

Smith 1992

PART II
CASE STUDIES

4 Rhythms of change in
Postclassic central
Mexico: archaeology,
ethnohistory, and the
Braudelian model

MICHAEL E. SMITH

This paper applies insights from the work of Fernand Braudel to the problem of correlating archaeology and native history in Postclassic central Mexico. Two aspects of Braudel's model of hierarchical temporal rhythms are emphasized. First, Braudel's *theoretical construct* provides a useful framework for conceptualizing past time and processes of change in complex societies. Second, his *empirical findings* on the diverse types of socioeconomic change and their rhythms contribute to the dialectical interaction between changing research questions and chronological refinement. These points are illustrated through an examination of archaeological and native historical data on processes of socioeconomic change in Postclassic central Mexico. Greater attention to temporal rhythms and chronological issues leads to more successful archaeological/historical correlation in central Mexico and thereby helps advance our understanding of processes of change.

Introduction

The Postclassic epoch in highland central Mexico was a time of major social, economic, and political change. Large cities and territorial empires rose and fell, significant demographic changes took place including mass migrations and rapid population increase, the city-state emerged as the dominant political form, and warfare, trade, and alliances became significant forms of interaction between polities. These developments are reflected not only in the archaeological record, but also in native historical chronicles preserved by the Nahuatl dynasties of the Late Postclassic city-states. While the existence of two separate but parallel sources of infor-

mation on this period provides an excellent opportunity to construct models of change, the full potential of this approach has yet to be realized for a number of reasons. In this chapter, I argue that the application of Braudel's model of hierarchical temporal rhythms contributes greatly to a clarification of the problems and potentials of archaeological/historical correlation in Postclassic central Mexico. This in turn leads to an improved understanding of processes of social change in one of the most important regions of the Precolumbian New World.

A longstanding methodological problem in the joint consideration of Postclassic archaeology and native history is that the two sources of data have been juxtaposed prematurely before either has been sufficiently analyzed on its own terms. Difficulties with this procedure when applied to Bronze Age Greece are outlined by Evans:

It does seem to me important that in a field in which various kinds of evidence, philological, literary and anthropological, as well as archaeological, are available, they should in one important sense be kept separate. Though comparisons of findings in each must be useful at all stages, it seems to be fatal to mix elements drawn from more than one in elaborating an argument. The kind of information provided by each of them is so distinct that when intermingled they inevitably weaken the reasoning. This must, in fact, be able to stand up first to judgement in terms of the strict logic of its own discipline. (Evans 1974: 17)

Brinkman makes the same point for Mesopotamia, arguing that "disciplinary autonomy does not preclude interdisciplinary work but is a necessary pre-condition for making meaningful such work" (1984: 179).

For Postclassic central Mexico, ethnohistorians working with native history have tended to ignore archaeology (e.g., Calnek 1978; Berdan 1982; Hassig 1985), and when they do incorporate archaeological data, it is often misinterpreted (e.g., Davies 1977: 132-40). Archaeologists on the other hand have always structured their research and interpretations in terms of native history. Historical events are used to gauge the accuracy of archaeological chronologies (e.g., Vaillant 1938; Tolstoy 1958; Sanders, Parsons, and Santley 1979: 457-74), native historical concepts like Toltec, Chichimec or *calpulli* are incorporated into archaeological interpretations (e.g., Sanders, Parsons, and Santley 1979: 137-76; Diehl 1983), and in general the analytical separation between the two types of data is less than it should be. The result is that many "archaeo-

logical" interpretations of Postclassic central Mexico are so permeated by historical constructs that their archaeological reliability or accuracy is difficult to judge. One particularly flagrant example is the assignment of historically derived dates to archaeological phases (discussed in Smith 1987a).

It should be noted here that the above discussion deals with the *diachronic* correlation of archaeology and native history. Most attempts to correlate archaeology and ethnohistory in central Mexico have been *synchronic* in orientation, with the goal of reconstructing contact-period social and cultural organization using Spanish descriptions rather than native historical traditions (see Spores 1980 or Charlton 1981 for general discussions). Archaeologists pursuing this latter approach in central Mexico (e.g., Brumfiel 1980; 1985; 1987; Evans 1988; see Smith 1987b) have generally been more explicit and cautious about the analytical separation of archaeological and ethnohistorical data in their work.

Other reasons for the general lack of success in past attempts to correlate archaeology and native history in central Mexico are discussed by Nicholson (1955), Charlton (1981: 155), and Smith (1984; 1987a). First, the degree of refinement of existing archaeological chronologies is not adequate to monitor much of the fast-paced action of the native histories. This relates directly to the hierarchical nature of rhythms of social change in complex societies. Processes that operate over long time-scales (e.g., many demographic or ecological changes) can be monitored with existing archaeological chronologies, while processes of shorter duration (like the wars and dynastic events depicted in Nahuatl native history) require the refinement of archaeological sequences before their material manifestations can be studied (Smith, this volume). Second, earlier archaeologists tended to employ the simplistic notion of a one-to-one association of ceramic types or styles with ethnic groups (Vaillant 1938; Noguera 1963), which more often than not has proved to be inaccurate in Postclassic central Mexico (Smith 1984: 176).

Charlton (1981: 155) suggests a final factor possibly hindering archaeological/ethnohistorical correlation: "the lack of correlation between sociopolitical change and ceramic change." This is a sweeping statement that is open to challenge on both empirical and theoretical grounds (Smith 1983: 15; Knapp *et al.* 1988). Braudel's work suggests that we need to separate "sociopolitical change" into its component processes, some of which have material indicators while others do not, and some of which operate at time scales amenable to archaeological investigation while others do not.

Figure 4.2 Archaeological chronologies for Postclassic central Mexico

Date, A.D.	Period	Basin of Mexico	Tula	Western Morelos	Cuemavaca	Tehuacan	Tlaxcala
1500	Late Postclassic	Late Aztec	Palacio	Late Cuauhnahuac	Tecpan	Late Venta Salada	Tlaxcala
1400				Early Cuauhnahuac			
1300	Middle Postclassic	Early Aztec	Fuego	Temazcali	Teopanzolco	Early Venta Salada	Texcalac
1200				Tilancingo			
1100	Early Postclassic	Mazapan	Tollan	Phase H	Not yet defined	Early Venta Salada	Texcalac
1000				Phase G			
900	Epiclassic	Coyotlatelco	Corral	Phase G	Not yet defined	Early Venta Salada	Texcalac
800							

Sources:

- Basin of Mexico: Sanders, Parsons and Santley (1979: 457-474).
- Tula: Diehl (1983: 19).
- Western Morelos: Smith (1983); Hirth (1984).
- Cuemavaca: Smith (1983).
- Tehuacan: MacNeish, Peterson and Flannery (1970: 177-237).
- Tlaxcala: Garcia Cook (1976: 64-89).

The archaeological record for Postclassic central Mexico

Chronology

Central Mexican archaeological chronology employs units that were initially designed as developmental stages (Formative, Classic, Postclassic) but now retain a primarily chronological connotation. The Postclassic epoch, from the fall of Teotihuacan to the arrival of Spanish invaders, is often divided into four units known as the Epiclassic, and Early, Middle, and Late Postclassic periods (Figure 4.2).¹ The outlines of this scheme

were first established for the Basin of Mexico by George Vaillant (1938); later workers refined and confirmed the sequence (e.g., Tolstoy 1958; Parsons 1966; Sanders, Parsons, and Santley 1979). While these four periods were well established by stratigraphy and ceramic styles, their dating was worked out initially by (questionable) correlation with ethnohistory (see Nicholson 1955 for comment), and surprisingly few chronometric dates have been run on the sequence. Recent radiocarbon dates from nearby areas like Hidalgo and Morelos, whose sequences are closely linked to the Basin of Mexico

through cross-ties, tend to support the consensus dating (e.g., Diehl 1983: 57; Norr 1987; Smith and Doershuk n.d.), but there is a clear need for chronometric dating in the Postclassic Basin of Mexico.² Outside of the Basin of Mexico, Morelos, and Hidalgo, Postclassic chronologies in central Mexico are less refined, and consist of either hypothetical sequences unsupported by published archaeological data (as in the Toluca Valley or Cholula) or else rough divisions into two periods generally referred to as Early and Late Postclassic (as in Tlaxcala and much of Puebla, including Tehuacan; see Figure 4.2); this situation is discussed further in Smith (1987a).

The Epiclassic period

The period immediately after the breakup of the large Classic polity of Teotihuacan was characterized by warfare and conflict among a number of smaller, though urban, polities throughout the central Mexican highlands. In the Basin of Mexico, total population dropped to two-thirds of its Classic level (Sanders, Parsons, and Santley 1979: 129). Teotihuacan, though much reduced in size and grandeur, remained a major city with a population on the order of 30,000–40,000 (Sanders, Parsons, and Santley 1979: 130). Among the excavated contexts in Epiclassic Teotihuacan is a workshop for the production of obsidian projectile points (Rattray 1987). Population in the rest of the Basin of Mexico was centered on a number of "settlement clusters" (Sanders, Parsons, and Santley 1979: 129–33), with most inhabitants living in large towns and cities. This period witnessed the lowest proportion of rural settlement of any phase in the Prehispanic sequence of the Basin (*ibid.*).

At least three major urban polities rose to prominence in central Mexico outside of the Basin of Mexico following the demise of Teotihuacan. The areas south and west of the Basin were respectively dominated by the large fortified hilltop urban centers of Xochicalco (Hirth 1984) and Teotenango (Piña Chán 1975). Both of these sites have impressive ceremonial and defensive architecture, large dense populations, and iconographic depictions of militarism and conflict (Figure 4.3). A number of obsidian workshops are present at Xochicalco (Sorensen, Hirth, and Ferguson 1981), which was involved in exchange with a number of central and west Mexican supply areas. The site of Cacaxtla in southern Tlaxcala (López de Molina 1981) is best known for its elaborate mural paintings with wide-ranging stylistic influences, including Late Classic Maya art (the Epiclassic period in central Mexico was contemporaneous with the Late Classic period in the Maya lowlands). Again, these paintings emphasize warfare and militarism, and the site

is a hilltop urban center with fortifications. Finally, the major site of Cholula in Puebla may or may not have had extraregional politico-military significance in the Epiclassic period (as suggested by Sanders, Parsons, and Santley 1979: 133–4); the published data are unfortunately not sufficiently informative to make a judgment (e.g., Marquina 1970). In summary, the Epiclassic period in central Mexico was a time of large competing urban centers, with no single polity achieving the regional dominance previously held by Teotihuacan. Epiclassic developments in central Mexico and elsewhere in Mesoamerica are reviewed by Webb (1978) and the papers in Diehl (1989).

