*	5	10	isolated residence	
26	*	5	10	isolated residence	
27	*	5	10	isolated residence	EC-22
28	1	7	15	hamlet	EC-24, ET-6
29	2	10	20	hamlet	
30	*	5	10	isolated residence	A-49
31	5	25	50	hamlet	LF-9
32	*	5	10	isolated residence	EC-27, LC-5, ET-19, A-58
33	6	30	60	hamlet	EF-3, MF-3, LF-8, TF-11, EC-30, LC-6, ET-9
34	6	30	60	hamlet	ET-20, A-59
35	1	7	15	hamlet	A-62
36	*	5	10	isolated residence	ET-10, A-63
37	*	5	10	isolated residence	EC-31, A-61

*Less than one hectare

Late Toltec (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
38	4.5	23	45	hamlet	MF-4, LF-6
39	5	25	50	hamlet	
40	1.5	7	15	hamlet	
41	6	30	60	hamlet	EC-34, LC-7, ET-12
42	4.5	23	45	hamlet	
43	2.5	13	25	hamlet	EC-36, A-67
44	11.5	60	120	hamlet	ET-13, EC-37, LC-8, A-69a
45	2	10	20	hamlet	EF-2, MF-2, LF-5, EC-23, LC-4, ET-15, A-57
46	*	none		isolated hill-top ceremonial center	A-13
47	2	10	20	hamlet	EC-34, LC-7, A-65
48	*	5	10	isolated residence	
Totals:	193	870	1,795		

*Less than one hectare

SITE #	HECTARES	Aztec Period		CLASSIFICATION	OTHER COMPONENTS
		POPULATION min.	POPULATION max.		
1	*	none		probable fortress	
2	8	25	80	hamlet	LT-2, EC-5
3	2.2	10	20	hamlet	
4	18	90	180	village	
5	*	5	10	isolated residence	
6	*	5	10	isolated residence	
7	*	10	20	hamlet	
8	13	65	130	hamlet	
9	11	55	110	hamlet	
10	*	5	10	isolated residence	LT-3
11	10	25	100	hamlet	EC-7, LC-1, ET-1, LT-10
12	5.6	28	56	hamlet	LT-9
13	*	none		isolated ceremonial precinct	LT-46
14	*	none		isolated ceremonial precinct	
15	*	none		civic or ceremonial platform	
16	*	5	10	isolated residence	
17	*	none		isolated ceremonial center	

*Less than one hectare

Aztec Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
18	*	5	10	isolated residence	
19	*	5	10	isolated residence	
20	*	none		isolated civic-ceremonial site	
21	*	10	20	hamlet	
22	*	5	10	isolated residence	
23	*	5	10	isolated residence	
24	*	5	10	isolated residence	
25	*	5	10	isolated residence	
26	90	862	1630	secondary regional center	
27	3	15	30	hamlet	
28	*	5	10	isolated residence	
29	2.5	10	20	hamlet	EC-12, LT-14
30	*	none		isolated civic-ceremonial	
31	*	5	10	isolated residence	
32	1	15	20	hamlet	

*Less than one hectare

Aztec Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
33	*	5	10	isolated residence	
34	4	20	40	hamlet	EC-16, ET-17, LT-19
35	*	none		isolated civic-ceremonial	
36	10	50	100	hamlet	LT-20
37	24	120	480	village	EC-20, ET-4, and 16, LT-21
38	2	10	20	hamlet	TF-7, EC-18, LC-3, ET-5, LT-22
39	*	5	10	isolated residence	
40	*	5	10	isolated residence	
41	18	100	450	village	ET-7, LT-24
42	4.6	25	115	village	
43	*	5	10	isolated residence	EC-25, ET-18
44	3.6	18	50	hamlet	
45	*	5	10	isolated residence	
46	*	5	10	isolated residence	
47	*	5	10	isolated residence	
48	*	5	10	isolated residence	
49	*	5	10	isolated residence	LT-30

*Less than one hectare

Aztec Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
50	2	10	20	hamlet	
51	*	5	10	isolated residence	
52	*	5	10	isolated residence	
53	29	290	725	village	LF-3, EC-19
54	*	5	10	isolated residence	
55	*	5	10	isolated residence	
56	*	10	15	hamlet	EC-21
57	3	15	30	hamlet	EF-2, MF-2, LF-5, EC-23, LC-4, ET-15, LT-45
58	*	5	10	isolated residence	
59	*	10	20	hamlet	ET-20, LT-34
60	4.4	44	110	village	
61	1	10	25	hamlet	
62	1.2	10	25	hamlet	LT-37
63	*	5	15	hamlet	ET-10, LT-36
64	6.8	50	150	village	
65	2	15	45	hamlet	EC-34, LC-7, LT-47
66	*	5	10	isolated residence	
67	38	193	963	village	EC-36, ET-14, LT-43

