Geochemical Evidence for Long-Distance Exchange

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3

The Emergence of Market Economies in the Ancient Maya World: Obsidian Exchange in Terminal Classic Yucatán, Mexico

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INTRODUCTION

Two perennial questions of Maya archaeology are: "To what extent were Maya polities horizontally and vertically integrated," and "How were Maya economies structured, and what role did the elite play in their organization?" The first question, involving the nature of Maya polities, has been addressed by numerous scholars over the past 70 years. Current views of Maya political organization tend to cluster near two poles established in the 1930s and 1940s by J. Eric, S. Thompson, and Sylvanus Griswald Morley. *Decentralists* assert that Maya political structures were poorly integrated, and fragilely held together by lineage ties, redistribution, ideological authority, or ritual performance (e.g., Demarest 1992; Fox 1987; Fox et al. 1996; Houston 1992; Mathews 1991). In contrast, *centralists* propose that at least some Maya polities, such as Tikal, Calakmul, and Caracol, were highly integrated states where social structure was provided by class ties and distinctions, rather than by kinship (e.g., Chase and Chase 1996a, 1996b; Fox et al. 1996; Martin and Grube 1995). In general, most of the decentralists are epigraphers or archaeologists who work at relatively small, non-urbanized sites. In contrast, the centralists tend to have much of their experience at large, urbanized centers. Despite their many differences, both centralist and decentralist perspectives are similar in one key respect—they are all static depictions that de-emphasize the ongoing processes of political coalescence and disintegration. A recent model of archaic state formation and fragmentation proposed by Marcus (1993, 1998) combines both centralist and decentralist perspectives within a processual framework. Her "Dynamic Model" proposes that archaic states underwent regular cycles of centralization, expansion, and

fragmentation. The Dynamic Model, then, accounts for the variation seen in the organization of Maya polities over time.

The nature of Maya economic organization, in contrast, has received less attention and is usually addressed from a political perspective. In other words, many thinkers base their characterizations of Maya economy on their position regarding Maya political organization. As is the case with political structure, the majority of scholars currently support a decentralized model. Thus, Maya economic organization is most-often portrayed as generally unspecialized and organizationally redundant, with production of food and crafts typically taking place in dispersed household contexts that were not under centralized control (e.g., Ford and Olson 1989; McAnany 1989, 1992, 1993; Rice 1987). Furthermore, though some scholars argue that redistribution played an important role in Maya economy, others state that exchange also lacked centralized control. But the Maya of the Classic period were a stratified society, and the elite certainly had wealth. Wealth is generated through the control of either the production or the distribution of *some* key goods.

Maya economy is more objectively studied when the analyst does not take a direct stance on political organization. This does not imply that economic and political organization are not intertwined—they are. But it is illustrative to reverse the direction of our reasoning. That is, if we can arrive at a clearer understanding of the attributes of ancient Maya economic systems, perhaps we will shed new light on issues of political organization. Two important aspects of any economy are production and exchange. In this chapter, we consider several alternative models of the spatial organization of exchange systems and apply them to the study of obsidian distribution in the Terminal Classic northern Maya lowlands. In particular, we look closely at the site of Chichén Itzá, once thought to date to the Early Postclassic period, but now more firmly dated between A.D. 800 and 1050. Our discussion is limited to only one commodity, imported volcanic glass used to manufacture chipped-stone tools, because different goods were subject to different kinds of exchange. In this sense, Maya economies were not as homogeneous as many decentralists argue. Moreover, economies change, yet virtually all depictions of Maya economy have been static. Thus, parallel to Marcus's Dynamic Model of political systems, we adopt a processual position and examine the transformation of one kind of distribution system into another.

EXCHANGE MODELS

Exchange is the transference of goods, services, or information between individuals and groups. Economic anthropologists long have made distinctions among three basic types of exchange: dyadic, polyadic, and market exchange (e.g., Polanyi 1957; Smith 1975). Dyadic exchange is direct trade between two equal-status individuals. The long-distance trade of the Kula ring and the gift-giving of jade between Classic Maya kings are examples of dyadic exchange. Polyadic exchange also is direct, but takes place between a high-status individual

and one or more subordinates. The redistribution of blankets by chiefs in the Pacific northwest is a classic example of polyadic exchange.

Market exchange is more complex. Carol Smith (1976a, 1976b) has identified three distinct kinds of market exchange. The first, *administered* market exchange, implies the control of commerce by political concerns. In contrast, *monopolistic* market exchange entails the domination of political concerns by commerce. The difference between administered and monopolistic market exchange is in where and how the elite regulate the circulation of goods and extract surplus, and where market forces govern exchange. In administered market exchange, rural producers compete to supply a relatively small class of middlemen. In other words, market forces determine wholesale prices. Elite administrators control the economy by regulating middlemen, such as merchants or artisans, rather than the large rural population. Surplus is extracted through the exertion of political control proscribing who, when, where, what, and how much trade takes place. Thus, retailing is the focus of elite control. In monopolistic exchange, on the other hand, the elite regulate the relationship between rural producers and middlemen, and retailing follows market principles. Colonialist extractive economies are classic examples of monopolistic market exchange. The final type is *competitive* market exchange, where market forces of supply and demand determine both the wholesale and retail value of goods. Most complex distribution systems depend on the coexistence of more than one of these distribution types in the broader economic system.