The Early Postclassic period

Settlement patterns in the Basin of Mexico underwent a major transformation between the Epiclassic and Early Postclassic periods. Whereas the Epiclassic period exhibited one of the highest levels of urbanism in the whole sequence, the Early Postclassic period witnessed the greatest ruralization of settlement, with very few large centers (Sanders, Parsons, and Santley 1979: 138). There is only one large urban settlement in central Mexico at this time: the site of Tula in Hidalgo, just north of the Basin of Mexico (Figure 4.4). Recent research suggests a dense population of around 30,000–40,000 inhabitants (Diehl 1983: 60), and reveals obsidian and other craft workshops, monumental ceremonial architecture, as well as a complex iconography with themes of warfare and militarism (Matos 1974; Diehl 1983; Healan 1986; 1989).

The early Postclassic situation at Cholula is again uncertain: we cannot be sure of its size, organization, or interregional significance. Sanders, Parsons, and Santley (1979: 146–9) suggest that Cholula may have been a political and economic rival of Tula, and they explain a settlement gap in the central Basin of Mexico as a buffer zone between these two major rival polities. However, apart from the uncertainties of Cholula's status, there is little evidence to suggest that Tula had much political or economic influence beyond its local support zone. Tollan phase (Early Postclassic) artifacts and styles from Tula (including architecture) are conspicuous by their absence from contexts outside of the Tula area, and the major Early Postclassic Mesoamerican trade routes generally bypassed Tula and central Mexico (Smith and Heath-Smith 1980). The only evidence which may relate to a possible extension of influence much beyond Tula is that the northern Basin (closest to Tula) represents the only portion of the Basin of Mexico witnessing population growth between the Epiclassic and Early Post-

Figure 4.3 Aerial view of the Epiclassic hilltop city of Xochicalco, Morelos



classic periods (Sanders, Parsons, and Santley 1979: 209-16); in the remainder of the Basin (and overall), population declined at this time. This demographic pattern is echoed in western Morelos, where the number of sites along the Río Chalma dropped between the Epiclassic and Early Postclassic periods (K. Hirth, unpublished data).

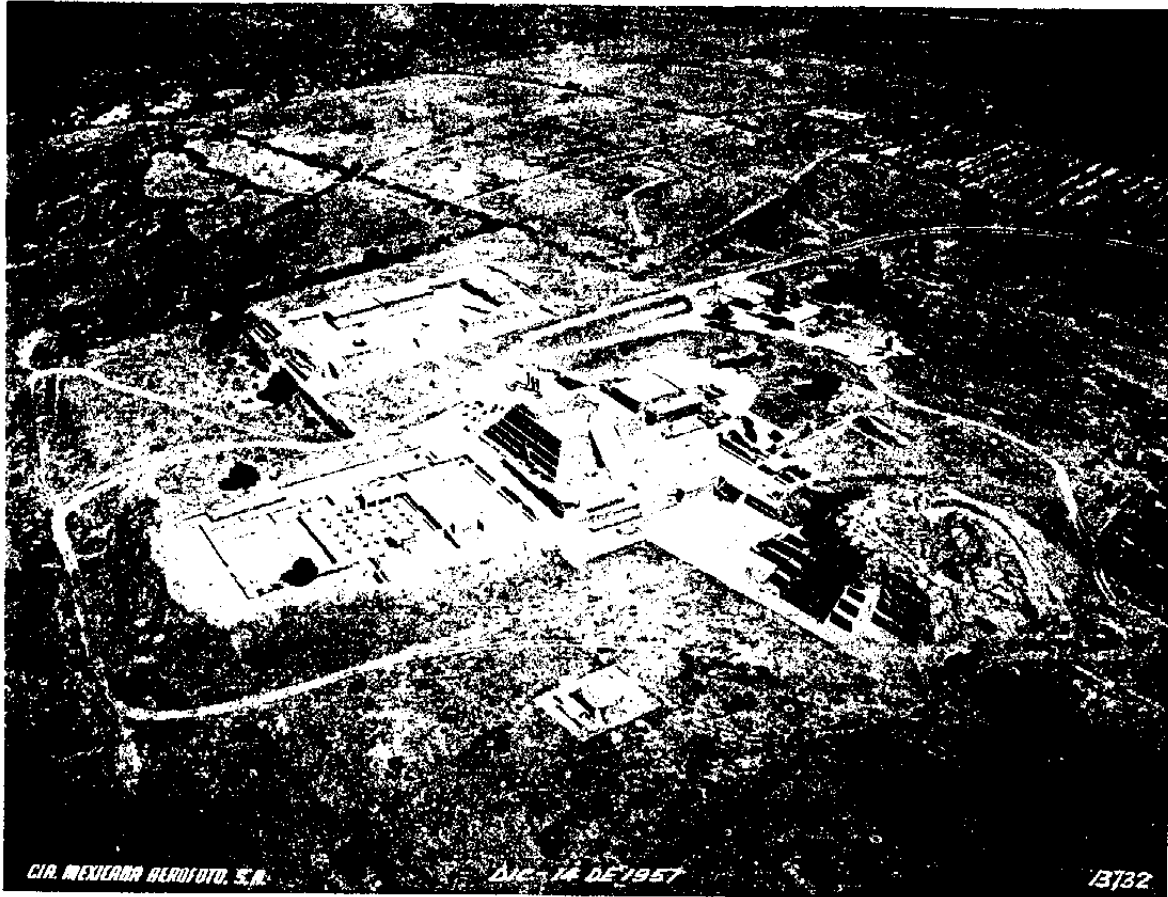
The Middle Postclassic period

There is a major discontinuity in settlement location between the Early and Middle Postclassic periods in both the Basin of Mexico (Sanders, Parsons, and Santley 1979: 152) and western Morelos (K. Hirth, unpublished data). At the same time, new bichrome and polychrome ceramic styles were initiated in these areas (and in at least one other part of central Mexico - Malinalco) and continued through the following Late Postclassic period (Figure 4.5). Elsewhere I have interpreted these changes

as archaeological evidence for the arrival of new populations in the central Mexican highlands (Smith 1984).

Although a number of Middle Postclassic sites have been excavated in central Mexico (e.g., Tenayuca, Chalco, and Culhuacan in the Basin of Mexico; Teopanzolco [or Cuauhnahuac], Tepozteco, and Tetla in Morelos), most of this work has consisted of limited testing and/or the study of ceremonial architecture; for this reason, we know little about patterns of urban structure or size during this period. Furthermore, there are chronological problems in the surface archaeology of the Middle Postclassic in the Basin of Mexico, where ceramics are difficult to distinguish from Late Postclassic material (see Sanders, Parsons, and Santley 1979: 150-1), making analyses of settlement patterns difficult and less secure than for other periods. Overall, the pattern appears to resemble that of the Early Postclassic, with a high level of ruralization and no large

Figure 4.4 Aerial view of the central ceremonial zone of the Early Postclassic city of Tula, Hidalgo



urban centres in the Basin. The Toltec city at Tula was largely abandoned by this time, a situation probably associated with a decline in regional population in the northern Basin of Mexico and the Tula area. This decline is offset by a large settlement buildup in the southern Basin, however. Parsons' recent excavations in the chinampa zone suggest that this population growth was related to the initiation of chinampa construction on a large scale (Parsons *et al.* 1982). The overall trend in the Basin of Mexico and Morelos is for a slight rise in population over Middle Postclassic levels.

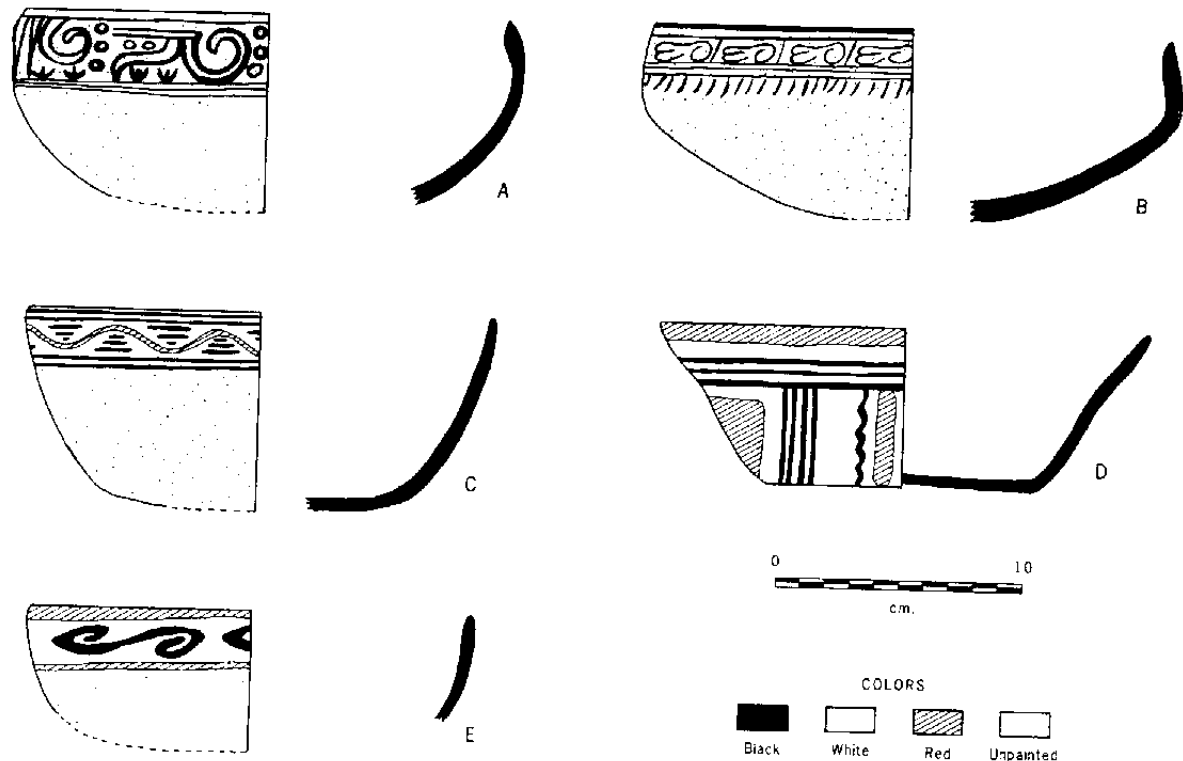
The Late Postclassic period

In the Basin of Mexico, two outstanding characteristics of Late Postclassic settlement are a very high population size and density, and an advanced degree of urbanization. Total population increased from 160,000 to

1,000,000, and the proportion of the population living in cities increased from zero to around 35 percent (these trends are discussed further below). The most dramatic example of urbanization is the Aztec capital Tenochtitlan (Figure 4.6), a process analyzed by Rojas (1986). In addition, Texcoco was a large city, and there were five or six smaller urban centers with populations well over 10,000 (Sanders, Parsons, and Santley 1979: 154). Rural population also expanded greatly, and in several areas Late Postclassic settlement is nearly continuous along major strips several km long. This overall population growth was accompanied by major construction projects in both urban ceremonial architecture (e.g., Matos 1988) and agricultural intensification (Parsons *et al.* 1982). The demographic explosion in the Basin of Mexico was mirrored in Morelos (Smith 1991), although there is less evidence for concomitant urban growth in this area.

