

Form and Meaning in the Earliest Cities: A New Approach to Ancient Urban Planning

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This article describes a new model for urban planning in ancient and preindustrial cities that moves beyond the traditional simplistic dichotomy of planned versus organic cities. The model has two components: coordination of buildings and spaces, and standardization among cities. A variety of coordinated arrangements of buildings reflect urban planning, including simple coordination, formality and monumentality, orthogonal layouts, other forms of geometric order, and access and visibility (viewshed). Standardization among cities is analyzed in terms of architectural inventories, spatial patterns, orientation, and metrology. The political and social significance of ancient urban planning is then discussed using Amos Rapoport's model of levels of meaning in the built environment.

Keywords: urban planning; archaeology; ancient cities; comparative urbanism; built environment

Ancient kings and builders were clearly involved in “urban planning,” and their cities were “planned” settlements, following common sense notions of planning. Yet most ancient cities are classified as “unplanned” in the literature on historical urbanism. Nearly all scholars adopt a simplistic scheme in which cities with an orthogonal layout are classified as planned, whereas those that lack the grid principle are considered to be unplanned. This viewpoint, which assumes that one particular modern western approach to city layout—the use of orderly, orthogonal street layouts—is the only valid kind of urban planning, is ethnocentric

AUTHOR'S NOTE: The model of urban planning presented in this article was developed in the course of teaching a yearly undergraduate class, *The Earliest Cities*, and I thank the students who have taken that class for putting up with my frequently changing ideas on ancient cities and urban planning and for sometimes asking good questions. A number of colleagues provided insightful comments and suggestions on an earlier draft; I thank Richard Blanton, Ray Bromley, George Cowgill, Joyce Marcus, Jerry Moore, Adam T. Smith, Barbara L. Stark, and Rita P. Wright for their helpful feedback. Christopher Silver and an anonymous referee also provided useful comments on an earlier draft.

and ignores the variety of urban planning schemes devised by ancient peoples in many parts of the globe.

The time has come to move beyond the traditional view of ancient city planning through a rejection of dichotomous schemes (planned versus unplanned) in favor of a consideration of spatial principles in addition to orthogonal layout. In this article, I propose a new approach to ancient urban planning that uses two concepts: coordination among urban buildings and spaces, and standardization of urban forms. This perspective acknowledges a wide variety of approaches to urban planning in the ancient world (e.g., Chinese planning principles were very different from Inkan principles), and it allows variation in the degree or extent of planning (i.e., some cities were more planned than others). I then explore the political context of early city planning using Amos Rapoport's model of levels of meaning in the built environment.¹ Rapoport's scheme illuminates some of the cosmological, social, and behavioral implications of my model of urban planning.

My major focus is on early urban settlements throughout the world. These cities are known to us today primarily through archaeology, and thus we have no direct access to the goals, concepts, or specific actions of kings, planners, architects, or builders. Although written documents are available in some cases, they rarely deal with the processes of urban planning. I draw examples from both the Old World (China, Southeast Asia, Africa, the Near East, South Asia, and the Mediterranean region) and the New World (Mesoamerica, the Andes, and North America). For the Near East and Mediterranean regions, my main focus is on Bronze Age urbanism prior to the Classical period. Urbanism in Greece and Rome was quite different from earlier periods and other regions in many ways, including organizational principles, the nature of urban layout and planning, and the amount of evidence on these topics available to modern scholars. Some discussion of urban planning in Classical Greece and Rome cannot be avoided, however, if only because of their prominent place in many traditional treatments of ancient urban planning.

In this article, I use the phrase *ancient city* to designate preindustrial urban settlements outside of the Classical world of Greece and Rome. This category includes Mediterranean cities before the sixth century B.C. and cities in other parts of the world prior to European conquest and/or industrialization. Thus, Aztec and Swahili cities of the fifteenth century A.D., and Yoruban cities of the eighteenth and early nineteenth centuries A.D., are included as "ancient" cities because they were indigenous urban settlements prior to European conquest and colonization. My usage parallels Bruce Trigger's concept of "early civilizations."² I use a functional definition of *urbanism*: urban settlements are centers whose activities and institutions—whether economic, administrative, or religious—affect a larger hinterland.³ Cities are large urban centers with numerous urban functions, whereas

towns are smaller urban centers with fewer urban functions. This functional definition allows the classification of a wider range of nonwestern settlements as *urban* than does the more common demographic definition of urban settlements as large, dense, socially heterogeneous settlements.⁴

Background

Planned versus Unplanned: A False Dichotomy

The dichotomy between planned and unplanned (sometimes termed *organic*) is nearly ubiquitous in the literature on ancient cities.⁵ These and other authors invariably use an orthogonal layout as the criterion for planned cities. Even scholars who are critical of the dichotomy, such as Harold Carter (“it is not possible to give any rigour to this rather simple division”),⁶ do not propose any alternative and continue to use it as a basis for classification of ancient cities. A wider perspective is suggested by archaeologist Adam T. Smith: “the ‘organic’ description of irregular cities often mistakes cultural variation in aesthetics for decentralization of urban planning.”⁷ He suggests that “the opposition is thus not between the planned and the organic but between various competing plans and their vision of the proper role of political authorities in landscape production.”⁸ Historical geographer Keith Lilley makes a similar argument for the nature of planning in medieval towns.⁹ For the ancient cities under discussion here, it is probable that the planners in most cases were kings and other members of the urban elite class; in other words, we are dealing with central planning.

Spiro Kostof is one of the few scholars to move beyond the planned/unplanned dichotomy.¹⁰ He proposes a more detailed classification of urban form and discusses at length the complexities of episodes of planned and unplanned growth throughout time in individual cities. Kostof identifies four spatial models of urban planning: organic, grid, diagram cities, and the grand manner. As noted above, *organic layout* is a common label for cities whose growth occurred without discernible overall direction or coordination. *Grid layout* refers to orthogonal planning. Although Kostof’s discussion is one of the best comparative analyses of orthogonal planning,¹¹ his treatment is simplistic and inadequate for the earliest cities (see below). *Diagram cities* is Kostof’s term for “inflexible” cities, “planned at one time as a precise diagram of some presumed or promulgated order . . . single-minded visions of some determined individual or institution about how the world should function ideally” (162). His examples range from Assyrian and Roman military camps through Renaissance star-shaped defended cities through modern utopian settlements. Finally, Kostof’s *grand manner* refers primarily to European baroque planning in which buildings and spaces are arranged to convey visual messages of grandeur

and coherence, although he finds antecedents in a few Greek and Roman cities. A number of archaeologists use the concept of monumentality as a broader concept with greater applicability to ancient cities;¹² this is one of the components of my approach to urban planning.

Defining Urban Planning

Archaeologists must by necessity approach the study of ancient urban planning very differently from the way scholars study modern planning. To begin with, archaeologists rarely if ever have access to the self-conscious plans, policies, laws, strategies, and social and ideological contexts that are the subjects of modern scholarship on urban planning.¹³ Second, the social and political dynamics of ancient states were quite different from those of modern capitalist nation-states.¹⁴ For the ancient cities discussed in this article, our major data consist of city plans—often sketchy and incomplete—and associated information on buildings and artifacts found in ancient cities.

Students of ancient cities have proposed three definitions of *planning*: one emphasizes the deliberate actions of builders, and two focus on the formal layouts that result from those actions. Wendy Ashmore's work exemplifies the first approach: "Site planning refers herein to the deliberate, self-conscious aspect of settlement patterning, at scales from individual structures through regional landscapes."¹⁵ The problem with this definition is that all urban construction—whether slum housing, latrines, or imperial palaces—is deliberate and self-conscious in nature. One might improve the usefulness of this approach by limiting consideration to larger spatial scales; planned cities are those in which large areas were deliberately and self-consciously laid out. As noted above, however, modern scholars rarely have written descriptions of the specific actions of ancient rulers, much less direct access to their thoughts or intentions. It is more parsimonious to define ancient urban planning from the empirical data we have available: the layouts of cities as excavated and mapped by archaeologists.

The second definition of ancient planning focuses on standardization of city plans. In the words of Romanist Simon Ellis, "By 'planned' I do not mean those [cities] that were pre-meditated, but rather those whose urban design was made to follow a specific regular urban design."¹⁶ Peter Lacovara uses a similar definition for planning in Egyptian cities.¹⁷ How does one determine the nature of this "specific regular urban design"? In some cases, such as imperial Chinese capitals or Roman cities, written documents and maps reveal explicit verbal and graphical models that urban builders followed.¹⁸ In most cases, however, scholars must reconstruct these regular designs through analysis and comparison of city plans. This implies that one needs to study a group of cities to discern the nature of planning in a given case; planning cannot be inferred from the

inspection of an individual city plan. The reference group can consist of contemporaneous cities within a single cultural area (e.g., Mayan cities during the Late Classic period or Mesopotamian cities in the Early Dynastic period) or else a historical trajectory of cities within a cultural area (e.g., Chinese imperial capitals throughout the centuries).