How does the archaeologist identify particular forms of exchange in the archaeological record? In his study of ceramics and obsidian from the central Mexican Epiclassic site of Xochicalco, Hirth (1998) proposes a set of criteria for identifying: (1) dyadic exchange, (2) redistribution from elite households controlling workshop production, and (3) marketplace exchange. He does not distinguish among administered, monopolistic, and competitive markets, but for our purposes, his criteria are sufficient. If material was procured directly from lithic producers, Hirth argues, obsidian artifacts found in a particular domestic context should come from the same geological sources, which would be represented in the same proportions as found at the workshop. But different households in a particular site or region could show different source-procurement patterns if they obtained their goods from distinct workshops. Alternatively, if obsidian was redistributed through polyadic exchange, then elite households should have the greatest quantity and perhaps geological diversity of obsidian artifacts, with an observable "trickle down" effect through the social hierarchy. Finally, households that procured goods through marketplace exchange should have obsidian in proportion to their needs and uses irrespective of social rank. In addition, marketplace procurement, according to Hirth (1998), will homogenize the relative quantities of obsidian from distinct sources at the community level because all households will have access to the same source of supply. These criteria are discussed below.

Smith (1976b) has identified six ideal patterns of spatial organization corre-

sponding to her five types of exchange. The simplest two are the extended network and the bounded network, each representative of uncommercialized distribution systems. In an extended network, exchange is conducted between several equivalent units, be they households or communities. Exchange is dyadic and poorly organized, largely because of the non-hierarchical pattern of the network. The weak integration of such systems precludes specialization, so production is conducted on the household level and surpluses are too small to support social stratification. In contrast, bounded networks are well ordered according to a local hierarchy, but exchange outside of the system is very limited. Within the bounded network, exchange is polyadic. Such systems are internally hierarchical, because of the linkage of households or communities to a nodal center that allocates some degree of specialization. Bounded network systems are small, have only two- or three-level decision-making hierarchies, and form closed corporate groups. In Service's old classificatory scheme, bounded network economies are almost synonymous with chiefdoms.

A solar central-place system is characterized by administered market exchange. Urban centers are located in the middle of tributary hinterlands with rural settlements connected to one and only one center for marketing purposes (Smith 1976b). Permanent specialization in craft production exists, but demand often is insufficient to allow permanent traders at any given site. Thus markets tend to be periodic, with middlemen moving from center to center. Elite control is manifested in the regulation of such markets. Decision making or political power is delegated through a pyramidal hierarchy, and according to Smith (1976b), there are no overlapping boundaries between the territories of competing centers. Solar central-place systems often exist on the fringes of larger interlocking central-place systems.

Dendritic central-place systems are typified by monopolistic market exchange and are open to larger areas than are solar central-place systems. Exchange is conducted at hierarchically organized markets focused on a single, high-level point outside of the regional system. The strict hierarchical form eliminates competition in the productive hinterland, and hence, all production nodes are connected to just one price-setting market. This kind of spatial organization is typical of colonial systems, and is not relevant to obsidian exchange in ancient Yucatán.

Finally, Smith (1976b) defines two types of interlocking central-place systems, though Blanton (1996) and others discuss additional types. Their distinctive characteristics, though important, are not relevant here. All interlocking central-place distribution systems are characterized by competitive market exchange. Such economies integrate both rural and urban specialization because rural markets are connected not only to urban markets, but also to each other. Although such systems have hierarchical organization, they are cross-linked at the same level to form a network structure rather than a pyramid or dendritic chain. The overlapping nature of trade areas allows the circulation of goods

within and between regions, and the network structure of the system allows supply, demand, and price information to circulate freely, supporting coordinated and organic specialization. The cores of modern economies are interlocking central-place systems, but may have dendritic peripheries. Santley (1994) has suggested that the Late Classic economy of the Tuxtla region of southern Veracruz resembled an interlocking central-place system in some respects, so it is possible that the emergence of fully commercialized economies in Mesoamerica began by the ninth century A.D.

Our goal is to use obsidian source procurement and distribution data on both the intrasite and regional level to demonstrate that ninth-century Chichén Itzá had an administered market economy. We then examine how this closed system evolved into an open, competitive market at about A.D. 900.