For the first time in many centuries, a single ceramic

Figure 4.5 Middle Postclassic decorated ceramics from central Mexico. A: Aztec I Black-on-Orange (southern Basin of Mexico); B: Aztec II Black-on-Orange (northern Basin of Mexico); C: Tlahuica Polychrome Type A (Teopanzolco, Morelos); D: Tlahuica Polychrome Type B-4 (Cuexcomate, Morelos); E: Malinalco Polychrome (Malinalco, State of Mexico)



style was predominant throughout the entire Basin of Mexico, suggesting the integration of the Basin into a single exchange system. Aztec tradewares (both ceramics and obsidian) achieved a widespread distribution throughout Mesoamerica, although on a lesser scale than Teotihuacan wares a millennium earlier (Smith 1990). Obsidian tools were manufactured in rural workshops throughout central Mexico (Smith, Sorensen, and Hopke 1984; Brumfiel 1985; 1987; Spence 1985), and there is little evidence of urban lithic production at this time (Figure 4.7). These patterns suggest a period of relative peace and stability, which is supported by a general lack of fortifications or defensible locations at Late Postclassic sites in central Mexico (although there were exceptions like the fortress of Oztuma in Guerrero or Cuauhtochco in Veracruz). Military motifs are moderate elements in Mexican iconography from Tenochtitlan, although they are somewhat rare outside of that context.

Major trends in the Postclassic archaeological record

The Postclassic archaeological record provides a basis for inferring a number of socioeconomic trends, including demography, urbanism, warfare, agricultural intensification, craft production, and long-distance trade orientations. Information on these topics is summarized in Table 4.1. There were two fundamental long-term demographic cycles in the Prehispanic Basin of Mexico. Population grew steadily from the introduction of agriculture through the Classic period of Teotihuacan's dominance (total Basin population of around 250,000 – Sanders, Parsons, and Santley 1979: 186), after which it fell to a low point in the Early Postclassic, only to rise again until the end of the Prehispanic era in the sixteenth century. The Middle to Late Postclassic increase approached a 1 percent annual growth rate, an extremely high rate for a preindustrial context (see Cowgill 1975). In the Late Postclassic, regional population density was

Figure 4.6 Plan of the Aztec Templo Mayor, the central pyramid-temple of the Aztec capital Tenochtitlan (reprinted from Broda, Carrasco, and Matos 1987)

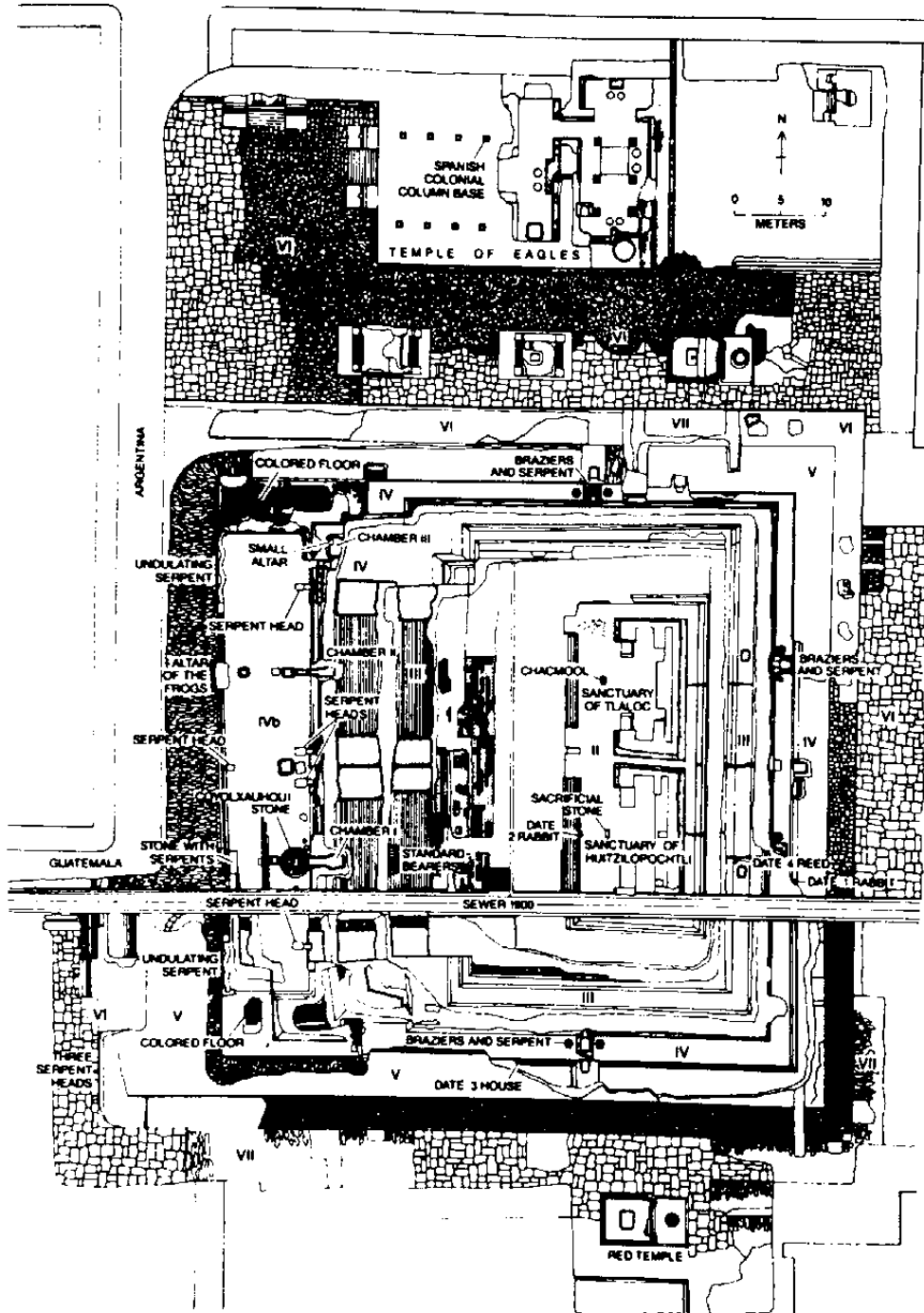


Figure 4.7 Late Postclassic obsidian artifacts manufactured of obsidian from the Puchuca source area, Hidalgo (excavated at the sites of Cuexcomate and Capileo in Morelos by the Postclassic Morelos Archaeological Project)

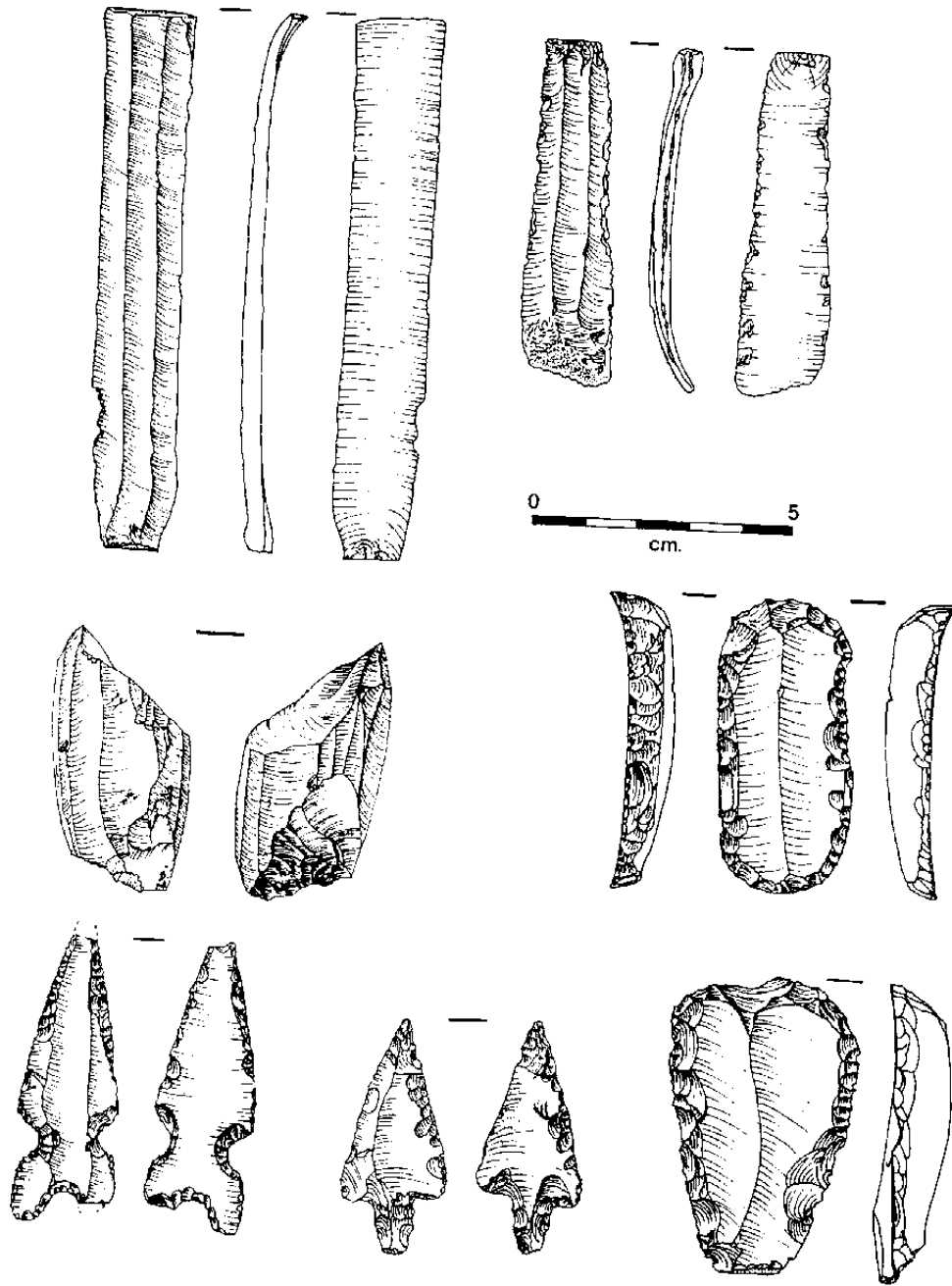


Table 4.1 *Trends in the Postclassic archaeological record*

Variable	Periods			
	Epiclassic	Early Postclassic	Middle Postclassic	Late Postclassic
<i>A Basin of Mexico demography^a</i>				
Total population	175,000	130,000	160,000	1,000,000
% of population in cities ^b	31	0	0	34
% of population in towns ^b	38	40	29	18
Maximum regional population density	65/km ²	56/km ²	103/km ²	234/km ²
<i>B Central Mexican politico-economic trends^c</i>				
Settlement orientation	urban	<----- rural ----->		urban
Primate city	none	Tula	none	Tenochtitlan
Warfare	<----- common ----->		no data	rare
Agricultural intensification	<----- low ----->		moderate	high
Textile production	<----- moderate ----->			high
Obsidian production	<----- urban ----->		no data	rural
Trade orientation	<----- non-nucleated ----->			nucleated

a These data are from Sanders, Parsons, and Santley (1979: 183–219).

b "Cities" refers to supraregional and large regional centers in the Basin of Mexico settlement classification; "towns" refers to small regional centers (Sanders, Parsons, and Santley 1979: 52–60).

c These are subjective judgements whose basis is discussed in the text.

around 150 persons per sq. km overall, with localized areal densities of over 200 persons per sq. km (Table 4.1). Again, this is a very high figure for a preindustrial population.