The third definition of planning emphasizes the concept of coordination among buildings. In the words of Harold Carter, planned cities are those in which “there is a discernible and formal organization of space.”¹⁹ In my approach to ancient urban planning, Carter’s formality is a special case of the more general phenomenon of coordination among buildings within a city. A similar concept, “group design,” was proposed by Robert Scranton for planning at Greek cities; this was defined as “creating an architectural scheme of one or more buildings in satisfactory relation to the surroundings.”²⁰

A New Approach

My approach to urban planning in the earliest cities has two components, based on the second and third definitions discussed above. The first component, coordination among the buildings and spaces in a city, is based on Carter’s definition of planning. I describe this phenomenon under five headings: the arrangement of buildings, formality and monumentality of layout, orthogonality, other forms of geometric order, and access and visibility. My second component is standardization among cities, based on Ellis’s definition. I discuss standardization in terms of urban architectural inventories, spatial layouts, orientation, and metrology.

In my approach, planning consists of a series of ordinal scales, not a single presence/absence variable. There are degrees of planning, and some cities were more planned than others. The planning scale is not simple, however. *More planned* can refer to the degree of coordination or standardization. Orthogonal layouts, for example, suggest more involvement in planning than simple coordination among buildings. *More planned* can also refer to the effort involved in planning. Formally placed large monumental buildings require greater energy investment than simple coordination of alignments among houses. *More planned* can also refer to the extent of a city that exhibits planning (in both absolute and relative terms). For example, a common pattern in the earliest cities is for the central district (often termed the *urban epicenter*) to exhibit planning, whereas the residential zones do not. Such cities show “less planning” than cities whose entire area is formally arranged. Thus, the scale of planning is complex and multifaceted.

One of the goals of studying urban planning in ancient or historical cities is to elucidate the meanings and social contexts of ancient buildings and urban settlements. The concept of *meaning* is an elusive one in

archaeology, particularly for contexts without contemporary written records. In the second part of this article, I address questions of meaning and context using Amos Rapoport's model of levels of communication in built environments.

Coordination among Buildings and Spaces

Coordinated Arrangement of Buildings and Spaces

The coordinated arrangement of buildings and spaces describes cases in which individual architectural features appear to have been arranged and constructed with reference to one another. For example, all buildings in a city or neighborhood may share a common orientation (figure 1). Some authors have examined the frequency distributions of building alignments, using the extent of a common orientation to investigate the nature of planning.²¹ The simple fact of common orientation does not necessarily imply central planning because other factors such as topography or location with respect to a river or shoreline could produce the same pattern. Stronger evidence of planning is provided when individual buildings share orientations and/or arrangements through common reference to features such as avenues, plazas, city walls, a royal palace, or other urban architecture. Some of these principles of coordination are discussed by Edmund Bacon,²² whose "methods of design growth" include "axes as connectors" and "mass as connector."

The Mayan town of Becan (figure 2) provides an example of coordination among buildings and spaces with respect to common features. The palace-city portion of Shangdu, a Chinese-influenced city in Mongolia, is spatially and functionally analogous to the Becan epicenter (figure 3). It exhibits a higher level of coordination among buildings than the Mayan city: buildings share a common orientation, and they are coordinated with respect to the rectangular compound wall. In other words, Shangdu shows a higher level of planning than Becan, a judgment that is strengthened by two additional features of its plan: (1) its adherence to a standardized Chinese imperial city layout,²³ and (2) its higher level of formality.

Formality and Monumentality

The concept of *formality* in art history refers to works whose organizational principles are clear to observers or participants.²⁴ The formal arrangement of urban buildings and spaces is a hallmark of many cities, ancient and modern. This feature is one of Nancy Steinhardt's eleven attributes of planning in ancient Chinese capitals;²⁵ she phrases it as

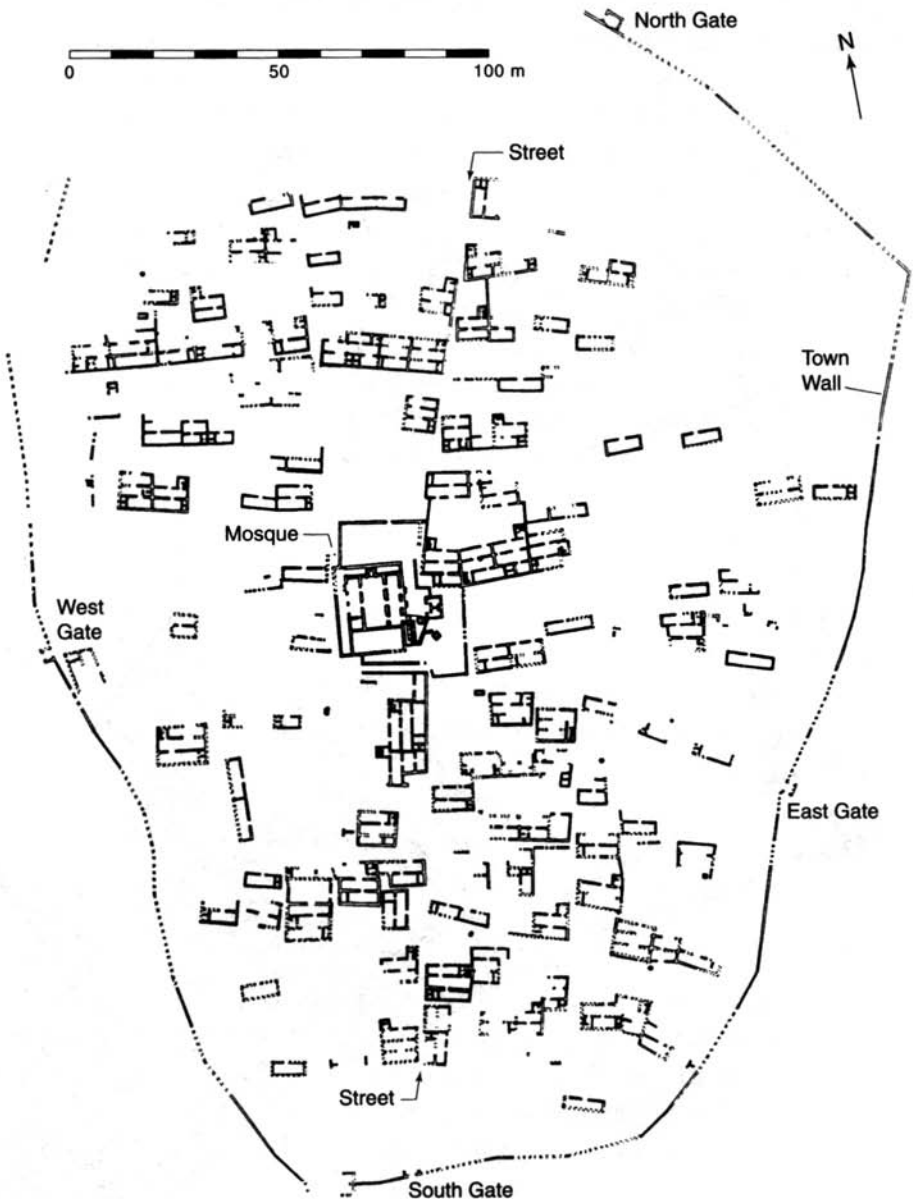


Figure 1: Plan of Takwa, a Swahili Town in Kenya

Note: Most structures conform to one of two similar orientations.

Source: Modified after Graham Connah, *African Civilizations: Archaeological Perspectives*, 2nd ed. (New York: Cambridge University Press, 2001), 199.

“clearly articulated and directed space.” To Barbara Stark, formality refers to architectural groups, “arranged in an orderly fashion that suggests a planned layout, for example around a plaza.”²⁶ In *The Image of the*

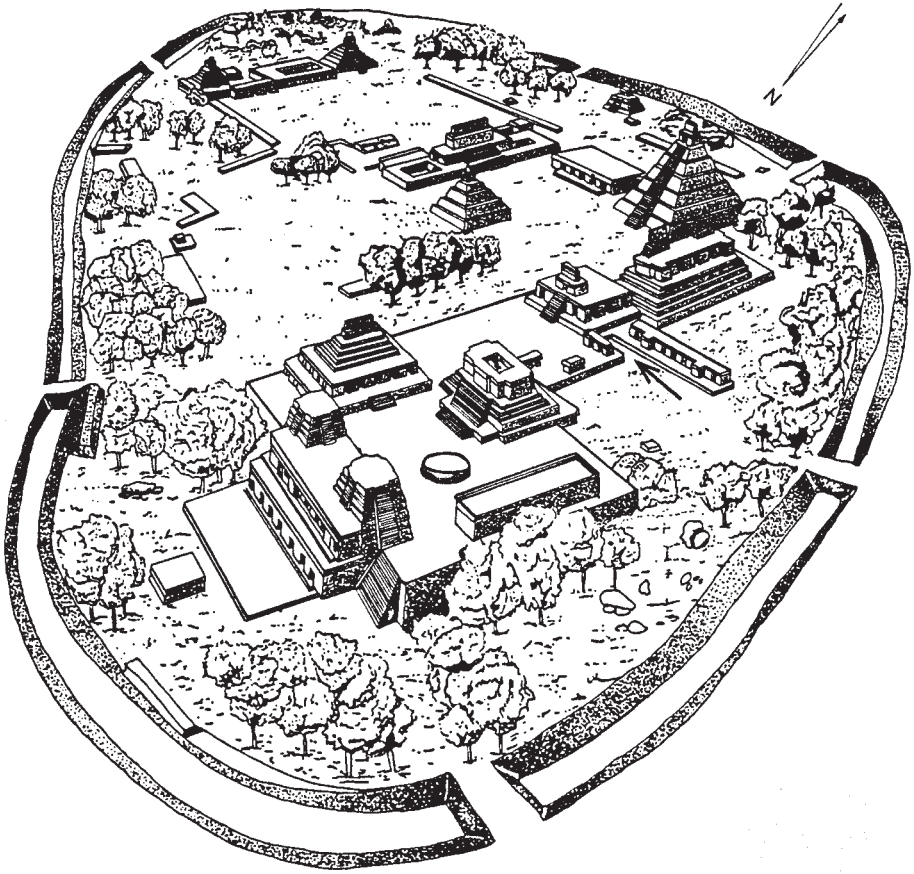


Figure 2: Artist's Reconstruction of Becan, an Early Classic Maya Town in Guatemala

Note: The entire epicenter was surrounded by a ditch and wall, and buildings were coordinated through their relationship with these and other features such as plazas, and through their common alignments.