OBSIDIAN EXCHANGE IN THE NORTHERN MAYA LOWLANDS DURING THE TERMINAL CLASSIC PERIOD

We turn now to the northern Maya lowlands during the ninth through early eleventh centuries, a period known as the Terminal Classic (Figure 3.1). In 1994, Braswell began research at Chichén Itzá as an invited investigator of the Proyecto Chichén Itzá sponsored by President Salinas Gotari and directed by Peter Schmidt of the Centro Regional de Yucatán of the Instituto Nacional de Antropología e Historia. Between 1993 and 1997, members of the Proyecto Chichén Itzá excavated large structures including the Osario or High Priest's Grave, the Group of a Thousand Columns, and other structures and groups near the epicenter of Chichén Itzá. Building on previous work by Kilmartin, O'Neill, and Lincoln, in 1995 Rafael Cobos began mapping a transect running from the northwest suburbs of Chichén Itzá, through the site epicenter, and to the southeast settlement zone. During this period Cobos located and mapped a total of 69 *sacbeob*, or causeways, connecting various groups at the site. In 1997, Cobos, Jennifer Braswell, Lilí Fernández Souza, and the first author of this chapter, Geoffrey Braswell directed large-scale horizontal excavations in Grupo del Sacbe 61, one of the outlying architectural groups of Chichén Itzá. We also excavated a series of test-pits in eight other groups of various sizes. The most elaborate of these was the Grupo del Extremo Este, which contains one of the largest ballcourts known in Mesoamerica. During laboratory seasons, Braswell analyzed 2,745 obsidian artifacts collected by all the subprojects of the Proyecto Chichén Itzá.

Since 1995, we have collaborated with 15 other Mexican, German, North American, and Spanish projects in Yucatán. The following sections focus on the obsidian collection from Chichén Itzá, as well as on samples from Yaxuná, Cobá, Ek Balam, and Uxmal. Source procurement data derived from these collections provides information about changes in the spatial organization of obsidian distribution systems during the Terminal Classic period.

Figure 3.1
Terminal Classic sites of the northern Maya lowlands that are discussed in the text.

The Obsidian of Chichén Itzá

The obsidian artifacts from Chichén Itzá were assigned to geological sources according to a combined procedure of visual attribute analysis and neutron activation analysis (Braswell et al. 1994, 2000). It was an iterative process, and chemically analyzed pieces were used to form a comparative collection employed as an aid to later visual sourcing. In all, 288 obsidian artifacts, or 10.5 percent of the collection, were assayed by neutron activation analysis (NAA) by Glascock at the Missouri University Research Reactor (for procedural descriptions, see Braswell and Glascock 1998; Glascock et al. 1994, 1998).

The results are striking in several respects as shown in Table 3.1. First, fully three-quarters of the obsidian artifacts at Chichén Itzá came from distant geological sources located in central and west Mexico. In fact, Ucareo (Michoacán), the most frequently represented source in the collection, also is the most distant, located more than 1,200 kilometers west of Chichén Itzá (Figure 3.2). In contrast, the three nearest sources, in the Maya highlands of Guatemala, account for only one quarter of the material. Clearly, Chichén Itzá had important, although perhaps indirect, economic ties with distant non-Maya sites located northwest of the Isthmus of Tehuantepec.

Second, no single late Epiclassic polity in central or west Mexico could have supplied obsidian from such a diversity of sources. Ucareo obsidian is quite

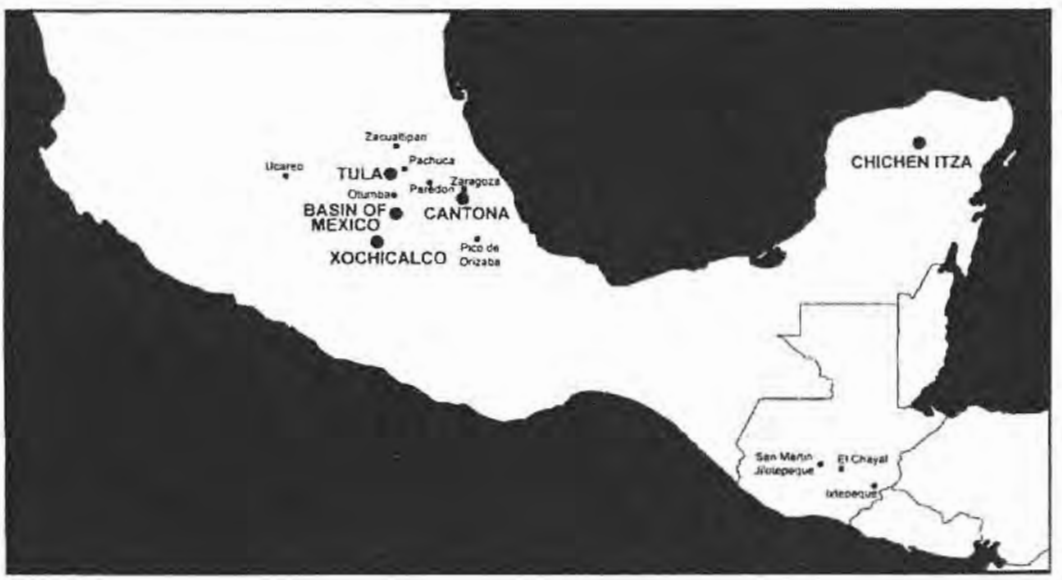
Table 3.1
Sources of obsidian artifacts recovered from Chichén Itzá and Isla Cerritos.