Urbanization closely followed population levels in the Basin of Mexico (Table 4.1). The Early and Middle Postclassic periods had the lowest populations, distributed in a predominantly rural configuration without large cities. On a wider scale, however, Early Postclassic Tula was a primate city within central Mexico as a whole, although not to the same extent as either Teotihuacan in the Classic or Tenochtitlan in the Late Postclassic. Warfare was significant in site layout and location and iconography in the first half of the Postclassic epoch, although there is less evidence in the two later periods.

There is little evidence for intensive agricultural practices early in the Postclassic, followed by increasing construction of chinampas, irrigation facilities, hillside terraces, and other agricultural features in the Middle and especially Late Postclassic (Parsons *et al.* 1982; Price 1988). In western Morelos, where Postclassic textile production has been studied in some detail, cotton spinning becomes significant in the Epiclassic period, and then undergoes a major increase in the Late Postclassic

(Smith and Hirth 1988); this is in contrast to the Basin of Mexico, where spinning appears to decline between the Early and Late Aztec phases (Brumfiel 1980; 1985; 1987). The macroregional orientation of long-distance trade remained non-nucleated for most of the Postclassic in that no single center controlled a major portion of trade and many important Postclassic trade networks bypassed central Mexico (see Smith and Heath-Smith 1980). The Late Postclassic pattern represents a return to the earlier Classic pattern where one central Mexican city controls a large part of Mesoamerican trade (Smith 1990).

Chronological refinement in Postclassic central Mexico

Before the trends discussed above can be analyzed in greater detail, archaeological chronologies in Postclassic central Mexico need to be refined in a relative sense and dated more accurately in a chronometric sense. Since Parsons' (1966) pioneering work on Aztec chronology, there have been only a few cases of significantly improved chronologies for Postclassic central Mexico. The University of Missouri Tula Project (Diehl 1983) produced a finer Epiclassic/Early Postclassic chronology for that site; the Xochicalco Mapping Project refined the

Classic/Epiclassic sequence in western Morelos (Hirth 1984); and the author's seriation work in western Morelos (Smith 1983; 1987a) produced a finer grained sequence for the post-Xochicalco periods. This latter work illustrates the influence of research goals and temporal rhythms on chronology-building. An Early-Middle-Late Postclassic chronology to match that in the Basin of Mexico was easily derived from test-pit stratigraphy and ceramic cross-ties. However, an interest in the expansion of the Aztec empire and its local effects led to a major effort in chronological refinement. Quantitative seriation (using multidimensional scaling and discriminant analysis) was applied to ceramic attribute data from excavated secondary refuse deposits, permitting a division of the post-Xochicalco epoch into five phases in place of the prior three. As a result, the pre- and post-imperial periods were separated for the first time in Mesoamerica (see Smith 1983: chapter 4; 1987a).

This example points out again the dialectical nature of chronological refinement (see Smith, this volume). As archaeologists have recovered more data and made more wide-ranging interpretations of the Postclassic archaeological record, the existing chronology that made that work possible has become inadequate for current research interests. Fortunately, several current projects include chronological refinement as an explicit goal – Jeffrey Parsons' excavations in the chinampa zone of the southern Basin of Mexico; Susan Evans' work at rural sites in the Teotihuacan Valley; Thomas Charlton and Deborah Nichols' study of Aztec Otumba; Patricia Plunket's work in southern Puebla, and the author's excavations of rural villages in western Morelos (Smith 1991; Smith and Doershuk n.d.). This work promises to lead to more refined sequences in the Basin of Mexico, Morelos, and Puebla, which would permit consideration of socioeconomic changes on the order of the long- and intermediate-term conjuncture.

Central Mexican ethnohistory

The nature of the sources

The major types of primary sources for central Mexican ethnohistory are native-style pictorial codices, first-hand Spanish accounts of the Aztecs, early colonial compilations, and Spanish administrative records. These may be classified into two broad categories, synchronic and diachronic. Synchronic sources provide a richly detailed picture of central Mexico at the time of Spanish conquest and on into the colonial epoch (e.g., Berdan 1982), while diachronic sources depict several centuries of pre-Spanish history for the politics and peoples of central

Mexico (e.g., Carrasco 1971). The focus here is on documentary treatments of historical change before the arrival of the Spanish.

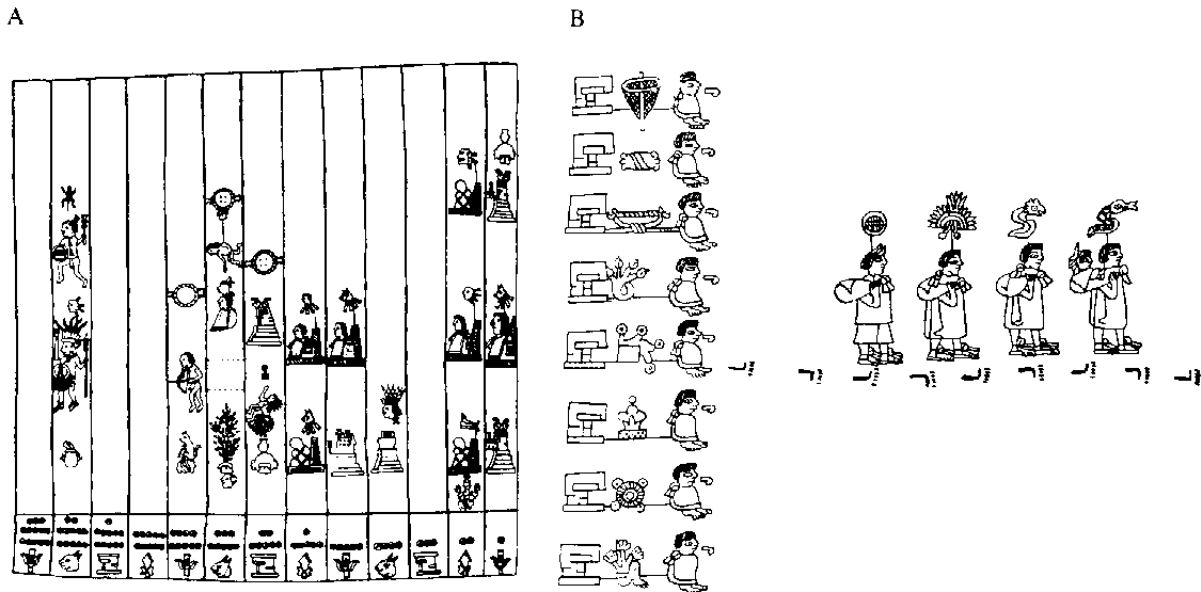
The Nahuatl-speaking peoples of central Mexico had a rudimentary writing system that served two primary purposes: religious and historical. The most common form of historical account combined written documents with oral narrative. The major documents, called "continuous year count annals" by Nicholson (1971), were based upon the Mesoamerican 52-year calendar. They typically have an unbroken sequence of year dates arranged along one side of each page of a screen-fold document (Figure 4.8A). Pictorial glyphs and scenes indicate events that happened in particular years and served as points of departure for oral narrative regarding the events portrayed. The purpose of these annals was to record the occurrence of events significant to the ruling dynasties of the city-states. They tend to focus on ethnic origins and later dynastic history: accessions and deaths of rulers, wars, alliances, and the like. Most of our knowledge of the Nahuatl histories comes from what Nicholson (1971: 48) calls "textual histories." These are descriptions and transcriptions of native chronicles (both written and oral) recorded in Spanish and Nahuatl in the sixteenth century.

Because of the nature of Nahuatl native history, the reliability of information declines as one moves back in time. The 80-year period of the Aztec empire (1438–1519) is well covered while the preceding century has somewhat less information. Prior to the founding of Tenochtitlan in 1345, however, the amount of data and its reliability drop off considerably. Most authorities agree that the earliest historical information that is not completely mythological concerns the Toltecs of the Early Postclassic period.³

The chronicle of native history

The major events and processes described in the central Mexican sources are listed in Figure 4.9 along with their most probable dates (I tend to follow Davies' (1973; 1977; 1980) approach to chronology and his specific dates for most events). Native history begins with the Toltecs, a semi-legendary people who purportedly invented the calendar and the technology of craft production. The Toltecs are depicted as wise and good, the greatest artists of Mesoamerica, with many other virtues and positive accomplishments. The Toltecs are also said to have created a large empire centered on a magnificent capital city, Tollan. Not only were some Aztec gods like Quetzalcoatl linked to Toltec culture heroes, but later rulers down through Motecuhzoma Xocoyotzin pos-

Figure 4.8 Native historical documents from central Mexico. A: Historical events between the year of AD 1467 (1 reed) and 1479 (13 reed) as portrayed in a continuous year-count annal, the *Codex en Cruz* (Dibble 1981); B: Migrations of the Aztlan groups as depicted in the *Tira de la Peregrinación* (1944)



sessed political legitimacy by virtue of their (proclaimed) direct line of descent from the Toltec kings.

Native historical information on the Toltecs is assembled and analyzed by Davies (1977; 1980), who also treats the related problem of the ideological importance of the Toltecs in later times. Davies (1977: 171–5) leaves the dates for the founding of the Toltec capital and empire to the archaeologists (see Diehl 1983), but suggests that AD 900 is not an unreasonable estimate from the fragmentary and conflicting available native dates. The extent of the Toltec “empire” is discussed by a number of authors: Davies (1977: 312–28) and Diehl (1983: 118–21) concur in the inclusion of central and southern Hidalgo, the Basin of Mexico, northern Puebla, and Morelos. The fall of Tollan and the Toltecs, probably at the hands of invading nomads, is dated by Davies to AD 1175.