*Less than one hectare

Aztec Period (continued)

SITE #	HECTARES	POPULATION		CLASSIFICATION	OTHER COMPONENTS
		min.	max.		
68	1.7	17	30	hamlet	
69a	8	2800		primary	EC-37, LC-8,
69b		(Ixtapalapa)		regional	ET-13
				center	
69c	20				
70	2.5	1108		secondary	
	(at least)	Mexicaltzingo		regional	
				center	
71	*	10	20	isolated	
				residence	
72	65	1625	3250	primary	
				regional	
				center	
73	*	5	10	isolated	
				residence	
74	*	none		isolated	TF-13
				civic-	
				ceremonial	
75	3	30	75	hamlet	ET-13
Totals:	418.1	7955	13,367		

*Less than one hectare

Bibliography

- Acosta, Jorge R.
1956-7 "Interpretacion de Algunos de los Datos Obtenidos en Tula Relativos a la Epoca Tolteca", RMEA, vol. 14, part 2, 75-110.
- Adams, Robert McC.
1966 The Evolution of Urban Society, Aldine, Chicago.
- Anderson, A., and C.E. Dibble
1951 Florentine Codex, Book 2, The Ceremonies, The School of American Research and the University of Utah, Santa Fe.
1953 Florentine Codex, Book 7, The Sun, Moon, and the Stars, and the Binding of the Years, The School of American Research and the University of Utah, Santa Fe.
- Anglerius, Peterus Martyr
1628 The Decades of the Newe World or West India, the Famous Historie of the Indies, second edition, London; University Microfilms Reel Number 819, Short Title Catalogue Number 652, 22208.
- Apenes, Ola
1944 "The Primitive Salt Production of Lake Texcoco", Ethnos, number 1, 35-40.
- Armillas, Pedro
1947 "Notas Sobre Los Sistemas de Cultivo en Mesoamerica", INAH, Anales, number 3, Mexico.
1950 "Teotihuacan, Tula, y los Toltecas", Runa, vol. III, Mexico.
1971 "Gardens on Swamps" Science, Vol. 174, No. 4010, 653-61.
- Bandelier, Adolph F.
1878 "On the Distribution and Tenure of Lands and the Customs with Respect to Inheritance Among the Ancient Mexicans", Eleventh Annual Report of the Peabody Museum of American Archaeology, Cambridge.
- Barba de Pina Chan, Beatriz
1956 "Tlapacoya: Un Sitio Preclasico de Transicion", Acta Antropologica, epoca 2, vol. 1, number 1, 1-205.
- Barlow, Robert
1949 The Extent of the Empire of the Culhua Mexico, Ibero Americana, number 28, University of California Press, Berkeley and Los Angeles.
- Bennyhoff, James A.
1967 "Chronology and Periodization: Continuity and Change in the Teotihuacan Ceramic Tradition", Teotihuacan, Onceava Mesa Redonda, RMEA, Mexico, 19-30.

Berger, Rainer, J.A. Graham, and R.F. Heizer

1967 "A Reconsideration of the Age of the La Venta Site",
Contributions of the University of California Archaeological Research
Facility, number 3, 1-24.

Boas, Franz

1911-12 Album de Colecciones Arqueologicas, Publicaciones de la
Escuela Nacional de Arqueología Y Etnología Americanas, Mexico.

1913 "Archaeological Investigations in the Valley of Mexico",
International Congress of Americanists, Proceedings, XVIII Session,
part I, London, 176-79.

Brenner, Anita

1931 The Influence of Technique on the Decorative Style in
the Domestic Pottery of Culhuacan, Columbia University Contributions to
Anthropology, vol. XIII, New York.

Carrasco, Pedro

1964 "Family Structure of Sixteenth-Century Tepoztlan", in
Process and Pattern in Culture, Robert A. Manners (ed.), Aldine, Chicago,
185-210.

Charlton, Thomas

1969 "Texcoco Fabric-Marked Pottery, Tlatels, and Salt-Making",
American Antiquity, vol. 34, number 1, 73-76.