Source: Modified after Enrique Nalda, "The Maya City," in *Maya*, ed. Peter J. Schmidt, Mercedes de la Garza, and Enrique Nalda (New York: Rizzoli, 1998), 102-29.

City, Kevin Lynch identifies ten "form qualities," or categories of urban design,²⁷ and five of these relate to the concept of formality: singularity, form simplicity, continuity, dominance, and clarity of joint. Towns of the Mississippian culture, for the most part capitals of modest chiefdoms, show formality in their arrangements of temple mounds, plazas, and palisades (figure 4).²⁸

Capital cities in ancient states typically combined formality with monumentality, the construction of very large buildings. In Bruce Trigger's often-cited definition, *monumental architecture* is defined as buildings that are much larger than they need to be for utilitarian purposes.²⁹

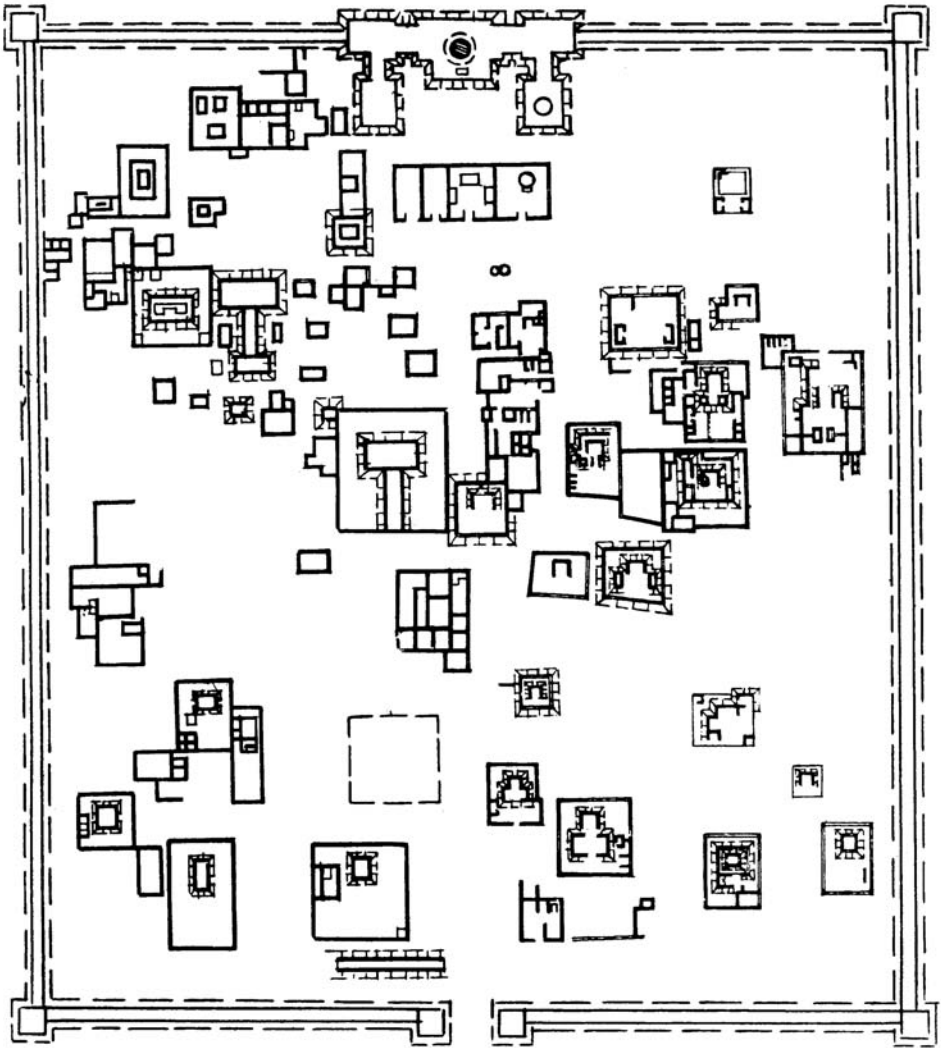


Figure 3: Palace City Portion of the Chinese/Mongolian City of Shangdu

Note: This shows coordination of buildings through common alignments and encircling rectangular wall.
Source: Modified after Nancy S. Steinhardt, *Chinese Imperial City Planning* (Honolulu: University of Hawaii Press, 1990), 152.

Ancient kings built huge pyramids, palaces, and other monuments to promote a variety of ideological messages (see discussion of middle-level meaning below). The integration of formality and monumentality is illustrated by the epicenters of three central Mexican capital cities of the Epiclassic/Early Postclassic period, circa A.D. 700-1100 (figure 5). All three cities used formal layouts and large buildings, but the architecture

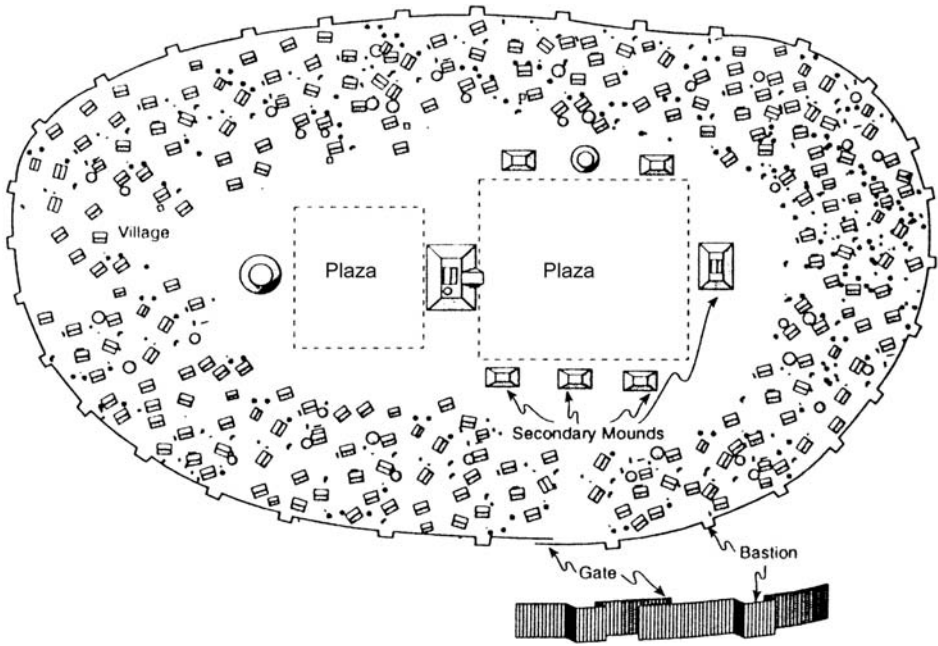


Figure 4: Idealized Layout of Mississippian Towns in the Central United States

Source: Modified after R. Barry Lewis, Charles Stout, and Cameron B. Wesson, "The Design of Mississippian Towns," in *Mississippian Towns and Sacred Spaces: Searching for an Architectural Grammar*, ed. R. Barry Lewis and Charles Stout (Tuscaloosa: University of Alabama Press, 1998), 7

of Tula stands out as more formal and more monumental. Angkor and the other Khmer capitals of Cambodia provide some of the most extreme examples of formal, monumental architecture in the ancient world (figure 6).³⁰ A number of principles of formal monumental architecture recur in a variety of urban contexts, ancient to modern: axiality (the use of straight avenues); large, open plazas; symmetrical arrangements of buildings; and walled areas of limited access with formal gates or entrances.