The next major process depicted in the native historical sources is the arrival in central Mexico of Nahuatl-speaking migrants from the north. These populations reportedly originated in the mythical place of Aztlan in the north and were guided to their eventual homelands in central Mexico by their gods (Figure 4.8B). The historicity and dating of these migrations is covered by Smith (1984). These populations represent the ancestors of the various central Mexican Nahuatl

groups of the sixteenth century. The most celebrated immigrant group (due to the source of the majority of the surviving texts) is the Mexica, the last of the Aztlan groups to arrive in central Mexico. Upon their arrival in the Basin of Mexico and the surrounding highland valleys, the settlers proceeded to found city-states and dynasties that quickly obtained links (through marriage) to the Toltec kings (Calnek 1978; 1982).

According to the sources, the thirteenth through early fifteenth centuries was a time of population increase, political expansion, and the growth of social stratification. The various city-states interacted intensively in both peaceful and violent ways: trade, marriage alliances, and elite co-operation were important, and these were accompanied by battles and shifting political alliances. This situation, described by Davies (1973; 1980) and analyzed by Brumfiel (1983), provides an excellent example of the process of “peer polity interaction” (Renfrew and Cherry 1986). The end result of these processes was the development of increasingly powerful and centralized states. The late fourteenth century saw the rise of the Tepanec empire in the western Basin of Mexico, the Acolhua state or empire in the eastern portion of the Basin, and the Cuauhnahuac conquest-state in Morelos to the south (Smith 1986).

Figure 4.9 Ethnohistorical chronology for Postclassic central Mexico

Date, A.D.	Archaeological Period	Historical Event	Historical Date*
1500	Late Postclassic	Spanish Conquest	1519
		Aztec Empire Established	1428
1400		Tepanec Empire Established	1370
	Middle Postclassic	Tenochtitlan Founded	1345
1300		Growth of City-States and Dynasties	
		Arrival of Aztlan Migrants	ca. 1200-1250
1200	Early Postclassic	Fall of Tollan	1175
1100		Toltec Empire	
1000		Toltec Empire Established	ca. 900
900	Epiclassic		
800			

*See text for discussion of the dates and chronology.

Table 4.2 *Areas of agreement between archaeology and ethnohistory*

Factor	Process/Event	Agree	Disagree	Not comparable
Demography	Aztlan migrations	X		
	Population growth	X		
Urbanism	Chronology of Tula	X		
	Primate cities	X		
	Founding of Tenochtitlan		X	
	Growth of Tenochtitlan			X
	Rural-urban orientation			X
Economics	Intensive agriculture			X
	Textile production			X
	Obsidian production			X
	Trade orientation			X
	Basin of Mexico market system			X
Political/military	Extent of Aztec empire	X		
	Extent of Toltec empire		X	
	Late Postclassic warfare		X	
	Growth of city-states			X
	Growth of Tepanec empire			X
	Growth of Aztec empire			X

This trajectory of political evolution culminated in the founding of the Aztec or Triple Alliance empire in the wake of the defeat of the Tepanecs by the Mexica and Acolhua in 1428 (Davies 1973). The Aztecs then initiated a process of expansion by conquest so that by 1519 the empire covered most of central and northern Mesoamerica. Late native history is preoccupied with the story of what king conquered which towns in what year, coupled with the nature of the resultant tribute paid to Tenochtitlan.

Diachronic correlation of archaeology and ethnohistory

It should be clear from the above discussions of archaeological and native historical data that there are some cases of agreement, some cases of disagreement, and many examples of non-comparability. When individual processes and events are classified by social category, some patterns begin to emerge (Table 4.2). Demographic processes show the greatest agreement, followed by aspects of urbanism. There is little comparability between the sources of evidence for economic phenomena, while political/military developments present a range of levels of agreement. Some of these patterns are the simple product of the nature of the evidence (e.g., native history has little to say about economics), but

others derive from the nature of the phenomena, particularly the temporal rhythms involved in various processes of change. The four categories listed in Table 4.2 are discussed in turn.

Demography

The arrival of the Aztlan migrants is known primarily from native history, and it finds archaeological agreement in changing patterns of settlement locations and ceramic styles (Smith 1984). Postclassic population growth, including the dramatic Middle/Late Postclassic surge, is revealed primarily in the archaeological record through settlement pattern studies. Although there is little explicit or precise information in native history on population levels, the general accounts of political development and migrations suggest steadily increasing populations in the final few Prehispanic centuries (e.g., Davies 1973; 1980). The high level of agreement in demographic questions is due to three factors: (1) demographic phenomena have clear material expressions in the archaeological record; (2) demographic phenomena often have major social impacts which lead to their inclusion in historical accounts; and (3) much demographic change proceeds over long time scales that can be monitored by both archaeology and history.

Urbanism

Radiocarbon dates for the major Early Postclassic occupation of Tula (Diehl 1983: 57) match native historical dates for the florescence of the Toltec capital Tollan. There is further agreement between the sources that both the Early and Late Postclassic periods witnessed large primate cities in central Mexico, while the Epiclassic and Middle Postclassic periods show no such pattern of urban dominance. Beyond the huge cities, however, the rural vs. urban orientation of settlement as documented by regional survey is simply not reflected in Nahuatl native history.

The only significant disagreement concerning cities and urbanism relates to the founding of Tenochtitlan. Davies (1973: 37; 1980: 182) argues convincingly that the traditional historical date for this event (AD 1325) is incorrect and needs to be moved up to 1345. This matches closely the archaeological date for the Early/Late Aztec transition in the Basin of Mexico (Figure 4.9). However, excavations in Mexico City (Tenochtitlan) have turned up significant amounts of Aztec II Black-on-Orange ceramics, an Early Aztec marker (Vega 1979). There are a number of minor archaeological and historical revisions which could resolve this contradiction (e.g., the traditional date for Tenochtitlan is correct after all; the Early Late Aztec transition is dated too early; there was pre-Mexica settlement at Tenochtitlan; etc.), but they have yet to be adequately explored. The historically documented rapid urban growth of Tenochtitlan (e.g., Lombardo de Ruiz 1973; Rojas 1986) cannot be studied archaeologically because of the logistics of excavating in the center of a modern metropolis, although some aspects of urbanization are reflected in the ceremonial state architecture excavated by the recent Templo Mayor project (Matos 1988).

The agreement between archaeology and ethnohistory on some urban phenomena can be attributed to the same reasons given above for demography – the material expressions of urbanism, the social impact of at least the large cities, and the time spans involved. The disagreement over the founding of Tenochtitlan is a minor issue that will probably be resolved with further research. The two cases of a lack of comparability arise from the logistics of fieldwork in a modern city and the lack of native historical information on all but the largest cities. This is generally a profitable area for joint archaeological-historical analysis, at least partially because the growth and decline of cities and towns often occurs over the relatively long time spans (the longer form of conjuncture) amenable to study by both excavation and surface methods (Braudel 1981). Some recent examples

of useful joint archaeological-historical studies of urbanization include Diehl (1983), Redman (1986), Smith (1989), Knapp (1992), and studies in Renfrew and Cherry (1986).

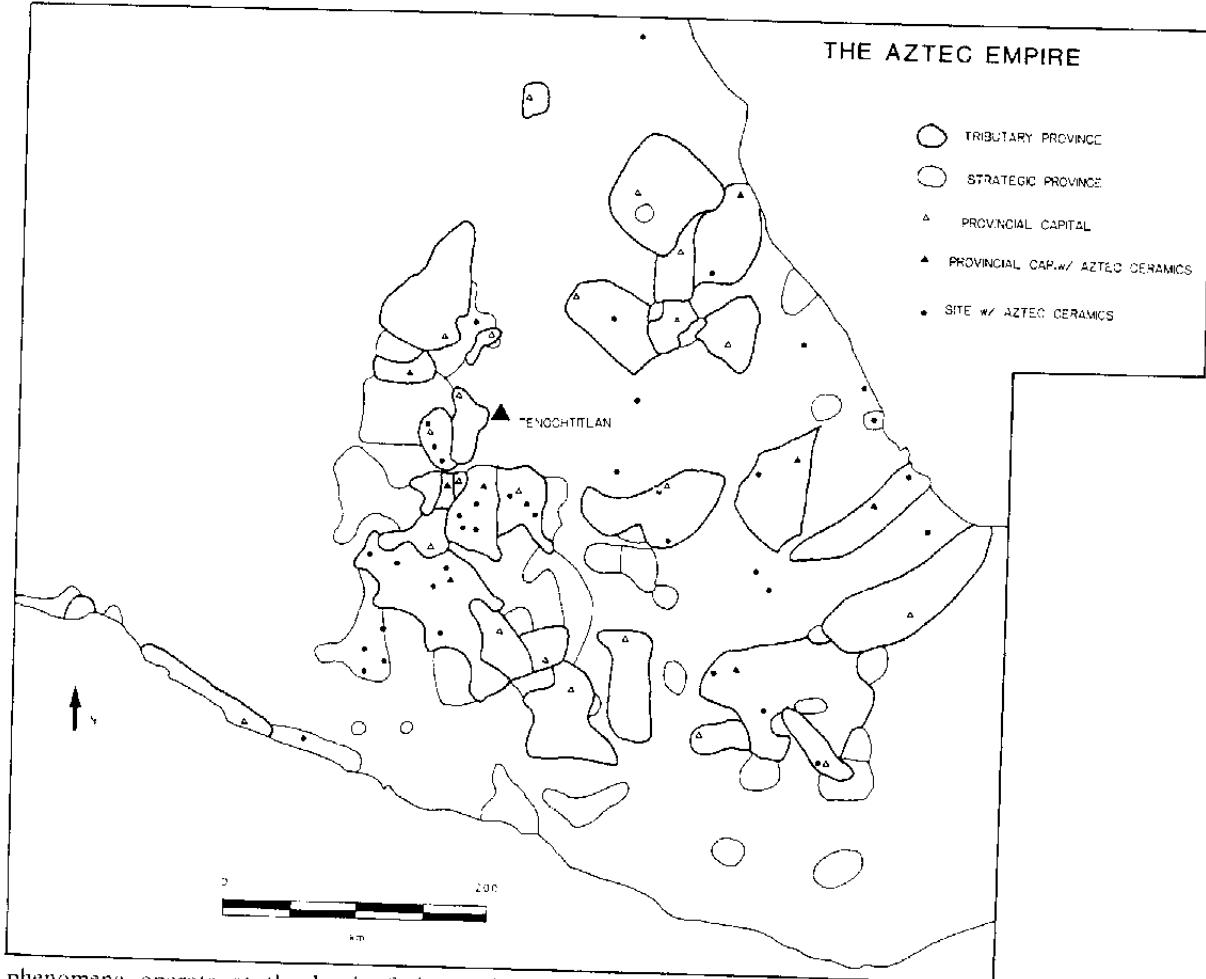
Economics

Analysis of economic change presents a major methodological challenge in Postclassic central Mexico. The lack of economic data for earlier periods in Nahuatl native history makes archaeological-historical correlation irrelevant for long-term changes over the course of the Postclassic epoch. For the final century or two (Late Postclassic period), there are scraps of economic data that permit some changes to be investigated with historical data. For example, we know something of the chronology of the celebrated *pochteca* trade, and there are some examples of early and late imperial tribute quotas from the same area. Furthermore, the founding of the Aztec empire in 1428 is generally acknowledged as a major socio-political turning point in central Mexico, and many economic patterns described in 1519 are believed to be the result of changes brought about by the growth of the empire and concomitant socioeconomic transformations (e.g., Davies 1973; Brumfiel 1983; Smith 1986; Rojas 1986). As an example, the extensive market system that linked the entire Basin of Mexico into a single economy (Smith 1979; Brumfiel 1980; Berdan 1985) could only have developed under the conditions of peace and stability after 1428.