Christaller, Walter

1966 Central Places in Southern Germany, translated by Carlisle
W. Baskin, Prentice-Hall, Englewood Cliffs.

Coe, Michael D.

1964 "The Chinampas of Mexico", Scientific American, vol. 211,
number 1, 90-98.

1965 The Jaguar's Children: Pre-Classic Central Mexico, The
Museum of Primitive Art, New York.

1968a "San Lorenzo and the Olmec Civilization", in Dumbarton
Oaks conference on the Olmec, October 28th and 29th 1967, Elizabeth Benson
(ed.), Washington, 41-78.

1968b America's First Civilization, The Smithsonian Library,
American Heritage Publishing Company, New York.

1969 "The Archaeological Sequence at San Lorenzo Tenochtitlan,
Veracruz, Mexico", paper presented at the annual meeting of the Society
of American Archaeology, Milwaukee.

Coe, Michael D., Richard Diehl, and Minze Struiver

1967 "Olmec Civilization, Veracruz, Mexico: Dating of the
San Lorenzo Phase", Science, vol. 155, number 3768, 1399-1401.

Coe, Michael D., and Kent V. Flannery
 1967 Early Cultures and Human Ecology in South Coastal Guatemala,
 Smithsonian Press, Washington.

Cook, Sherburn, and L.B. Simpson
 1948 The Population of Central Mexico in the Sixteenth Century,
 Ibero-Americana, number 31, The University of California Press, Berkeley
 and Los Angeles.

Cortes, Hernando
 1524 La Preclara Narratione di Ferdinan do Cortese della Nuova
Hispania del Mare Oceano, Venice.

1963 Cartas Y Documentos, Editorial Porrúa, S.A., Mexico.

Covarrubias, Miguel
 1957 Indian Art of Mexico and Central America, Alfred A. Knopf,
 New York.

Cummings, Byron C.
 1933 "Cuicuilco and the Archaic Culture of Mexico", University
of Arizona Bulletin, vol. 4, number 8.

Díaz del Castillo, Bernal
 1908-16 The True History of the Conquest of New Spain, 5 volumes,
 translation and appendices by A.P. Maudslay, Hakluyt Society.

Dibble, Charles
 1951 Códice Xolotl, Publicaciones del Instituto de Historia,
 Primera Serie, number 22, Mexico.

Dibble, Charles, and A. Anderson
 1957 Florentine Codex, Book 4, the Soothsayers, The School of
 American Research and the University of Utah, Santa Fe.

Dixon, Keith A.
 1959 "Ceramics from Two Preclassic Periods at Chiapa de Corzo,
 Chiapas, Mexico", Papers of the New World Archaeological Foundation,
 number 5.

1966 "Progress Report on Excavation of Terminal Late Preclassic
 Ceremonial Architecture, Temesco, Valley of Mexico (summer, 1965)", MS.

Drewitt, Bruce
 1967 "Planeación en la Antigua Ciudad de Teotihuacán", Teoti-
huacán, Onceava Mesa Redonda, RMEA, Mexico, 79-94.

Drucker, Phillip, Robert F. Heizer, and Robert Squire
 1957 "Radiocarbon Dates from La Venta, Tabasco", Science, vol.
 126, number 72, 72-3.

1959 Excavations at La Venta, Tabasco, 1955, Bureau of American
 Ethnology, Bulletin 170, Washington.

Duran, Fray Diego

1967 Historia de las Indias de Nueva Espana E Islas de la Tierra Firme, Angel Garibay K. (ed.), Editorial Porrúa S.A., Mexico, 2 volumes.

Flannery, Kent V.

1968 "The Olmec and the Valley of Oaxaca: A Model for Inter-Regional Interaction in Formative Times", in Dumbarton Oaks Conference on the Olmec, October 28th and 29th, 1967, Elizabeth Benson (ed.), Washington.

, A.V. Kirkby, and A. Williams Jr.

1967 "Farming Systems and Political Growth in Ancient Oaxaca", Science, vol. 158, number 3800, 445-454.

, and Michael D. Coe

1968 "Social and Economic Systems in Formative Mesoamerica", New Perspectives in Archeology, Sally R. and Lewis R. Binford (eds.), Aldine, Chicago.

, and James Schoenwetter

1970 "Climate and Man in Formative Oaxaca", Archaeology, volume 23, number 2, 144-152.

Fried, Morton H.