Source	Chichén Itzá n	Chichén Itzá %	Isla Cerritos[1] n	Isla Cerritos[1] %
GUATEMALA				
El Chayal	263	10%	9	18%
Ixtepeque	325	12%	1	2%
San Martín Jilotepeque	106	4%		
SUBTOTAL	694	25%	10	20%
MEXICO				
Otumba, Estado de México	40	1%		
Pachuca, Hidalgo	577	21%	19	35%
Paredón, Puebla	207	8%	1	2%
Pico de Orizaba, Veracruz	116	4%	1	2%
Ucareo, Michoacán	885	32%	18	35%
Zacualtipán, Hidalgo	30	1%		
Zaragoza, Puebla	196	7%	2	4%
SUBTOTAL	2051	75%	41	79%
TOTAL	2745	100%	54	100%

[1]Chacpel/Jotuto and Jotuto contexts only, derived from original data summarized by Andrews et al. (1989). The total number of pieces for which there is source data is 51, three additional "gray" (i.e., not from Pachuca) pieces are included in the total. The percentages in the last column have been adjusted to account for these three additional pieces.

common in Terminal Corral-phase Tula (Healan 1993; Hester et al. 1973) and Late G-phase Xochicalco contexts (Hirth 1989), but several of the other central Mexican sources represented at Chichén Itzá—particularly Zaragoza, Pico de Orizaba, and Paredón—are not. Therefore, we should not assume that Tula or Xochicalco supplied all the Mexican obsidian used at Chichén Itzá. Zaragoza obsidian makes up the vast majority of lithic material at Epiclassic Cantona (Braswell 2001:Table 1), located in northeastern Puebla, so it is probable that this powerful polity supplied some of the Chichén Itzá obsidian. Otumba and Ucareo are the dominant sources found in Coyotlatelco-phase collections from the Basin of Mexico (García Chávez et al. 1990), so again, traders from another region probably supplied, directly or indirectly, some of the obsidian used at Chichén Itzá. Curiously, we know of no Epiclassic site, including Coyotlatelco-phase Teotihuacan, where green Pachuca obsidian is proportionally more abundant than at Chichén Itzá and Isla Cerritos (see below). It seems probable that Pachuca obsidian, which became dominant at Tula during the Tollan phase,[1]

Figure 3.2
Obsidian sources represented in the Chichén Itzá collection and contemporary central Mexican sites discussed in the text.



appeared in great quantities at Chichén Itzá only after A.D. 850 or so, and very likely was supplied by Tula or by other sites in central Mexico. In sum, Chichén Itzá must have obtained its obsidian from a wide variety of traders who had access to prismatic blade cores produced in many regions of west, central, and Gulf Coast Mexico.

What does the distribution of distinct obsidian sources within the city of Chichén Itzá and at smaller sites in its dominion tell us about exchange types and the spatial organization of distribution? In particular, are Hirth's (1998) two criteria for market exchange satisfied, and if so, was the economy administered, monopolistic, or competitive in character? We begin by comparing the Chichén Itzá obsidian data with similar information from a much more modest site in its territory. Isla Cerritos (Figure 3.1) is a small island site that served as a port for Chichén Itzá (Andrews et al. 1988, 1989). At Isla Cerritos, the pattern of obsidian sources represented in the collection is very similar to that of Chichén Itzá in Table 3.1. The only significant exceptions are that El Chayal obsidian is more common at Isla Cerritos while Ixtepeque is less common, and that Pachuca material is somewhat more frequent at Isla Cerritos than at Chichén Itzá.

These small incongruities may have to do with the longer occupation of Isla Cerritos, where significant settlement appears to have begun earlier than at Chichén Itzá and to have lasted later, or with the special role of the site as a port. The island site, unlike Chichén Itzá, had a significant Late Classic occupation (when nearly all obsidian in the northern lowlands came from El Chayal). Perhaps there is proportionally more Pachuca and Ucareo obsidian at Isla Cer-

ritos than at Chichén Itzá because material from these sources entered the northern lowlands via the port, while materials from the Guatemalan sources did not. In any case, we cannot conclude that elites at Chichén Itzá kept the lion's share of exotic-source obsidian for their own use.