It is tempting to relate these economic changes to the dramatic transformations documented in the archaeological record between the Middle and Late Postclassic periods. For example, the Basin-wide uniformity of Late Aztec ceramic assemblages might appear to relate to the operation of the historically documented market system, or various Early to Late Aztec changes in archaeological markers of production and exchange might seem to be due to historically documented conditions before and after the formation of the empire (Brumfiel 1980; 1985). However at this stage of central Mexican chronology these are not valid correlations because the relevant chronological unit for the archaeological record – the Late Postclassic period – includes nearly equal intervals of time before and after the formation of the empire (see Smith 1987a for comment).

If scholars wish to deal with these issues, archaeological chronologies will have to be refined to the point where we can separate at least the pre- and post-imperial periods. Another stimulus to chronological refinement comes from Braudel's insights into the rhythms of economic change. He shows that many economic

Figure 4.10 Extent of the Aztec empire in 1519 with the locations of late Aztec trade ceramics indicated (see Smith 1990). This map is a preliminary version of the new map of the empire now in preparation by the Dumbarton Oaks Aztec Empire Project. Provincial borders are still subject to revision; the final map will be published in Berdan *et al.* (n.d.).



phenomena operate at the level of the conjuncture, which is often a faster paced rhythm than the changes on a 200-year scale revealed by the existing archaeological record. It is entirely possible that the changing Postclassic patterns of production and exchange revealed in the central Mexican archaeological record are spurious in that quantitative means for individual phases can mask cyclical variability of a quite different pattern.

Political and military processes

The geographical extent of large polities is another useful area of archaeological-historical correlation; Braudel includes "the changing dimensions of states and empires" (1972: 899) as an example of his longer con-

juncture. For Postclassic central Mexico, we have agreement of sorts on the extent of the Aztec empire and a major disagreement for the Toltec case. As mentioned above, there is no archaeological evidence suggesting any kind of empire or expansive state centered on Tula in the Early Postclassic, while the historical sources attribute a large area to Tollan's domination. My own inclination is to doubt the native history, since so much of the historical information on the Toltecs is clearly mythological and exaggerated. Other archaeologists, however, tend to follow the sources over the archaeological record on this subject (e.g., Diehl 1983; Sanders and Santley 1983; Healan 1989).

The case for the Aztec empire is complex, but existing

archaeological data can be construed to agree with the historical accounts of the empire's extent. The political geography of the empire is currently undergoing revision, and a new map to replace Barlow's (1949) classic version is being produced by the Dumbarton Oaks Aztec Empire Project under the direction of Frances Berdan (Berdan *et al.* n.d.). Aztec expansion did not in most cases lead to the imposition of rulers, cities, garrisons, or colonies in the provinces (Hassig 1985; Smith 1986). However, a map of the distribution of Aztec ceramics outside of the Basin of Mexico coincides relatively well with the new map of the empire (Figure 4.10; see Smith 1990). While it is unlikely that the expansion of the empire led to the spread of the ceramics in question, the parallel distributions imply some link between ceramic trade and Aztec imperialism. Both the archaeologically documented artifact distributions and the historically documented imperial territory are due to the same underlying factor – the economic interest of the Aztecs in particular regions of Mesoamerica (Smith 1990). This is a complex issue, and unfortunately the whole methodological problem of the archaeological analysis of imperialism is rather poorly developed (see Bartel 1980; 1985; Alcock 1989).

There is some disagreement between archaeology and native history on the question of Late Postclassic warfare. The historical sources are full of information on battles, armies, and conquests, and this finds support in one class of archaeological remains – iconographic depictions on the imperial sculpture of Tenochtitlan (Townsend 1979). Militarism and warfare were clearly important aspects of Aztec society in 1519 (Berdan 1982: 105–8; Hassig 1988). However, compared to earlier periods, Late Postclassic sites are not located in defensible positions and do not exhibit defensive features like walls and ditches. While a number of fortresses have been found (e.g., Oztuma, Cuauhtochco; see Berdan *et al.* n.d.), these are the exceptions, located on the margins of central Mexico. It is possible that the native historical sources exaggerated the prevalence and importance of warfare because of their dynastic orientation and propagandistic role in Aztec society (see Smith 1986: 84; Gillespie 1989), or it may be that these patterns increased in intensity throughout the Late Postclassic. In Braudel's scheme (1972: 899), wars tend to operate on the level of the shorter conjuncture, and the growth of militarism may have occurred too quickly to be reflected in architectural patterns at most sites. In any case, by the mid-fifteenth century, most Aztec military activity was carried out on the frontiers of the empire, away from central Mexico (Hassig 1988).

Finally, three political-military processes documented in native history have few relevant archaeological manifestations: the growth of city-states, and the expansion of the Tepanec and Aztec empires. The first is amenable to archaeological analysis, but the emphasis on temples and test pits at Middle Postclassic sites (see above) prevents meaningful conclusions. As suggested above, the problem with the Aztec and Tepanec empires is the rapidity and lateness of their growth; the answer to the lack of comparability is chronological refinement and the development of archaeological methods for analyzing ancient imperialism.

Conclusions

Temporal rhythms in Postclassic central Mexico

The archaeological-ethnohistoric correlations discussed above permit a number of conclusions on the rhythms of social change in Postclassic central Mexico. There were no fundamental upheavals on the scale of Butzer's (1982) adaptive transformation between the fall of Teotihuacan and the arrival of the Spanish. The epoch begins and ends with urban state-level societies and relatively dense populations. However, within this setting, two major long-term trends on the scale of the *longue durée* stand out, both established sometime in the Early Postclassic and continuing through the end of the Prehispanic era. First, the archaeological record reveals an interlocking trend of population growth, agricultural intensification, urbanization, and economic growth. These processes begin slowly in the Early Postclassic and then accelerate at a greater rate in the Middle and Late Postclassic periods (see Table 4.1). In broad terms, this trend bears some resemblance to the "great agrarian cycle" in early modern Languedoc as analyzed by Le Roy Ladurie (1974). In the French case, the cycle also begins with a rural orientation of settlement and low population levels. Rapid population increase and economic growth led to the expansion of settlement and trade, but the limits of agricultural production were soon reached, leading to widespread poverty and general economic recession. The Aztec growth cycle never had a chance to reach maturity and subsequent decline on its own; Cortés arrived in a period of growth and expansion before recession could set in.

A second basic long-term trend is documented primarily in the realm of native history – the growth of the city-state as the dominant political form in central Mexico. City-states may have gotten their start in the wake of Teotihuacan's decline (Hirth 1984), but it is in the context of the fall of Tula and the arrival of the Aztlan migrants that this political form really took root

and spread throughout the central Mexican highlands. The subsequent rise of the Tepanec and then Aztec empires did not signal an end to the dominance of city-states, since these loosely integrated empires left local political institutions in place and were built upon a foundation of local independent polities (Hodge 1985; Smith 1986). In Braudel's sense, the city-state represents one of the important and enduring "structures" of Postclassic central Mexico. While archaeology has yet to contribute much to our knowledge of Postclassic city-states (although see Brumfiel 1980; 1983), this is due to the small number of projects that have undertaken extensive excavations with the recovery of socioeconomic and political data as a goal (current work by Thomas Charlton and Deborah Nichols at Otumba will make a major contribution here).

At the level of Braudel's conjunctures, there are a number of such social and economic cycles recorded in both the archaeological and the native historical records for Postclassic central Mexico. The various empires – Toltec (if this was indeed an empire), Tepanec, and Aztec – were relatively short-lived cyclical phenomena (compared to many Old World empires). The Aztec case is similar in at least outline form to the growth of European empires in the sixteenth century which also developed out of a city-state background. According to Braudel (1972: 678, 895–6), economic growth, fueled by population growth, encouraged the growth of territorial states and empires in Europe. Urbanization in post-Teotihuacan central Mexico was another cyclical or conjunctural process. No single city maintained its growth or economic dominance for more than one of the existing archaeological periods, and the rural urban orientation of settlement in the Basin of Mexico also followed a cyclical trajectory.

The temporal scale of the conjuncture lies at the edge of current archaeological capabilities in central Mexico. The existing chronology is sufficient to document contrasting patterns and the presence of change, but it is not refined to the point where we can analyze adequately the actual processes or events of change. Just how did the urban orientation of the Epiclassic Basin of Mexico evolve into the rural settlement configuration of the Early Postclassic? What socioeconomic changes were associated with the expansion of the Aztec empire? The answers to these and many other important research questions will come only after central Mexican archaeological chronologies are refined beyond their current level of resolution.

The relevance of Braudel

Fernand Braudel's model of hierarchical temporal rhythms helps advance the study of change in Postclassic central Mexico in several ways. Perhaps the most obvious contribution is the framework that Braudel's model provides for the interpretation of various types of sociocultural change. Different processes operate at different temporal scales, and changes at the level of the *longue durée* (e.g., many settlement pattern shifts) should not be viewed as equivalent to changes operating over shorter intervals (e.g., urbanization or the rise and fall of empires). This insight (see also Bailey 1983; 1987) casts doubt on attempts to provide unitary causal explanations for processes as diverse as settlement pattern change, urbanization, and shifts in production and distribution patterns (e.g., Sanders, Parsons, and Santley 1979; Sanders and Santley 1983). Particularly appealing for archaeologists is Braudel's theoretical justification for a strong emphasis on processes and structures of the *longue durée*, a level of time appropriate for the study of much of the data of prehistory.