1967 The Evolution of Political Society, Random House, New York.

Garcia, Enriqueta

1968 "Clima Actual de Teotihuacan", in Materiales Para La Arqueologia de Teotihuacan, Jose L. Lorenzo (ed.), Mexico, 11-28.

Garcia Pimentel, Luis (ed.)

1904 Relacion de los Obispos de Tlaxcala, Michoacan, Oaxaca, Y Otros Lugares en el Siglo XVI, Mexico.

Garcia Pimentel, P.J. (ed.)

1897 Descripcion del Arzobispado de Mexico, Hecha en 1570, Mexico.

Gibson, Charles

1956 "Llamamiento General, Repartimiento, and the Empire of Acolhuacan", Hispanic American Historical Review, vol. XXXVI, number 1, 1-27.

1964 The Aztecs Under Spanish Rule, A History of the Indians of the Valley of Mexico, 1519-1810, Stanford University Press, Stanford.

Goodliffe, Elizabeth and Michael

1966 "Un Sitio Pleistoceno en Tlapacoya, Estado de Mexico", INAH Boletin, number 23, 30-32.

Griffin, James B. and Antonieta Espejo

1947 "La Alfareria Correspondiente al Ultimo Periodo de Ocupacion Nahua del Valle de Mexico: I", Tlatelolco a Traves de los Tiempos, IX, Mexico, 10-26.

- Griffin, James B. and Antonieta Espejo
 1950 "La Alfareria Correspondients al Ultimo Periodo de
 Ocupacion Nahua del Valle de Mexico: II", Tlatelolco a Traves de los
 Tiempos, XI, Mexico, 3-54.
- Grove, David
 1963 "The Ixtapaluca Viejo Ballcourt Excavations, 1963", MS.
 1968a The Morelos Preclassic and the Highland Olmec Problem,
 An Archaeological Study, PhD. Dissertation, submitted to the University
 of California, Los Angeles.
 1968b "The Pre-Classic Olmec in Central Mexico: Site Distri-
 bution and Inferences", Dumbarton Oaks Conference on the Olmec, October
 28th and 29th, 1967, Elizabeth Benson (ed.), Washington, 179-85
 1970 "The San Pablo Pantheon Mound: A Middle Preclassic Site
 in Morelos, Mexico", American Antiquity, vol. 35, number 1, 62-73
 , and H.B. Nicholson
 1965 "Excavacion de un Juego de Pelota en Ixtapaluca Viejo,
 Valle de Mexico", INAH Boletin, number 22, Mexico.
- Haynes, C. Vance Jr.
 1967 "Muestras de C14 de Tiapacoya, Estado de Mexico", INAH
Boletin, number 29, 49-52.
- Heizer, Robert, and James A. Bennyhoff
 1958 "Archaeological Investigations at Cuicuilco, Valley of
 Mexico, 1957", Science, vol. 127, 232-3.
- Heizer, Robert, and Sherburne Cook
 1959 "New Evidence of Antiquity of Tepexpan and Other Human
 Remains from the Valley of Mexico", Southwestern Journal of Anthropology,
 vol. 15, 32-42.
- Herrera y Perez, Manuel Maria
 1873 "Tlahuac", Sociedad Mexicana de Geografia y Estadistica,
 Tercera Epoca, Tomo I, Mexico, 294-303.
- Hicks, Frederic, and H.B. Nicholson
 1964 "The Transition From Classic to Postclassic at Cerro
 Portezuelo, Valley of Mexico", XXXV International Congress of Americanists,
Mexico, two volumes.
- Ixtlilxochitl, Don Fernando de Alva
 1952 Obras Historicas, Alfredo Chavero (ed.), Editorial
 Nacional S.A., Mexico, two volumes.
- Jimenez Moreno, Wigberto
 1954-55 "Sintesis de la Historia Precolonial del Valle de Mexico",
 RMEA, vol. XIV, part 1, 219-36.

Jimenez Moreno, Wigberto

1966 "Mesoamerica Before the Toltecs", in Ancient Oaxaca, John Paddock (ed.), 1-82, Stanford.

Katz, Friedrich

1966 Situacion Social y Economica de los Aztecas Durante los Siglos XV y XVI, Universidad Nacional Autonoma de Mexico, Instituto de Investigaciones Historicas, Mexico.

Kirchoff, Paul

1959 "The Principles of Clanship in Human Society" in Readings in Anthropology, Morton H. Fried, (ed.), vol. II, 259-270.