Orthogonal Layouts

Orthogonality or the "grid" pattern describes the use of right angles in the layout of buildings and cities.³¹ Orthogonal city planning is a special case of two principles described above (coordinated arrangement of buildings, and formality), but it is worth singling out because of its prominence in the literature on city planning (for both ancient and modern cities). Most urban historians who use the planned/unplanned dichotomy identify planned cities through the presence of orthogonal layouts. Even if one were to limit consideration of planning to orthogonal patterns, however, it is still inadequate to conceptualize the orthogonality principle in presence/

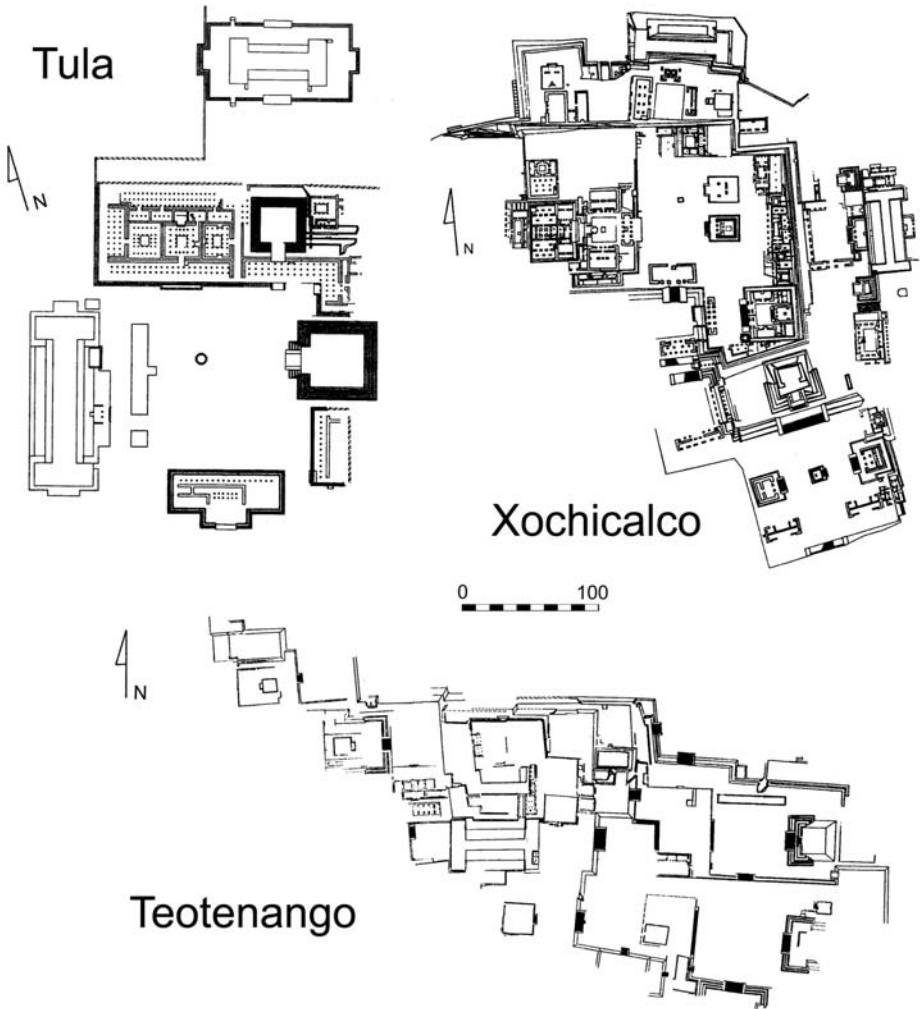


Figure 5: Plans of the Epicenters of Tula, Xochicalco, and Teotenango in Central Mexico, Illustrating Formality of Layout

Source: From Michael E. Smith, "Tula and Chichén Itzá: Are We Asking the Right Questions?" in *Twin Tollans: Chichén Itzá, Tula, and the Epiclassic-Early Postclassic Mesoamerican World*, ed. Cynthia Kristan-Graham and Jeff Karl Kowalski (Washington, D.C.: Dumbarton Oaks, 2006). Used with permission.

absence terms. There are degrees of orthogonality, just as there are degrees of coordination or formality.

Before discussing orthogonal layouts proper, mention should be made of a pattern that resembles orthogonality but does not necessarily reflect orthogonal planning. This pattern, which I call *semiorthogonal urban blocks*, occurs in dense settlements in which each individual house abuts one or more other houses (figures 7-9). It occurs in the earliest Neolithic nucleated villages,³² such as Çatal Höyük (figure 7), as well as at numerous

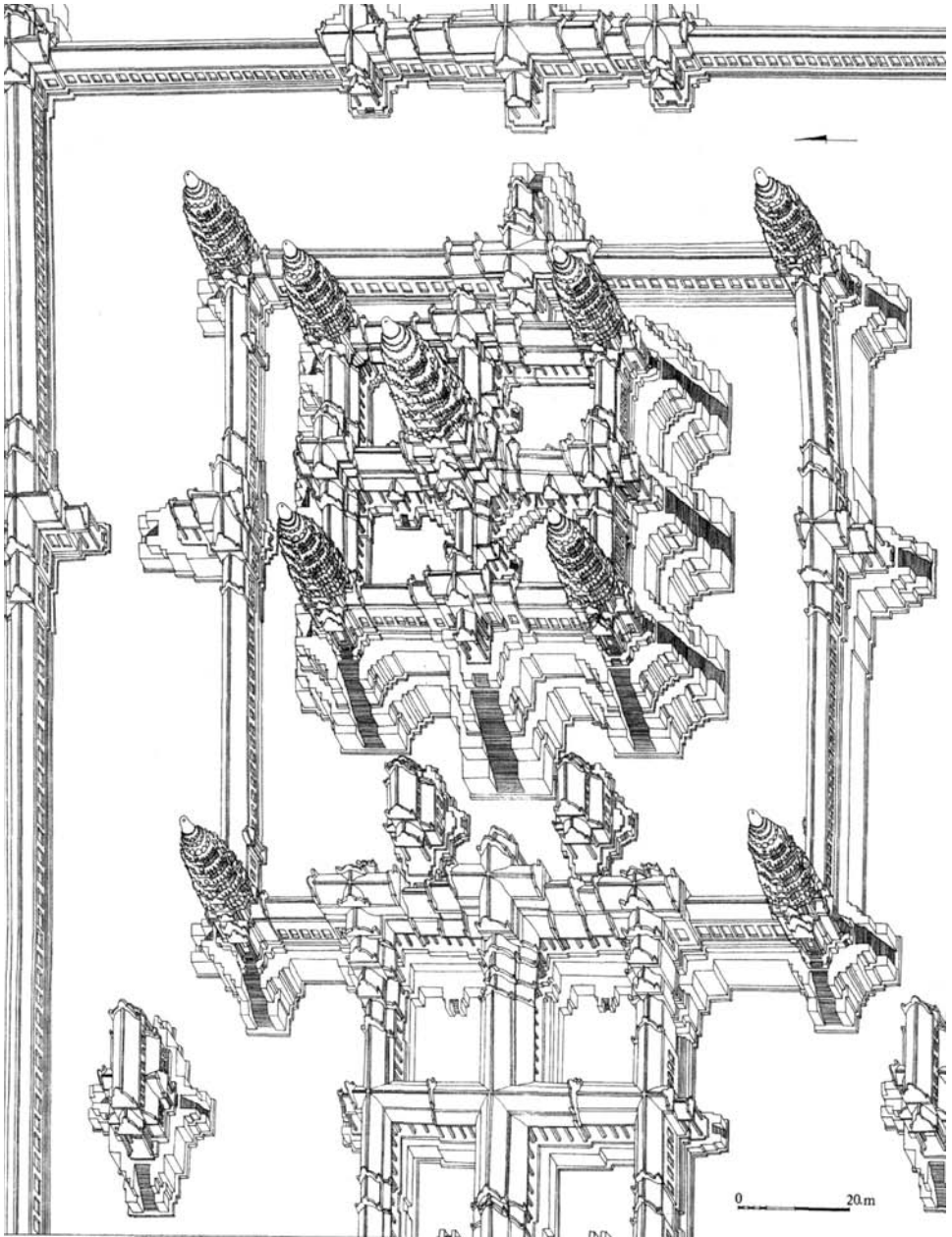


Figure 6: Perspective Drawing of Angkor Wat, a Temple Compound within the Cambodian Capital Angkor

Source: Modified after Jacques Dumarçay and Pascal Royère, *Cambodian Architecture, Eighth to Thirteenth Centuries*, Handbook of Oriental Studies, sec. 3, Southeast Asia, vol. 12 (Leiden: Brill, 2001).