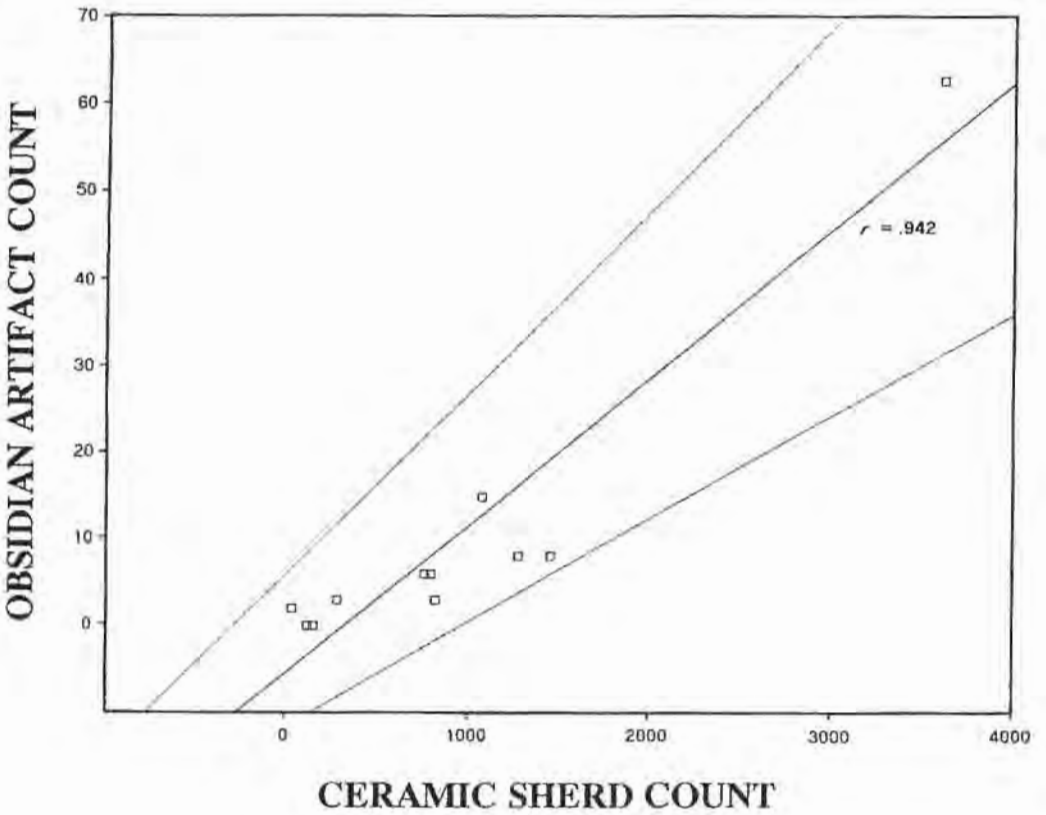
The same pattern can be observed *within* the city of Chichén Itzá. There is no statistically meaningful difference in source-procurement data among samples from the site epicenter (presumably the location of activities conducted by the apical elite and their retainers), nine outlying groups (of varying social status), and assorted residential zones. Again, we cannot conclude that the Terminal Classic elite of Chichén Itzá redistributed exotic, Mexican source obsidian. The homogeneity of source procurement patterns seen throughout Itzá territory satisfies one of Hirth's (1998) two criteria for marketplace exchange.

But did households have access to obsidian proportional to their needs, Hirth's (1998) second criterion? In order to answer this question, we set up a cross-tabulation and looked for patterns of correlation between the quantity of imported ceramics and obsidian found in each of nine outlying groups, as well as for two operations in the epicenter. Our assumption was that "fancy" imported pottery would be a good surrogate variable for elite status, and that if access to obsidian was limited, it would correlate well with elite ceramics. We then repeated the process for obsidian versus *all* ceramics (Figure 3.3). This second cross-tabulation served as a control for occupation intensity and duration.

There is no meaningful correlation between the quantity of obsidian and imported pottery found in any of the 11 studied contexts. In contrast, the total number of ceramic sherds and the quantity of obsidian artifacts showed a high degree of linear correlation, with Pearson's $R = .942$. If we assume that all people, regardless of status, used roughly the same number of ceramic vessels, then we may conclude that obsidian consumption was related to occupation intensity rather than to status. Thus, the lack of status-based consumption and the homogeneity of source procurement patterns throughout the Terminal Classic Itzá polity are consistent with Hirth's (1998) two criteria for market exchange. We can safely rule out the possibility that the Itzá economy was a colonialist, dendritic network controlled by some polity in highland Mexico, but these data on their own are insufficient for determining if market exchange was administered or competitive in nature.