Koehler, Thomas

1962 Late Toltec Ceramics in the Valley of Teotihuacan, unpublished Master's Essay, submitted to Columbia University.

Leach, E.

1954 Political Systems of Highland Burma, 1965 edition published by the Beacon Press, Boston.

Linne, Sigvald

1948 El Valle y la Ciudad de Mexico en 1550, The Ethnographical Museum of Sweden, New Series, Publication Number 9, Stockholm.

Lorenzo, Jose L.

1956 "Notas Sobre Arqueologia y Cambios Climaticos en la Cuenca de Mexico", in La Cuenca de Mexico, Consideraciones Geologicas y Arqueologicas, by Federico Mooser, Sidney White, and Jose L. Lorenzo, INAH, Mexico.

1968 "Clima y Agricultura En Teotihuacan", in Materiales Para La Arqueologia de Teotihuacan, Jose L. Lorenzo (ed.), Mexico, 53-72.

MacNeish, Richard

1962 Second Annual Report of the Tehuacan Archaeological-Botanical Project, Robert S. Peabody Foundation for Archaeology, Andover.

Mangelsdorf, Paul, Richard MacNeish, and Paul Galinat

1967 "Prehistoric Wild and Cultivated Maize", chapter 9 of The Prehistory of the Tehuacan Valley, Volume 1, Environment and Subsistence, Douglas S. Byers (ed.), University of Texas Press.

Matos, M., Eduardo

1967 "Restos de un Basamento Prehispanico en Mexicaltzingo, D.F.", INAH Boletin, number 30, 32-36.

Mayer-Oakes, W.

1959 A Stratigraphic Excavation at El Risco, Mexico, Proceedings of the American Philosophical Society, vol. 103, part 3, 332-73.

Millon, Rene

1954 "Irrigation at Teotihuacan", American Antiquity, vol. 20, number 2, 177-80.

1960 "The Beginnings of Teotihuacan", American Antiquity, vol. 26, number 1, 1-10.

1964 "The Teotihuacan Mapping Project", American Antiquity, vol. 29, number 3, 345-352.

1967a "Teotihuacan", Scientific American, vol. 216, number 6.

1967b "Extension y Poblacion de la Ciudad de Teotihuacan en Sus Diferentes Periodos: Un Calculo Provisional", Teotihuacan, Onceava Mesa Redonda, Sociedad Mexicana de Antropologia, Mexico, 57-78.

1970 "Teotihuacan: Completion of Map of Giant Ancient City in the Valley of Mexico", Science, Vol. 170, No. 3962, 1077-82.

, and James A. Bennyhoff
1961 "A Long Architectural Sequence at Teotihuacan", American Antiquity, vol. 26, number 4, 516-523.

Millon, Rene, Bruce Drewitt, and James A. Bennyhoff

1965 The Pyramid of the Sun At Teotihuacan: 1959 Investigations, Transactions of the American Philosophical Society, New Series, vol. 55, part 6, Philadelphia.

Mirambell, L.

1967 "Excavaciones en un Sitio Pleistoceno de Tlapacoya, Mexico", INAH Boletin, number 30, 37-41.

Mooser, Federico

1956 "Consideraciones Geologicas Acerca de la Formacion del Lago de Texcoco", in La Cuenca de Mexico, Consideraciones Geologicas y Arqueologicas, by Federico Mooser, Sidney E. White, and Jose L. Lorenzo, INAH, Mexico.

Monzon, Arturo

1949 El Calpulli en la Organizacion Social de los Tenochca, Universidad Nacional Autonoma de Mexico, Instituto de Historia, in collaboration with the INAH, Mexico

Moreno, Manuel M.

1962 La Organizacion Politica y Social de los Aztecas, INAH, Mexico.

Muller, Florencia

1967 "Sequencia Ceramica de Teotihuacan", Teotihuacan, Onceava Mesa Redonda, Sociedad Mexicana de Antropologia, 31-44.