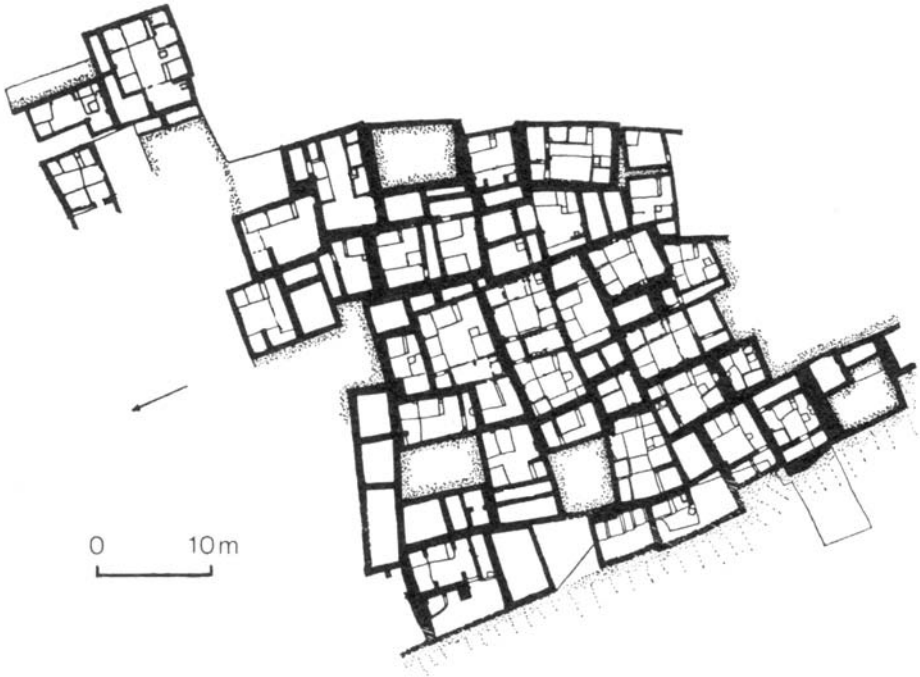


Figure 7: Plan of Çatal Höyük, a Neolithic Town in Anatolia

Note: This settlement exhibits the semiorthogonal layout that can arise in the absence of central planning.

Source: Modified after James Mellaart, *The Neolithic of the Near East* (New York: Scribner, 1975), 101.

densely settled ancient cities, such as Mohenjo-Daro³³ (figure 8), Ur,³⁴ and Amarna (figure 9a). This layout results from the actions of individual builders who make additions to an existing rectangular house or build a new house adjacent to a standing structure. Simple factors of practicality and efficiency generate these patterns, which owe little if anything to central planning. Barry Kemp argues that such semiorthogonal urban layouts also occurred on the level of the house lot at Amarna.³⁵ He compares a residential district at the Egyptian capital (figure 9b) to a simulated urban layout (figure 9a) generated by stochastic factors of unplanned growth³⁶ to argue against David O'Connor's interpretation that Amarna's layout was generated by central planning based on cosmological ideas.³⁷

The use of an *integrated orthogonal plan* suggests a higher level of planning than simple common alignments or semiorthogonal urban blocks. An integrated orthogonal plan occurs when buildings are aligned orthogonally with respect to one or more large-scale features. For example, at Teotihuacán in Mexico, two crossing formal avenues, the Street of the Dead and an East-West street, give structure to the entire city (figure 10). Nearly all of the several thousand buildings in the city share a common alignment with the Street of the Dead.³⁸ Angkor provides

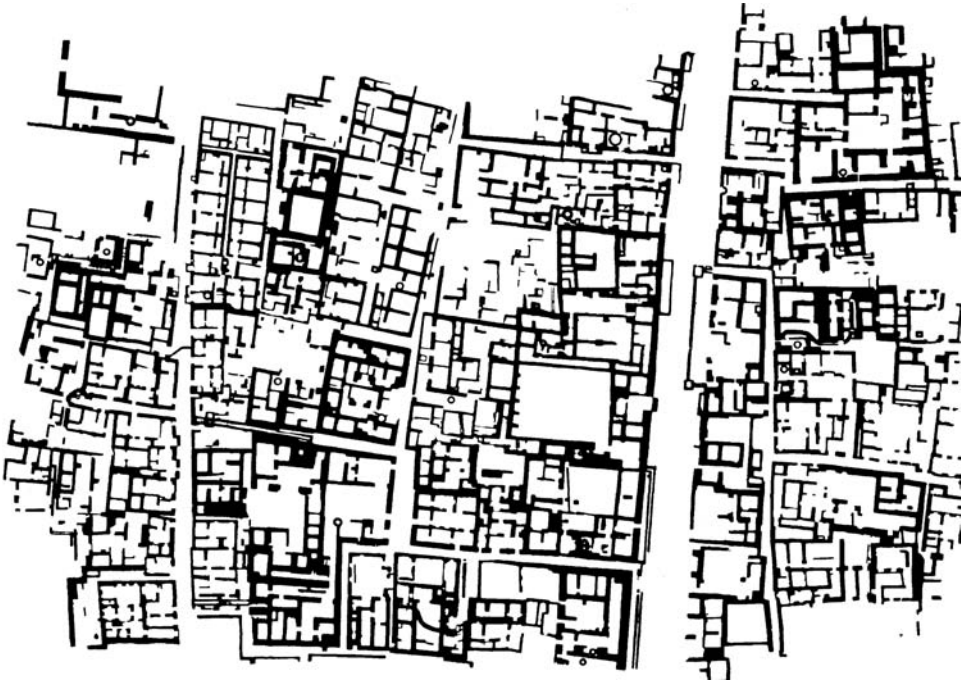


Figure 8: Residential Zone of Mohenjo-Daro, a Harappan City in Pakistan, Showing Semiorthogonal Urban Blocks

Source: Modified after Michael R. N. Jansen, "Mohenjo-Daro: Type Site of the Earliest Urbanization Process in South Asia," in *Urban Form and Meaning in South Asia: The Shaping of Cities from Prehistoric to Precolonial Times*, ed. Howard Spodek and Doris Meth Srinivasan, vol. 31, *Studies in the History of Art, Center for Advanced Study in the Visual Arts, Symposium Papers XV* (Washington, D.C.: National Gallery of Art, 1993), 42.

another example (figure 11) in which large reservoirs (*barays*) and canals provide a clear orthogonal structure for the city. At Angkor, few residences have been mapped, and the extent to which they may have followed the orthogonal alignment is unknown.³⁹ The large spatial extent of the common orientations and the use of major linear and rectangular features give cities like Teotihuacán and Angkor a much more formal layout than those characterized by simple common orientations or those using semiorthogonal urban blocks. A variation of the integrated orthogonal plan occurs when an overall layout is distorted (typically by topography) such that there are two or more orthogonally planned zones within a single town or city (figure 12); such patterns are not uncommon in Greek orthogonal cities.⁴⁰

A higher level of central planning is suggested in cases in which an integrated orthogonal plan exhibits a regular street layout; this can be called a *modular orthogonal plan*.⁴¹ This pattern is highly characteristic of Roman city planning (figure 13), particularly military camps, colonies,



Figure 9: Comparison of Semiorthogonal Urban Blocks at Amarna, Egypt (b), with a simulated Urban Growth Pattern (a), Suggesting That Such Layouts Were Not Due to Central Planning

Source: Modified after Barry J. Kemp, "Bricks and Metaphor. In: Viewpoint: Were Cities Built as Images?" *Cambridge Archaeological Journal* 10 (2000): 343.

and new foundations in provincial areas.⁴² It also occurs at some Greek and Hellenistic cities,⁴³ but is rare among other ancient traditions of urbanism. The Greek city of Olynthus (figure 14) is an extreme example of a modular urban plan.⁴⁴ One of the few non-Classical examples of a modular orthogonal plan, at least in one portion of the city, is the Egyptian Middle Kingdom pyramid town of Kahun (figure 15).

The prevalence of orthogonal layouts in Greek and Roman cities probably contributes to the tendency among urban historians to use orthogonal layouts as the basis for the planned/unplanned dichotomy. The occurrence of orthogonal planning is quite variable in the earliest urban traditions. In the Old World, it is found in political capitals in ancient China, South Asia, and the ancient Khmer cities of Cambodia.⁴⁵ We do not yet know enough about Egyptian cities to assess the full extent of orthogonal planning.⁴⁶ Kemp argues that orthogonal planning was used in towns of the Old and Middle Kingdoms, only to be abandoned as a planning principle at Amarna and other New Kingdom cities.⁴⁷

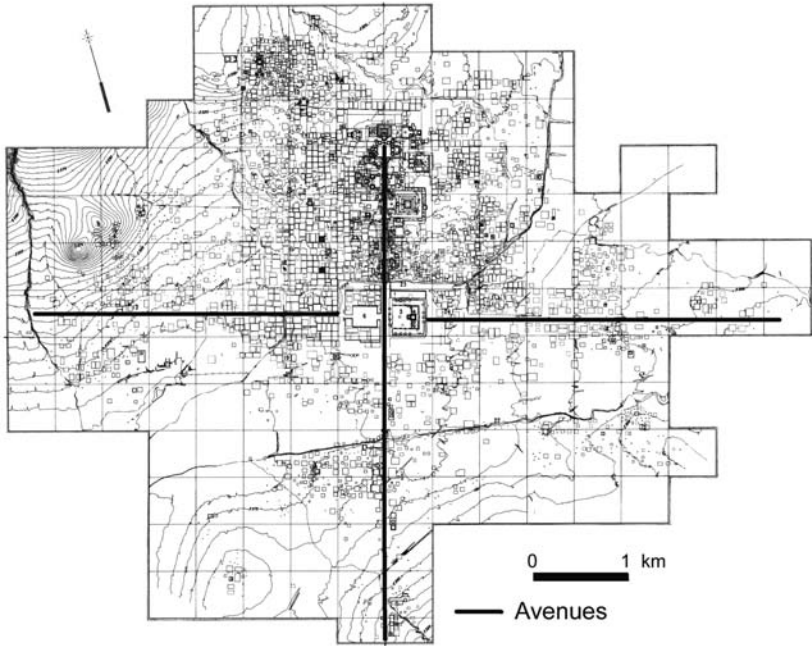


Figure 10: Teotihuacán, a Classic-Period Capital in Central Mexico

Note: This shows an integrated orthogonal layout (based on project maps from the Teotihuacan Mapping Project, directed by René Millon); I have added the lines designating the avenues. Used with permission.