Different types of market exchange, however, are characteristic of distinct spatial organizational patterns. If we exclude the dendritic central-place system, we are left with the solar central-place system (characterized by administered market exchange) and the various forms of interlocking central-place systems (characterized by competitive market exchange). Our hypothesis is that around A.D. 900, Chichén Itzá shifted from being a solar central-place of a regional administered market to becoming an important node in a trans-Mesoamerican interlocking central-place system.

Figure 3.3
Ceramic and obsidian counts for 11 architectural groups of varying status at Chichén Itzá. The best-fit regression line is shown in bold type, other lines are derived from the 95 percent confidence intervals for the upper and lower bounds of the regression coefficients.



Obsidian Distribution at Yaxuná, Cobá, and Ek Balam

To test this hypothesis, it is necessary to turn to other important Terminal Classic sites in the northern Maya lowlands (Figure 3.1). Several scholars have argued that Cobá was an economic and political rival of Chichén Itzá (e.g., Andrews and Robles 1985; Freidel 1986; Schele and Mathews 1998). This conflict came to a head at Yaxuná, a secondary site located 20 km southwest of Chichén Itzá, but physically linked to Cobá by a 100-km long causeway. According to its excavators, Yaxuná was sacked by Chichén Itzá in a violent battle, and at least one important Puuc-style building in the North Acropolis was subjected to violent termination rituals (Freidel 1992; Suhler 1996; Suhler and Freidel 1994).

We have analyzed 180 obsidian artifacts from Yaxuná as shown in Table 3.2. Most of this material comes from the El Chayal source (Guatemala), and not from the Mexican sources represented at nearby Chichén Itzá and Isla Cerritos. In part, this is due to the longer occupational history of Yaxuná; a substantial

Table 3.2
Sources of obsidian artifacts recovered from Yaxuná, Cobá, and Ek Balam.

Source	Yaxuná n	Yaxuná %	Cobá n	Cobá %	Ek Balam n	Ek Balam %
GUATEMALA						
El Chayal	151	84%	294	96%	192	97%
Ixtepeque	2	1%	2	1%	2	1%
San Martín Jilotepeque	7	4%	7	2%		
SUBTOTAL	160	89%	303	99%	194	98%
MEXICO						
Otumba, Estado de México	2	1%				
Pachuca, Hidalgo	2	1%	2	1%	3	2%
Pico de Orizaba, Veracruz			1	<1%		
Ucareo, Michoacán	14	8%	1	<1%		
Zacualtipán, Hidalgo	2	1%				
Zaragoza, Puebla					1	1%
SUBTOTAL	20	11%	4	1%	4	2%
TOTAL	180	100%	307	100%	198	100%

portion of the obsidian from the site dates to the Early Classic and Preclassic periods. Nevertheless, much of the collection comes from contexts that also contained Cehpech-tradition ceramics, roughly contemporary with the Sotuta-tradition ceramics found at nearby Chichén Itzá.

Most importantly, although very little Sotuta material has been found at Yaxuná, there is a high spatial correlation between the Mexican obsidian and Sotuta ceramics at the site. Nineteen of the 20 Mexican obsidian artifacts found at Yaxuná come from three operations that also recovered nearly all the Sotuta ceramics known from the site. In fact, 13 Mexican obsidian artifacts, including two broken projectile points, were found in the Puuc-style structure thought to have been violently terminated by victorious warriors from Chichén Itzá (see Suhler 1996). Mexican obsidian at Yaxuná, therefore, is strongly associated with the Itzá conquest of the site, and was apparently not available during earlier times.

A similar pattern of source utilization can be seen at Terminal Classic Cobá, which some have speculated was defeated in battle by Chichén Itzá near the end of the Oro phase. We have analyzed 307 obsidian artifacts from an architectural group excavated by Tomás Gallareta Negrón of the Centro Regional de Yucatán of INAH. Most of the obsidian artifacts were used during the Terminal Classic period, but a small amount may date to the Late Classic. Numerous

small prismatic blade points, probably *atlatl* (dart) tips, were found in the collection. These were first used in the Terminal Classic period, but became less common as the Postclassic progressed. Moreover, Ixtepeque, the predominant Postclassic source found at sites like Mayapán, Xelhá, and San Gervasio (Braswell 2001), is not found in significant quantity in the Cobá collection. As can be seen in Table 3.2, nearly all the obsidian from this Late to Terminal Classic group comes from the El Chayal source (Guatemala), and not from Ucareo, Pachuca, and the other Mexican sources represented in significant quantities at contemporary Chichén Itzá.

A sample of 198 obsidian artifacts recovered by the Mexican Proyecto Ek Balam (directed by Leticia Vargas of the Centro Regional de Yucatán of INAH) from Structures 8, 10, 13, 14, 16, 17, and 18 also differs greatly from the Chichén Itzá collection. Most of the associated ceramics belong to the Yumcab complex, and probably date to the Late Yumcab phase (A.D. 700–1000/1050; see Bey et al. 1998), completely overlapping the Terminal Classic occupation of Chichén Itzá. As shown in Table 3.2, 97 percent of the artifacts from Ek Balam are attributed to the El Chayal. All six artifacts from other sources were recovered from surface or near-surface contexts, suggesting that they date to the end of the Terminal Classic occupation of Ek Balam, or perhaps to a Postclassic reoccupation.