Another contribution of Braudel's model to studies of Postclassic central Mexico is that it helps account for patterns of agreement, disagreement, and non-comparability between the archaeological and native historical records. The general agreement between the two sources of data on demographic phenomena (see Table 4.2) is due in large part to the relatively long time span over which many demographic processes operate, while much of the disagreement and non-comparability of economic, political, and military matters arises from their shorter temporal rhythms coupled with the relatively coarse grain of Postclassic archaeological chronologies. This observation points out a third important benefit of Braudel's model: it can help archaeologists relate chronology-building to research goals and fieldwork results (Smith, this volume). For central Mexico, existing archaeological chronologies are adequate to study the processes of the *longue durée*, and past emphases on settlement patterns and demography (e.g., Sanders, Parsons, and Santley 1979; Blanton *et al.* 1979) are appropriate for the same end. However, as research goals turn to economic and political changes that typically operate at shorter time scales (e.g., agricultural intensification, state-formation, urbanization, or imperialism; see for example Parsons *et al.* 1982; Brumfiel 1983; 1987; Smith 1986; Matos 1988), archaeologists need to devote more attention to chronological refinement (Smith 1987a).

The relevance of Braudel's model, particularly in relation to the correlation of archaeology and history,

extends far beyond Postclassic central Mexico, as other articles in this book show. Few scholars would question the need to consider both archaeological and historical data (where both are available) in the attempt to develop more adequate models and interpretations of the complex societies of the past, and there are many general discussions of this issue in the literature (e.g., Nicholson 1955; 1978; Evans 1974; Spores 1980; Charlton 1981; Adams 1984; Brinkman 1984; Smith 1987a; Deetz 1988; Knapp this volume; 1991; note that most of these discussions are by archaeologists, not historians). However, this case study suggests that we need to go beyond programmatic statements about archaeological data versus historical data and take into account the particular kinds of evidence available. Different classes of archaeological remains as recovered by different methods provide very different kinds of information, and this variability needs to be considered explicitly in attempts to relate archaeology and history. If we compare settlement patterns as revealed by surface reconnaissance, or excavations of different types like test pitting, trenching ceremonial architecture, or clearing residential structures, these operations not only supply different kinds of evidence (Smith 1987b) but also permit varying levels of chronological refinement. A similar situation exists with regard to historical data. Varying kinds of documentary sources not only provide different information, but also permit different levels of temporal control and refinement. A major benefit of Braudel's work is that it forces scholars to confront these issues, thereby leading to more successful correlations of the archaeological and historical records.

Conclusions

The work of Braudel and the wider *Annales* school is not a panacea that will provide instant illumination of the archaeological past, but it does tie in with current concerns in archaeological method and theory (Fletcher and Smith, this volume), and can help advance the study of the past in a number of ways. Explicit attention to the issues raised by Braudel's model of hierarchical temporal rhythms not only helps in the interpretation and explanation of varying sociocultural processes in the Pre-Columbian past, but it also makes methodological contributions to archaeological research. This paper emphasizes two relevant areas of methodology – chronological refinement and the correlation of archaeology and ethnohistory – but there are others as well (Fletcher and Knapp, this volume). These two relevant aspects of Braudel's model – the explanatory and the methodological – are illustrated by the example of Postclassic central

Mexico presented above. This was a setting for the rise and fall of complex state-level societies, and the application of insights from the work of Braudel contributes both to our understanding of the social processes involved and to the resolution of problems in correlating archaeology and ethnohistory.

Notes

- 1 The author's objections to a recently proposed chronological nomenclature involving horizons and intermediate phases (e.g., Sanders, Parsons, and Santley 1979: 91–3) are discussed in Smith (1987a).
- 2 Recent obsidian hydration at the Late Aztec/Early Colonial site of Siguatepecan (Susan Evans, personal communication) is a step in the right direction.
- 3 There is some disagreement over the historical accuracy of Nahuatl native history. Some scholars interpret nearly everything in these accounts as literal history (e.g., Carrasco 1971), while others take the opposite view that mythological elements dominate to the extent that it is nearly impossible to derive historically accurate information from the accounts (e.g., Gillespie 1989). The middle ground followed here assumes that both mythological and historical information are present in Nahuatl native history, and that historical accuracy can be determined by standard methods of source criticism and comparison. For examples of this latter approach, see Nicholson (1971), Davies (1977; 1980), and Smith (1984).

Acknowledgements

I would like to thank Bernard Knapp for the encouragement to write this paper and for helpful comments on earlier drafts. My knowledge and understanding of the archaeological and ethnohistorical records for Postclassic central Mexico have benefited greatly from discussions over the years with Frances Berdan, David Grove, Kenneth Hirth, William Sanders, and many other colleagues. Figures 4.3 and 4.4 are reprinted with permission of the Compañía Mexicana de Aerofoto, Mexico City; Figure 4.6 is reprinted with permission of the University of California Press; and Figure 4.8A with permission of the University of Utah Press. Figures 4.5 and 4.10 were drafted by Michael Smith, Figure 4.7 by Fernando Botas. Figures 4.1, 4.2, and 4.9 were prepared by the Loyola University Center for Instructional Design.

References

- Adams, R. McC. 1984 Mesopotamian social evolution: old outlooks, new goals, in T. K. Earle, ed., *On the Evolution of Complex Societies: Essays in Honor of Harry Hoijer, 1982*, pp. 79–129. (Other Realities 6.) Malibu: Undena Press.
- Alcock, S. E. 1989 Archaeology and imperialism:

- Roman expansion and the Greek city. *Journal of Mediterranean Archaeology* 2: 87-135.
- Bailey, G. N. 1983 Concepts of time in Quaternary prehistory. *Annual Review of Anthropology* 12: 165-92.
- 1987 Breaking the time barrier. *Archaeological Review from Cambridge* 6: 5-20.
- Barlow, R. H. 1949 The Extent of the Empire of the Culua Mexica. *Ibero-Americana* 28.
- Bartel, B. 1980 Colonialism and cultural responses: problems related to Roman provincial analysis. *World Archaeology* 12: 11-26.
- 1985 Comparative historical archaeology and archaeological theory. in S. L. Dyson, ed., *Comparative Studies in the Archaeology of Colonialism*, pp. 8-37. British Archaeological Reports, International Series 233. Oxford: BAR.
- Berdan, F. F. 1982 *The Aztecs of Central Mexico: An Imperial Society*. New York: Holt, Rinehart and Winston.
- 1985 Markets in the economy of Aztec Mexico. in S. Plattner, ed., *Markets and Marketing*, pp. 339-67. Lanham, MD: University Press of America.
- Berdan, F. F., R. E. Blanton, E. H. Boone, M. G. Hodge, M. E. Smith, and F. Umberger *Aztec Imperial Strategies*. (In preparation)
- Blanton, R. E., S. Kowalewski, G. Feinman, and J. Appel 1979 *Ancient Mesoamerica: A Comparison of Change in Three Regions*. New York: Cambridge University Press.
- Braudel, F. 1972 *The Mediterranean and the Mediterranean World in the Age of Philip II* (translated by Sian Reynolds). 2 vols. New York: Harper and Row.
- 1980 *On History* (translated by Sarah Matthews). Chicago: University of Chicago Press.
- 1981 *The Structures of Everyday Life: The Limits of the Possible* (translated by M. Kochan and S. Reynolds). New York: Harper and Row.
- Brinkman, J. A. 1984 Settlement surveys and documentary evidence: regional variation and secular trend in Mesopotamian demography. *Journal of Near Eastern Studies* 43: 169-80.
- Broda, J., D. Carrasco, and E. Matos 1987 *The Great Temple of Tenochtitlan: Center and Periphery in the Ancient World*. Berkeley: University of California Press.
- Brumfiel, E. M. 1980 Specialization, market exchange, and the Aztec state: a view from Huexotla. *Current Anthropology* 21: 459-78.
- 1983 Aztec state making: ecology, structure, and the origin of the state. *American Anthropologist* 85: 261-84.
- 1985 The division of labor at Xico: the chipped stone industry, in B. L. Isaac, ed., *Economic Aspects of Prehispanic Highland Mexico*, pp. 245-79. Research in Economic Anthropology, Supplement 2. Greenwich, CT: JAI Press.
- 1987 Elite and utilitarian crafts in the Aztec state, in E. M. Brumfiel and T. K. Earle, eds., *Specialization, Exchange, and Complex Societies*, pp. 102-18. New York: Cambridge University Press.
- Butzer, K. W. 1982 *Archaeology as Human Ecology: Method and Theory for a Contextual Approach*. New York: Cambridge University Press.
- Calkin, E. 1978 The city-state in the Basin of Mexico: Late Pre-Hispanic period. in R. P. Schaedel, J. E. Hardoy, and N. S. Kinzer, eds., *Urbanization in the Americas from its Beginnings to the Present*, pp. 463-70. The Hague: Mouton.
- 1982 Patterns of empire formation in the Valley of Mexico. Late Postclassic period. 1200-1521. in G. A. Collier, R. I. Roslado, and J. D. Wirth, eds., *The Inca and Aztec States, 1400-1800: Anthropology and History*, pp. 43-62. New York: Academic Press.
- Carrasco, P. 1971 The peoples of central Mexico and their historical traditions. in G. F. Ekholm and I. Bernal, eds., *Archaeology of Northern Mesoamerica*, pt 2, pp. 459-73. Handbook of Middle American Indians 11. Austin: University of Texas Press.
- Charlton, T. H. 1981 Archaeology, ethnohistory, and ethnology: interpretive interfaces. *Advances in Archaeological Method and Theory* 4: 129-76.
- Cowgill, G. L. 1975 On causes and consequences of ancient and modern population changes. *American Anthropologist* 77: 505-25.
- Davies, N. 1973 *The Aztecs: A History*. New York: G. P. Putnam's Sons.
- 1977 *The Toltecs Until the Fall of Tula*. Norman: University of Oklahoma Press.
- 1980 *The Toltec Heritage: from the Fall of Tula to the Rise of Tenochtitlan*. Norman: University of Oklahoma Press.
- Deetz, J. 1988 American historical archaeology: methods and results. *Science* 239: 362-7.
- Dibble, C. E. (ed.) 1981 *Codex en Cruz*. Salt Lake City: University of Utah Press.
- Diehl, R. A. 1983 *Tula: The Toltec Capital of Ancient Mexico*. New York: Thames and Hudson.
- (ed.) 1989 *Mesoamerica After the Decline of Teotihuacan*. Washington, DC: Dumbarton Oaks.
- Evans, J. D. 1974 The archaeological evidence and its interpretation: some suggested approaches to the problems of the Aegean Bronze Age. in R. A.