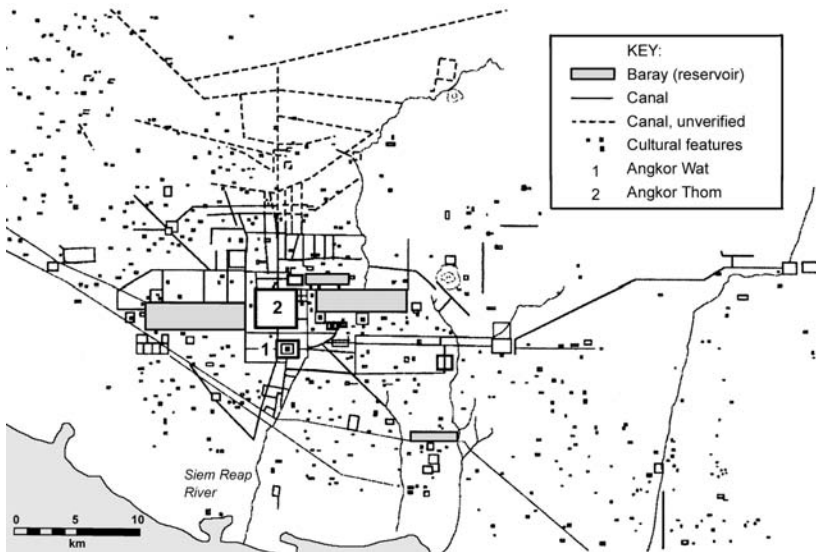


Figure 11: Outline Plan of Angkor, Showing an Integrated Orthogonal Layout

Source: Modified after Roland Fletcher, "Seeing Angkor: New Views of an Old City," *Journal of the Oriental Society of Australia* 32-33 (2000-2001): 26.

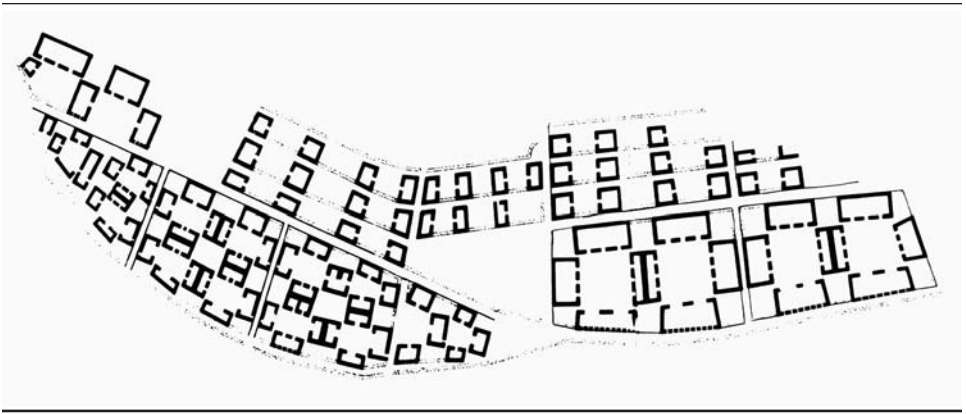


Figure 12: Patallaqka, an Inkan Settlement, Showing a Distorted Orthogonal Layout
Source: Modified after Graziano Gasparini and Luise Margolies, *Inca Architecture*, trans. Patricia J. Lyon (Bloomington: Indiana University Press, 1980), 78.

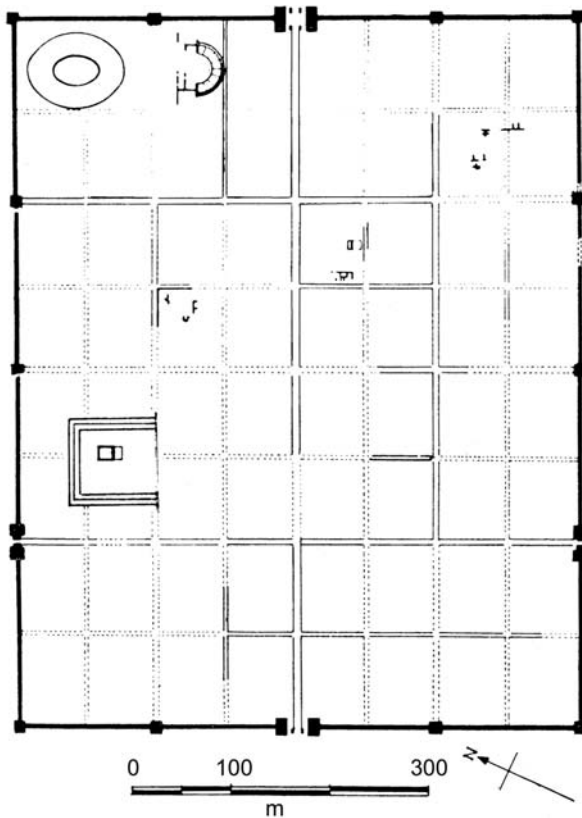


Figure 13: Aosta, a Roman City, Showing a Regular Street Plan
Source: Modified after Ferdinando Castagnoli, *Orthogonal Town Planning in Antiquity* (Cambridge, Mass.: MIT Press, 1971), 113.

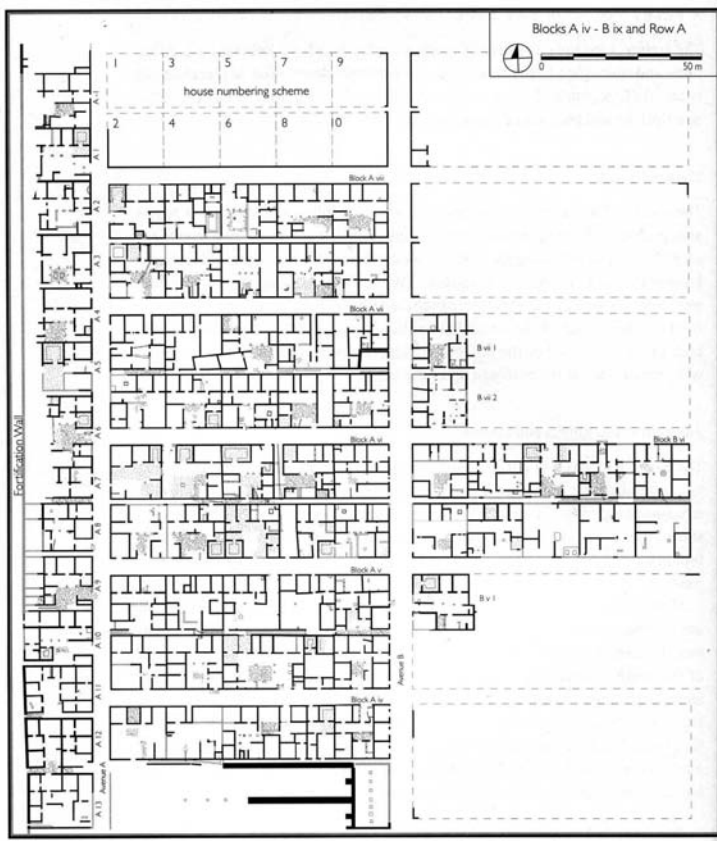


Figure 14: Olynthus, a Greek City, Showing Regular Streets and Buildings

Source: Modified after Nicholas Cahill, *Household and City Organization at Olynthus* (New Haven, Conn.: Yale University Press, 2001), 28.

In the Near East, orthogonal planning was rare in the earliest cities.⁴⁸ The residential neighborhoods of Ur, for example, more closely resemble the plan of Çatal Höyük (figure 7) than the plan of Kahun (figure 15). Later imperial capitals from the Assyrian and Persian periods, such as Borsippa (figure 16) and Babylon, do show strict orthogonal layouts.⁴⁹ In the New World, two Andean urban traditions used orthogonal planning (Middle Horizon Wari and Late Horizon Inka),⁵⁰ but other Andean cities apparently did not. In Mesoamerica, only the central Mexican imperial capitals Teotihuacán and Tenochtitlán exhibit integrated orthogonal layouts.⁵¹ Of orthogonal planning, Joseph Rykwert claims that “all the great civilizations practice it.”⁵² It is not clear whether he is ignoring the numerous examples of nonorthogonal cities in the ancient world or just banishing their inhabitants to a status lower than the “great civilizations.”