The Terminal Classic obsidian procurement data from Yaxuná, Cobá, and Ek Balam demonstrate that these sites did not participate in the same distribution system as contemporary Chichén Itzá and Isla Cerritos, despite their proximity (Figure 3.1). In other words, the obsidian distribution system centered at Chichén Itzá was *bounded*. The only type of market exchange that is characterized by bounded distribution is the administered market. Thus, the fact that the obsidian distribution system centered at Chichén Itzá was firmly bounded, coupled with evidence for some sort of market exchange within the Itzá polity, is strong evidence that Chichén Itzá was the focus of a solar central-place system during the first half of the Terminal Classic period.

Obsidian Distribution at Uxmal

Evidence for our argument, that this system changed around A.D. 900, can be found at several sites in the Puuc region, most notably Uxmal, Kabah, and Oxkintok (see Braswell 2001:Table 1). Recent excavations at Uxmal, directed by Alfredo Barrera Rubio and José G. Huchim Herrera, have recovered 501 obsidian artifacts from contexts dating to the early Terminal Classic (A.D. 770–900) and the late Terminal Classic (A.D. 900–1050). During earlier excavations near the House of the Turtle, Tomás Gallareta Negrón recovered 8 additional obsidian artifacts dating to late Terminal Classic period. At Uxmal, the two facets of the Terminal Classic are distinguished both by ceramics and architecture. Early Terminal Classic ceramics are local Cehpech-tradition types, but late Terminal Classic ceramics are a mixture of Cehpech with a surprisingly high

Table 3.3
Sources of obsidian artifacts from Uxmal.

Source	Early Terminal Classic n	%	Late Terminal Classic n	%
GUATEMALA				
El Chayal	174	62%	92	40%
Ixtepeque	63	23%	45	20%
San Martín Jilotepeque	5	2%	1	<1%
SUBTOTAL	242	87%	138	60%
MEXICO				
Otumba			1	<1%
Pachuca	9	3%	19	8%
Paredón			2	1%
Pico de Orizaba	7	3%	3	1%
Ucareo	16	6%	47	20%
Zacualtipán	1	<1%	1	<1%
Zaragoza	4	1%	19	8%
SUBTOTAL	37	13%	92	40%
TOTAL	279	100%	230	100%

concentration of imported Sotuta types that are best known from Chichén Itzá. These Sotuta ceramics are assigned a post–A.D. 900 date because they are associated with architectural features built after well-dated buildings such as the Nunnery Quadrangle and the Palace of the Governor. In particular, Sotuta ceramics from Chichén Itzá are found in the Bird Quadrangle, in fill dating to the last two construction phases of the Adivino pyramid, and are also associated with a series of C-shaped buildings located south of the Bird and Nunnery Quadrangles. All of these structures are built in the "Mosaic" Puuc style or in an architectural style from Chichén Itzá. In contrast, very low concentrations of Sotuta ceramics have been found associated with earlier Puuc architecture.

Table 3.3 shows that those contexts dating to the first part of the Terminal Classic period do have some Mexican-source obsidian, notably more than found at Yaxuná, Cobá, and Ek Balam. Nonetheless, these sum up to only 13 percent of the early Terminal Classic assemblage. When we have enough contextual data for this time period, we expect to find that Mexican obsidian was redistributed at Uxmal, and that it entered the Puuc region in limited quantity through acts of dyadic exchange with the early Terminal Classic elites of Chichén Itzá.

In contrast, 40 percent of the *late* Terminal Classic obsidian comes from the same central and west Mexican sources represented at Chichén Itzá. In other

words, it appears that during the late Terminal Classic period, Uxmal began to participate more fully in the same obsidian procurement system as Chichén Itzá. Ceramics, including both fancy wares and utilitarian types, also circulated in this system, as did marine shell from the Caribbean, north, and Gulf coasts of Yucatán (Rafael Cobos, personal communication 1998; see also Cobos 2001). This dramatic increase in the exchange of both utilitarian commodities and elite goods across a formerly, more-or-less "closed" economic boundary suggests that shortly after A.D. 900, Chichén Itzá and Uxmal became central places in the same interlocking distribution system.