- Crossland and A. Birchall, eds., *Bronze Age Migrations in the Aegean: Archaeological and Linguistic Problems in Greek Prehistory*, pp. 17–26. Park Ridge, NJ: Noyes Press.
- Evans, S. T. 1988 *Excavations at Cihuateopan: An Aztec Village in the Teotihuacan Valley*. Vanderbilt University Publications in Anthropology 36. Nashville: Vanderbilt University, Department of Anthropology.
- García Cook, A. 1976 *El Desarrollo Cultural en el Norte del Valle Poblano: Inferencias*. Instituto Nacional de Antropología e Historia, Departamento de Monumentas Prehispánicas, Serie Arqueología, No. 1. Mexico City.
- Gillespie, S. D. 1989 *The Aztec Kings: The Construction of Rulership in Mexican History*. Tucson: University of Arizona Press.
- Hassig, R. 1985 *Trade, Tribute, and Transportation: The Sixteenth Century Political Economy of the Valley of Mexico*. Norman: University of Oklahoma Press.
- 1988 *Aztec Warfare: Imperial Expansion and Political Control*. Norman: University of Oklahoma Press.
- Healan, D. M. 1986 Technological and nontechnological aspects of an obsidian workshop excavated at Tula, Hidalgo, in B. L. Isaac, ed., *Economic Aspects of Prehispanic Highland Mexico*, pp. 133–52. Research in Economic Anthropology, Supplement 2. Greenwich, CT: JAI Press.
- (ed.) 1989 *Tula of the Toltecs: Excavations and Survey*. Iowa City: University of Iowa Press.
- Hirth, K. G. 1984 Xochicalco: urban growth and state formation in central Mexico. *Science* 225: 579–86.
- Hodge, M. 1985 *Aztec City-States*. University of Michigan, Museum of Anthropology, Memoirs 18. Ann Arbor.
- Knapp A. B. 1992 *Society and Polity at Bronze Age Pella: An Annales Perspective*. Sheffield: Sheffield Academic Press.
- Knapp, A. B., P. Duerden, R. V. S. Wright, and P. Grave 1988 Ceramic production and social change: archaeometric analysis of Bronze Age pottery from Jordan. *Journal of Mediterranean Archaeology* 1(2): 57–113.
- Le Roy Ladurie, E. 1974 *The Peasants of Languedoc* (translated by John Day). Urbana: University of Illinois Press.
- Lombardo de Ruiz, S. 1973 *Desarrollo Urbana de Mexico-Tenochtitlan Segun las Fuentes Históricas*. Mexico City: Instituto Nacional de Antropología e Historia.
- López de Molina, D. 1981 Un informe preliminar sobre la cronología de Cacaxtla, in E. C. Rattray, J. L. King and C. Díaz Oyarzabal, eds., *Interacción Cultural en México Central*, pp. 169–74. Mexico City: Universidad Nacional Autónoma de México.
- MacNeish, R. S., F. A. Peterson, and K. V. Flannery 1970 *The Prehistory of the Tehuacan Valley*. Volume 3, *Ceramics*. Austin: University of Texas Press.
- Marquina, I. (ed.) 1970 *Proyecto Cholula*. Instituto Nacional de Antropología e Historia, Serie Investigaciones 19. Mexico City.
- Matos Moctezuma, E. (ed.) 1974 *Proyecto Tula*. Instituto Nacional de Antropología e Historia, Colección Científica 15. Mexico City.
- 1988 *The Great Temple of the Aztecs*. New York: Thames and Hudson.
- Nicholson, H. B. 1955 Native historical traditions of nuclear America and the problem of their archaeological correlation. *American Anthropologist* 57: 594–613.
- 1971 Pre-Hispanic central Mexican historiography, in *Investigaciones Contemporáneas Sobre Historia de México*, pp. 38–81. Mexico City and Austin: El Colegio de México and University of Texas Press.
- 1978 Western Mesoamerica: A.D. 900–1520, in R. E. Taylor and C. W. Meighan, eds., *Chronologies in New World Archaeology*, pp. 285–329. New York: Academic Press.
- Noguera, E. 1963 Correlación de la arqueología y la historia en la porción norte del valle de México. *Anales del Instituto Nacional de Antropología e Historia*, Epoca 6, 15: 39–65.
- Norr, L. 1987 The excavation of a Postclassic house at Tetla, in D. C. Grove, ed., *Ancient Chalcatzingo*, pp. 400–8. Austin: University of Texas Press.
- Parsons, J. R. 1966 The Aztec ceramic sequence in the Teotihuacan Valley, Mexico 2 vols. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.
- Parsons, J., E. Brumfield, M. Parsons, V. Popper, and M. Taft 1982 Late Prehispanic chinampa agriculture on Lake Chalco–Xochimilco, Mexico: preliminary report. Report submitted to the National Science Foundation.
- Piña Chán, R. 1975 *Teotenango: El Antiguo Lugar de la Muralla: Memoria de las Excavaciones Arqueológicas*. 2 vols. Mexico City: Gobierno del Estado de México, Dirección de Turismo.
- Price, T. J. 1988 Investigation of agricultural features at two rural Late Postclassic sites in western Morelos, Mexico. M.A. thesis, Department of Anthropology, University of Georgia.

- Ratray, E. C. 1987 La producción y la distribución de obsidiana en el periodo Coyotlatelco en Teotihuacán, in E. McClung de Tapia and E. Ratray, eds., *Teotihuacán: Nuevos Datos, Nuevas Síntesis, Nuevos Problemas*, pp. 451-63. Mexico City: Universidad Nacional Autónoma de México.
- Redman, C. L. 1986 *Qsar es-Seghir: An Archaeological View of Medieval Life*. New York: Academic Press.
- Renfrew, C. and J. F. Cherry (eds.) 1986 *Peer Polity Interaction and Socio-Political Change*. Cambridge: Cambridge University Press.
- Rojas, J. L. 1986 *México Tenochtitlan: Economía y Sociedad en el Siglo XVI*. Mexico City: Fondo de Cultura Económica.
- Sanders, W. T. 1956 The central Mexican symbiotic region, in G. R. Willey, ed., *Prehistoric Settlement Patterns in the New World*, pp. 115-27. Viking Fund Publications in Archaeology 23. New York: Wenner-Gren Foundation for Archaeological Research.
- Sanders, W. T., J. R. Parsons, and R. S. Santley 1979 *The Basin of Mexico: Ecological Processes in the Evolution of a Civilization*. New York: Academic Press.
- Sanders, W. T. and R. S. Santley 1983 A tale of three cities: energetics and urbanization in Pre-Hispanic central Mexico, in E. Z. Vogt and R. Leventhal, eds., *Prehistoric Settlement Patterns: Essays in Honor of G. R. Willey*, pp. 243-91. Albuquerque: University of New Mexico Press.
- Smith, M. E. 1979 The Aztec marketing system and settlement patterns in the valley of Mexico: a central place analysis. *American Antiquity* 44: 110-25.
- 1983 Postclassic culture change in western Morelos, Mexico: the development and correlation of archaeological and ethnohistorical chronologies. Ph.D. dissertation, Department of Anthropology, University of Illinois.
- 1984 The Aztlan migrations of the Nahuatl chronicles: myth or history? *Ethnohistory* 31: 153-86.
- 1986 The role of social stratification in the Aztec empire: a view from the provinces. *American Anthropologist* 88: 70-91.
- 1987a The expansion of the Aztec empire: a case study in the correlation of diachronic archaeological and ethnohistorical data. *American Antiquity* 52: 37-54.
- 1987b Archaeology and the Aztec economy: the social scientific use of archaeological data. *Social Science History* 11: 237-59.
- 1989 Cities, towns and urbanism: comment on Sanders and Webster. *American Anthropologist* 91: 454-60.
- 1990 Long-distance trade under the Aztec empire: the archaeological evidence. *Ancient Mesoamerica* 1: 153-69.
- 1991 *Archaeological Excavations at Aztec-Period Rural Sites in Morelos, Mexico*. Volume 1, *Excavations and Architecture*. Memoirs in Latin American Archaeology 4. Pittsburgh: University of Pittsburgh, Department of Anthropology.
- Smith, M. E. and J. Doershuk n.d. Late Postclassic chronology in western Morelos, Mexico. Unpublished manuscript.
- Smith, M. E. and C. Heath-Smith 1980 Waves of influence in Postclassic Mesoamerica? A critique of the Mixteca-Puebla concept. *Anthropology* 4(2): 15-50.
- Smith, M. E. and K. G. Hirth 1988 The development of Pre-Hispanic cotton-spinning technology in western Morelos, Mexico. *Journal of Field Archaeology* 15: 349-58.
- Smith, M. E., J. H. Sorensen, and P. K. Hopke 1984 Obsidian exchange in Postclassic central Mexico: new data from Morelos. Paper presented at the 1984 International Symposium on Archaeometry.
- Sorensen, J. H., K. G. Hirth, and S. M. Ferguson 1981 Contents of seven obsidian workshops in western Morelos. Paper presented at the Simposio Sobre la Obsidiana en Mesoamérica (Pachuca, Hidalgo).
- Spence, M. W. 1985. Specialized production in rural Aztec society: obsidian workshops of the Teotihuacan Valley, in W. J. Folan, ed., *Contributions to the Archaeology and Ethnohistory of Greater Mesoamerica*, pp. 76-125. Carbondale: Southern Illinois University Press.
- Spores, R. 1980 New world ethnohistory and archaeology, 1970-1980. *Annual Review of Anthropology* 9: 575-603.
- Tira de la Penegrinación 1944 *Tira de la Penegrinación Mexicana*. Mexico City: Librería Anticuaria G. M. Echaniz.
- Tolstoy, P. 1958 Surface survey of the northern Valley of Mexico: the Classic and Post-Classic periods. *American Philosophical Society, Transactions* 48 (5). Philadelphia.
- Townsend, R. F. 1979 *State and Cosmos in the Art of Tenochtitlan*. Dumbarton Oaks, Studies in Pre-Columbian Art and Archaeology 20. Washington, DC: Dumbarton Oaks.
- Vaillant, G. C. 1938 A correlation of archaeological and historical sequences in the valley of Mexico. *American Anthropologist* 40: 535-73.

- Vega Sosa, C. 1979 La cerámica: clasificación y cronología, in C. Vega Sosa, ed., *El Recinto Sagrado de México-Tenochtitlan: Excavaciones 1968-69 y 1975-76*, pp. 37-53. Mexico City: Instituto Nacional de Antropología e Historia.
- Webb, M. 1978 The significance of the "epiclassic" period in Mesoamerican prehistory, in D. L. Browman, ed., *Cultural Continuity in Mesoamerica*, pp. 155-78. The Hague: Mouton.

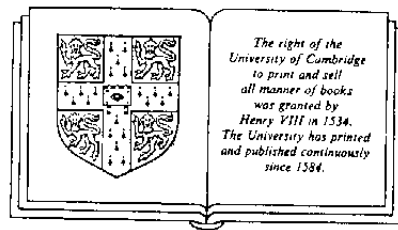
Archaeology, *Annales*, and ethnohistory

Edited by

A. BERNARD KNAPP

Macquarie University, Sydney

1992



CAMBRIDGE UNIVERSITY PRESS

Cambridge

New York Port Chester

Melbourne Sydney