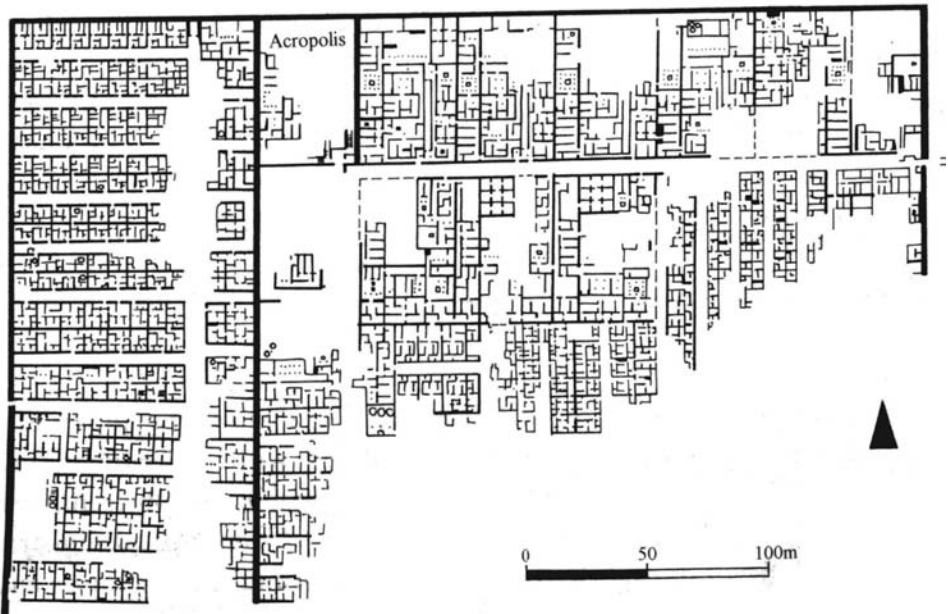


Figure 15: Kahun, an Egyptian Middle Kingdom Walled Pyramid Town, Showing a Regular Street Plan

Source: Modified after Charles Gates, *Ancient Cities: The Archaeology of Urban Life in the Ancient Near East and Egypt, Greece, and Rome* (New York: Routledge, 2003), 100.

There is no doubt that in most cases, orthogonal layouts in ancient cities are indicative of central urban planning. In the words of James Scott, “[T]he elective affinity between a strong state and a uniformly laid out city is obvious.”⁵³ This does not imply, however, that cities that lacked orthogonal plans were not the targets of strong political control.

Other Forms of Geometric Order

Spiro Kostof uses the term “diagram cities” to describe cities that were “planned at one time as a precise diagram of some presumed or promulgated order.”⁵⁴ These cities use a strict geometric layout, whether orthogonal or nonorthogonal in plan. Most of Kostof’s nonorthogonal examples date to the Renaissance and modern periods; they include Renaissance fortresses such as Palmanova, later European radial towns, and twentieth-century examples such as Griffin’s plan for Canberra. Lynch includes several nonorthogonal geometric forms in his catalog of “models of settlement form,” including the star plan and the Baroque axial network.⁵⁵ Ancient examples are much rarer, however.

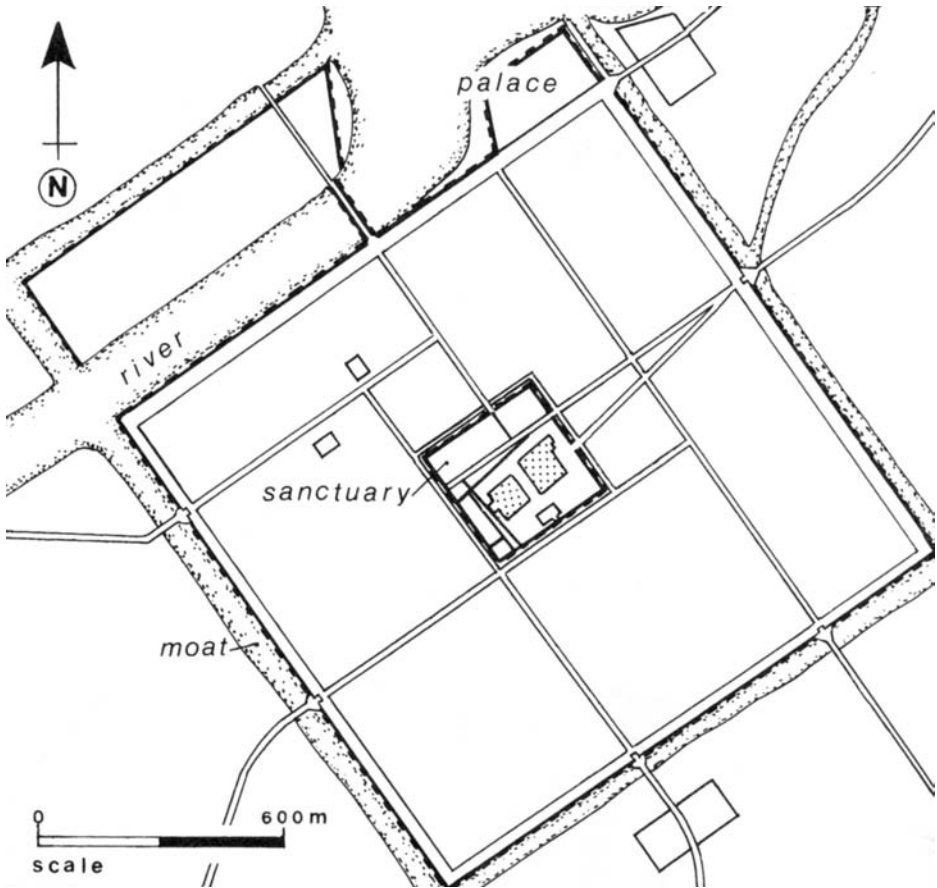


Figure 16: Borsippa, an Important Capital of the Babylonian and Assyrian Periods in Mesopotamia

Source: Modified after Marc Van De Mieroop, *The Ancient Mesopotamian City* (Oxford: Oxford University Press, 1999), 88.

At least two traditions of circle-based urban planning can be identified for the ancient world. The better known example is in the Near East, where a tradition of circular capitals started with Parthian and Sassanian cultures, and then became incorporated into Islamic city planning with al-Mansur's plan of Baghdad.⁵⁶ A second, poorly understood tradition of circular urban planning is found in towns of the Teuchitlán tradition of western Mexico (circa A.D. 200-700), where numerous circular complexes of shrines and houses cover the landscape (figure 17).⁵⁷ The circular layouts that structure these settlements are unique within Mesoamerica. A different type of circular layout occurs in fortified settlements such as forts and castles. In Iron Age Palestine, for example, the circular fortification walls structured the layout of the houses within.⁵⁸

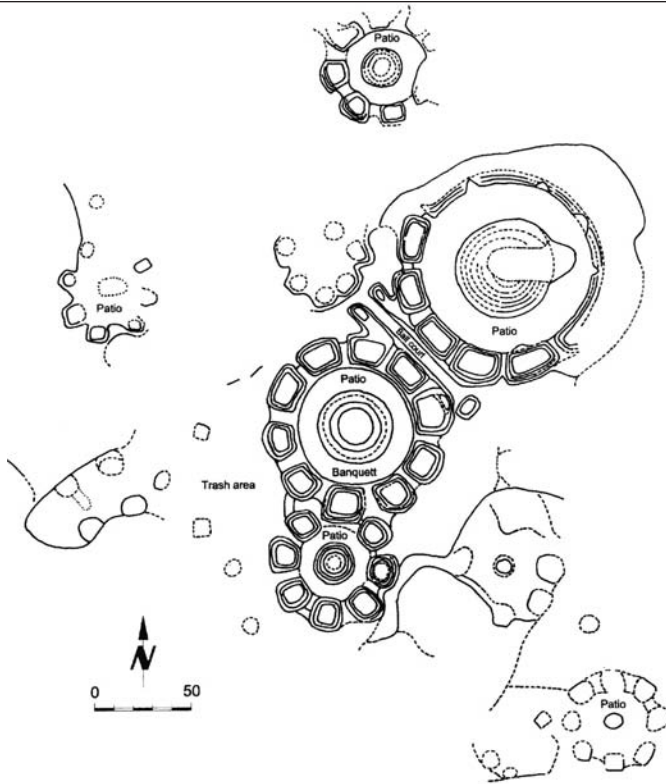


Figure 17: Circular Ceremonial-Residential Zones of the Guachimontón Site of the Teuchitlán Tradition of Ancient West Mexico

Source: Modified after Phil C. Weigand, "The Evolution and Decline of a Core of Civilization: The Teuchitlán Tradition and the Archaeology of Jalisco," in *Greater Mesoamerica: The Archaeology of West and Northwest Mexico*, ed. Michael S. Foster and Shirley Gorenstein (Salt Lake City: University of Utah Press, 2000), 51.