What could have caused this transformation? Many scholars have argued that like Cobá, Uxmal was a rival of Chichén Itzá, and competed with that polity for agricultural land and the control of exchange routes. Examples of militarism in the art of both sites have been seen to support this hypothesis. But Ringle, Gallareta, and Bey (1998) have suggested a new interpretation: that Chichén Itzá and Uxmal became important cult centers in a trans-Mesoamerican pilgrimage route. Just as trade follows the *hajj* in the Islamic world, it may be that the development and spread of the cult of Quetzalcoatl-Kukulcán served to promote the transition from bounded solar central-place distribution systems to participation in an inter-regional, interlocking central-place system. This is not to say that Chichén Itzá and Uxmal were always on good terms, but that some level of economic and ideological integration developed *despite* their apparent rivalry. In world systems terms, such a cult could have served as a "structure of accumulation" that promoted both religious and economic articulation and integration.

CONCLUSIONS

Maya economies were more complex than many researchers have suggested. Although it is reasonable to argue that some important goods, such as utilitarian pottery, were produced and exchanged without the intervention of the elite, certain materials, including obsidian in ninth-century Chichén Itzá, were distributed through administered market exchange. In contrast, sumptuary items of jade and gold were traded through acts of gift-giving or other forms of dyadic exchange among the elite, and other classes of luxury or status-endowing materials may have been redistributed. The point is, different forms of exchange—some simple, some complex—may co-exist within the broader economy. A second point—one that should be obvious—is that ancient Maya economies were *dynamic*, rather than static, systems. We cannot describe correctly such changing systems with global phrases of the form "ancient Maya economy was *x*." Instead, we must be clear to specify when, where, and even which goods we are discussing. Finally, it is possible to approach important aspects of ancient economy without appealing to specific models of political organization, even though economic and political structures are intertwined in stratified societies.

We conclude by briefly examining the relationship between economic and

political organization, but adopt a methodological perspective antithetical to how most scholars have approached the ancient Maya. Rather than employing political information as data relevant to economic structure, we will use our understanding of obsidian distribution in the Terminal Classic northern lowlands to infer something about political organization at Chichén Itzá.

Both solar central-place systems and interlocking central-place systems are associated with state-level political organization. According to Smith (1976b), many centralized and hierarchically structured archaic states have solar central-place distribution systems, but participation in an interlocking central-place system additionally implies a great deal of horizontal integration. Such political systems are *not* consistent with the models proposed by the decentralists for the Classic Maya, so we should not extrapolate these political models to ninth- through eleventh-century Chichén Itzá and Uxmal. Although many of the smaller Early and Late Classic polities may have been decentralized, the economies of the Terminal Classic lowlands suggest that at least some states were highly centralized.

The most frequently cited model for political organization in the Terminal Classic and Postclassic northern lowlands involves the Yucatec concept of *mul tepal*, literally "to govern together." This decentralist model was first developed by Ralph Roys (1957) for Late Postclassic Mayapán. Recently, Ringle and Bey (2001) have challenged the notion of joint rule at Mayapán, noting that there are only three references to *mul tepal* in colonial texts, and that these are limited to documents that were rewritten as late as the eighteenth or early nineteenth centuries. Instead, they argue from earlier texts that ultimate authority at Mayapán was vested in a single lord or king drawn first from the Cocom faction, and later in time from the Xíus.

The *mul tepal* model also is frequently applied to Chichén Itzá. Direct evidence that the Itzá polity was governed by a loose confederacy of allies is slim, apparently relying on Bishop Landa's story (repeated by no native source) that Chichén Itzá was ruled by three "brothers," on the difficulty of identifying divine kings in Itzá art, and on an erroneous hieroglyphic translation.[2] The economic data presented here are inconsistent with our understanding of *mul tepal* as a decentralized, loosely organized form of government. The administered market system of ninth-century Chichén Itzá implies a highly centralized political hierarchy. Moreover, if tenth-century Chichén Itzá and Uxmal did indeed become important nodes in an inter-regional interlocking central-place system, as we argue, neither polity could have been structured as a loose and poorly integrated confederacy of competing factions.

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NOTES

1. The absolute chronology of Tula, like that of Chichén Itzá, probably should be pushed back in time. Radiocarbon dates from the Basin of Mexico suggest that the Coyotlatelco phase was well underway by the end of the seventh century (Cowgill 1996). A large suite of radiocarbon dates determined for recent excavations at Tula suggests that its period of "Early Postclassic" fluorescence was over by A.D. 1050 (Paredes 2000). Just as Chichén Itzá is now considered by many to be a Terminal Classic Maya city, it may be more accurate to describe Tula as the last, great Epiclassic center. It now appears that throughout much of Mesoamerica, the late eleventh through thirteenth centuries were a period of regionalism, disengagement, and relative isolation.

2. The glyph *yitaj* often has been interpreted as meaning "companion" because it commonly links two or more individuals. Thus, the frequent appearance of *yitaj* in the inscriptions of Chichén Itzá seemed to suggest joint rule among several "companions." It now is recognized that *yitaj* is the past participle of a transitive verb of unknown meaning.

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