- Nicholson, H.B., and David Grove
1964 "Excavation of a Ballcourt at Ixtapaluca Viejo, Valley of Mexico", MS.
- Niederberger, Christine B.
1969 "Paleocologia Humana y Playas Lacustres Post-pleistocenicos en Tlapacoya", INAH Boletin, number 37, 19-24.
- Noguera, Eduardo
1935 Tenayuca, Talleres Graficos del Museo Nacional de Arqueologia, Historia, y Etnografia, Mexico.
1943 "Excavaciones en El Tepalcate, Chimalhuacan, Mexico", American Antiquity, vol. 9, number 1, 29-32.
- O'Neill, George
1963 Postclassic Ceramic Stratigraphy at Chalco in the Valley of Mexico, unpublished PhD. Dissertation, submitted to Columbia University, New York.
- Octavo Censo General de Poblacion, 1960
1963 Published by the Secretaria de Industria y Comercio, Dirreccion General de Estadistica, volumes for the Estado de Mexico and the Distrito Federal.
- Olivera Sedano, Alicia
1954-55 "Cuitlahuac", RMEA, vol. 14, part 1, 299-302.
- Palerm, Angel
1955 "The Agricultural Basis of Urban Civilization in Mesoamerica", in Irrigation Civilizations: A Comparative Study, Panamerican Union, Social Science Monographs, I, 28-42.
1961 "Sistemas de Regadio en Teotihuacan y en el Pedregal", in La Agricultura y el Desarrollo de la Civilizacion en Mesoamerica, by Angel Palerm and Eric R. Wolf, Panamerican Union, Revista Interamericana de Ciencias Sociales, Segunda Epoca, vol. 1, number 2, 297-302.
- Parsons, Jeffrey R.
1966 The Aztec Ceramic Sequence in the Teotihuacan Valley, Mexico, unpublished PhD. Dissertation, submitted to the University of Michigan, 2 volumes.
1968 "Teotihuacan, Mexico, and Its Impact on Regional Demography", Science, vol. 162, number 3856, 872-877.
1969 "Patrones de Asentamiento Prehispanico en la Region Texcocana", INAH Boletin, number 35, Mexico.
MS Prehispanic Settlement Patterns in the Texcoco Region, Mexico.
in press "The Function of Texcoco Fabric-Marked Pottery

- Paso y Troncoso, Francisco (ed.)
1905-48 Papeles de Nueva Espana, Madrid and Mexico, nine volumes.
- 1939-42 Epistolario de Nueva Espana, 1505-1818, Biblioteca Historica Mexicana de Obras Ineditos, segunda serie, Mexico, 16 volumes.
- Penafiel, Antonio
1884 Memoria Sobre las Aguas Potables de la Capital de Mexico, Oficina Tipografica de la Secretaria de Fomento, Mexico.
- Pina Chan, Roman
1955 Las Culturas Preclassicas de la Cuenca de Mexico, Fonda de Cultura Economica, Mexico.
- 1964 , and Luis Covarrubias
El Pueblo del Jaguar (Los Olmecas Arqueologicas) Mexico.
- Porter, Muriel
1953 Tlatilco and the Pre-Classic Cultures of the New World, Viking Fund Publications in Anthropology, number 19, New York.
- Rattray, Evelyn
1966 "An Archaeological and Stylistic Study of Coyotlatelco Pottery", Mesoamerican Notes, numbers 7-8, 87-211.
- Robelo, Cecilio A.
(no publication date indicated) Diccionario de Aztequismos, Ediciones Fuente Cultural, Mexico, D.F.
- Romano, Arturo
1955 "Nota Preliminar Sobre Los Restos Humanos Sub-Fosiles de Santa Maria Astahuacan, D.F.", INAH Anales, vol. VII, number 36, 65-76.
- Sahlins, Marshall D.
1958 Social Stratification in Polynesia, University of Washington Press, Seattle.
- Sanders, William T.
1952 "El Mercado de Tlatelolco: Un Estudio de Economia Urbana", Tlatoani, vol. 1, number 1, 14-16.
- 1956 "The Central Mexican Symbiotic Region, A Study in Pre-Historic Settlement Patterns", in Prehistoric Settlement Patterns in the New World, G.F. Willey (ed.), Viking Fund Publications in Anthropology, number 23, 115-27, New York.
- 1962 "Cultural Ecology of Nuclear Mesoamerica" American Anthropologist, vol. 64, number 1, part 1, 34-43.
- 1965 The Cultural Ecology of the Teotihuacan Valley, mimeo, Department of Sociology and Anthropology, Pennsylvania State University, University Park.

Sanders, William T.

1966 Review of W. Borah and S. Cook; The Aboriginal Population of Central Mexico on the Eve of the Spanish Conquest (Ibero Americana 45), in American Anthropologist, vol. 68, number 15, 1298-99.

1967 "Life in A Classic Village", Teotihuacan, Onceava Mesa Redonda. Sociedad Mexicana de Antropologia; Mexico, 123-48.

1968 "Hydraulic Agriculture, Economic Symbiosis, and the Evolution of States in Central Mexico", in Anthropological Archaeology in the Americas, The Anthropological Society of Washington, D.C., 88-107.

, and Barbara Price
1968 Mesoamerica, The Evolution of a Civilization, Random House, New York.

, Anton Kovar, Thomas Charlton and Richard A. Diehl
1970 The Natural Environment, Contemporary Occupation and 16th Century Population of the Valley, vol. 1 of the Teotihuacan Valley Final Report, The Department of Anthropology, Pennsylvania State University, Occasional Papers in Anthropology, Number 3.

Sears, Paul B., and K. H. Clisby

1955 "Palinology in Southern North America, Part IV: Pleistocene Climate in Mexico", Bulletin, Geological Society of America, vol. 66, number 5.

Service, Elman

1962 Primitive Social Organization, Random House, New York.

Snow, Dean R.

1969 "Ceramic Sequence and Settlement Location in Pre-Hispanic Tlaxcala", American Antiquity, vol. 34, number 2, 131-45.

Standley, Paul C.

1920 Trees and Shrubs of Mexico, Contributions from the United States National Herbarium, vol. 23, part 1, Smithsonian Institution, United States National Museum, Washington.

Stern, Theodore

1950 The Rubber-Ball Games of the Americas, Monographs of the American Ethnological Society, number XVII, Marian W. Smith (ed.), New York.

Tolstoy, Paul

1958 Surface Survey of the Northern Valley of Mexico: The Classic and Postclassic Periods, Transactions of the American Philosophical Society, New Series, vol. 48, part 5.

, and Andre Guenette

1965 "Le Placement de Tlatilco Dans le Cadre du Pre-Classique du Bassin de Mexico", Journal de Societe de Americanistes, vol. 54, part 1, 47-91.

- Tolstoy, Paul, and Luis I. Paradis
1970 "Early and Middle Preclassic Culture in the Basin of Mexico",
Science, vol. 167, number 3971, 344-51.
- Tozzer, Alfred M.
1921 Excavation of a Site at Santiago Ahuizotla, D.F., Mexico,
Bureau of American Ethnology, Bulletin number 74, Washington.
- Tschohl, Peter
1966 "Informe Sobre Estado de los Trabajos Arqueologicos", mimeo.
- Vaillant, George C.
1930 Excavations at Zacatenco, Anthropological Papers of the
American Museum of Natural History, vol. 32, part 1.
1931 Excavations at Ticoman, Anthropological Papers of the
American Museum of Natural History, vol. 32, part 2.
1935 Excavations at El Arbolillo, Anthropological Papers of the
American Museum of Natural History, vol. 35, part 2.
1938 "A Correlation of Archaeological and Historical Sequences
in the Valley of Mexico", American Anthropologist, New Series, vol. 40,
535-543.
1941 Aztecs of Mexico, Doubleday, Doran, and Company, New York.
- Velazquez, Primo Feliciano
1945 Anales de Cuauhtitlan, Codice Chimalpopoca, Universidad
Nacional Autonoma de Mexico, Instituto de Historia, Mexico.
- Weaver, Muriel Porter
1967 Tlapacoya Pottery in the Museum Collection, Indian Notes
and Monographs, Misc. Series number 56, Museum of the American Indian
Heye Foundation, New York.
- West, Michael
1965 "Transition from Preclassic to Classic at Teotihuacan",
American Antiquity, vol. 31, number 2, part 1, 193-202.
- West, R., and Pedro Armillas
1950 "Las Chinampas de Mexico", Cuadernos Americanos, vol. 2
(2), 165-82.
- Wicke, Charles, and Fernando Horcasitas
1957 "Archaeological Investigations on Monte Tlaloc, Mexico",
Mesoamerican Notes, number 5, Department of Anthropology, Mexico City
College, Mexico, 83-96.
- Wittfogel, Karl A.
1957 Oriental Despotism, A Comparative Study of Total Power,
Yale University Press, New Haven and London.

Wolf, Eric R.
1959
Chicago.

Sons of the Shaking Earth, University of Chicago Press,

1955 , and Angel Palerm
"Irrigation in the Old Acolhua Domain", Southwestern Journal
of Anthropology, vol. 11, 265-81.