Access and Visibility

One variant of coordination among buildings and spaces in ancient cities is the creation of areas of limited access. On the largest scale are city walls. Some walls served a defensive purpose, some were primarily symbolic in nature, and many probably served both purposes.⁵⁹ In all cases, however, walls with gates served to channel the movement of people in and out of the city. On a smaller scale, many ancient cities were laid out around centrally located walled compounds that housed ritual and/or administrative activities only accessible to a portion of the population. The "Forbidden City" of Beijing and other walled "palace cities" within Chinese capitals (figure 3) provide some of the best-known examples; others include the large elliptical compound at Great Zimbabwe (figure 18); the sacred precinct in the middle of the Aztec capital, Tenochtitlán; Mississippian towns (figure 4); and the ten great compounds

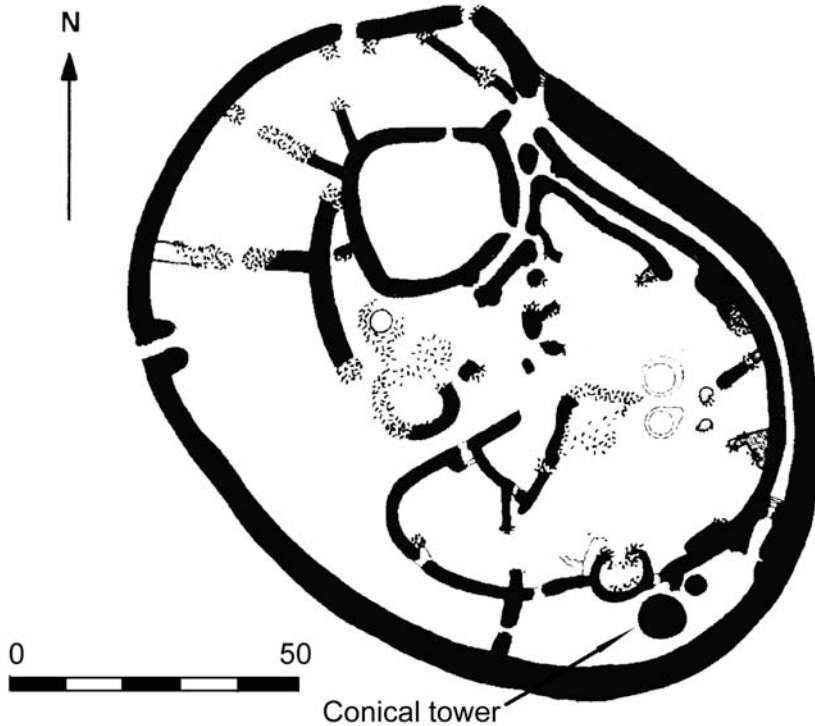


Figure 18: Great Zimbabwe in Zimbabwe, Showing the Central Walled Compound
 Source: Modified after Innocent Pikirayi, *The Zimbabwe Culture: Origins and Decline of Southern Zambesian States* (Walnut Creek, Calif.: Altamira, 2001), 38.

of the Chimu capital, Chan Chan, on the Peruvian coast.⁶⁰ The construction of walls and gates is an act of planning, and features like the size, exclusivity, and formality of walled compounds can suggest degrees of planning.

The role of walled compounds in regulating access is well illustrated by historically documented nineteenth-century royal palaces in Bali and the Yoruban area of Africa.⁶¹ In both cases, the palace compounds contained spaces of increasingly limited access, starting with large open areas in which the urban population gathered on key ritual and administrative occasions, followed by more restricted areas for elites and priests, and leading finally to the innermost controlled spaces where the royal family lived.

Visibility refers to two aspects of visual perception: the area that can be seen from a given point (*outward viewshed*, in Geographic Information System [GIS] terminology), and the areas from which a given point can be seen (*inward viewshed*). In spite of early innovative work on visibility by Constantinos Doxiadis, archaeologists have only recently begun to explore this topic.⁶² Research at a number of early cities suggests that

inward viewshed, or visibility, influenced the design of buildings and spaces as well as the locations of key ceremonial and political activities.⁶³ With the increasing use of GIS and computer-mapping methods by archaeologists—combined with built environment perspectives—this line of analysis is becoming more common.⁶⁴

Standardization among Cities

The presence of similar buildings, layouts, and other urban features in a series of related cities suggests adherence to a common plan or idea of city planning. This aspect of urban planning presents more obstacles to archaeologists than the coordination among buildings, for a number of reasons. First, there are sampling problems. One needs a good sample of well-documented cities to establish similarities, and this is simply not available for many ancient urban traditions. Second, there are methodological difficulties in making comparisons. How many cities are needed to establish a standard plan? How does one measure similarity? Third, the discussion of standardization has gotten bogged down in speculative discussions of the role of cosmology in generating urban layouts (see discussion of high-level meaning below). Archaeologists need to develop more reliable methods for the analysis of standardization to address the reasons for such commonalities of form. Here, I review three aspects of standardization: architectural inventories, spatial patterns, and orientation and metrology.

Architectural Inventories

The presence of a basic inventory of public buildings and features among a number of related cities suggests the use of common plans or ideas of urban form. Perhaps the best-documented example is the historical tradition of Chinese imperial capitals.⁶⁵ Three of Nancy Steinhardt's eleven features of this planning tradition—the four-sided enclosure, gates, and defensive projections—pertain to the category of architectural inventory. Classic period Mayan cities tend to have a basic inventory of public buildings and spaces, including several temple-pyramids, rectangular plazas, stelae carved with hieroglyphic texts, a royal palace compound, one or more ball courts, and often a series of raised ceremonial roads.⁶⁶ These patterns suggest some level of standardization of concepts of appropriate capital cities. Inkan imperial cities are easily identifiable throughout the Andes, partly for their distinctive stonework, partly for their orthogonal layouts, and partly for their standard inventories of buildings, including *kanchas* (walled residential compounds), *kallankas* (long ceremonial/administrative halls), *qollcas* (storehouses), and other building types.⁶⁷ Marc Van De Mieroop identifies a series of buildings and features

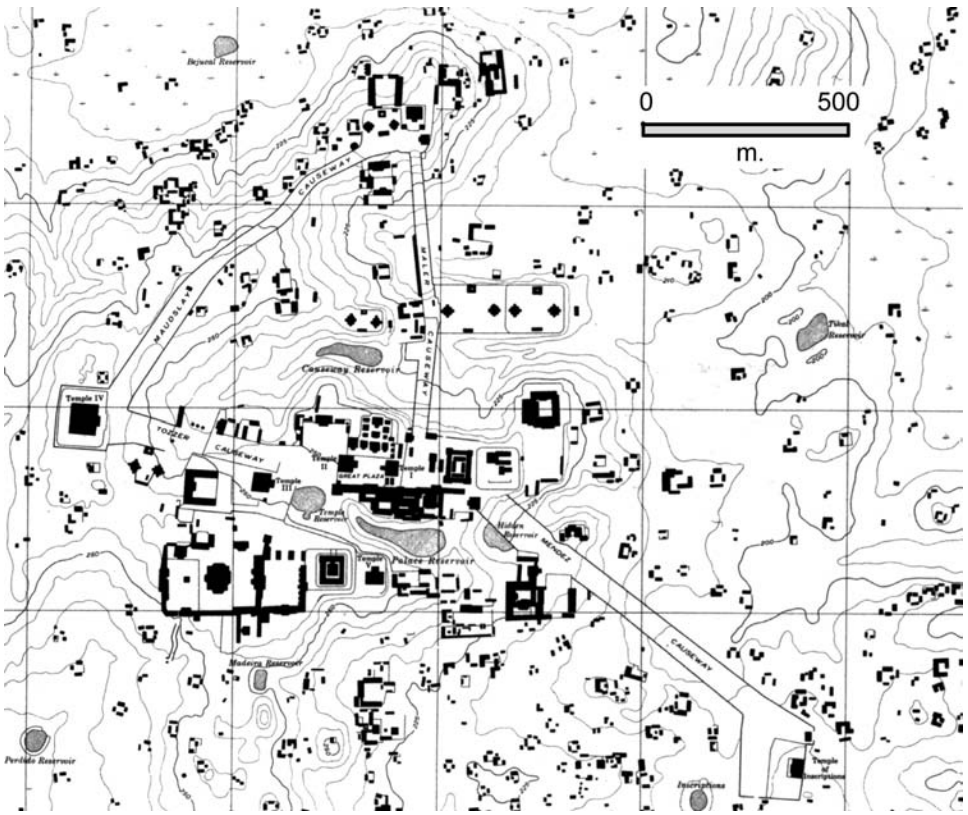


Figure 19: The Epicenter of Tikal, a Large Classic-Period Mayan Capital

Source: Modified after William R. Coe, *Tikal: A Handbook of the Ancient Maya Ruins* (Philadelphia: University Museum, University of Pennsylvania, 1967), 21.

that characterize ancient Mesopotamian cities, from houses and temples to walls to harbors and orchards.⁶⁸

Architectural inventories are a topic ripe for quantitative analysis, and techniques like Guttman scaling have the potential to make important contributions to the study of ancient urban planning. Several of the cases mentioned above (Chinese, Mayan, and Inkan cities) are sufficiently well published to warrant such analyses; such research can provide an objective and quantitative foundation for city comparisons.

Spatial Patterns

The presence of common spatial patterns at a series of cities provides stronger evidence for urban planning than architectural inventories. Such spatial similarities, however, are more difficult to document objectively. Again, the Chinese imperial city tradition furnishes a good example of

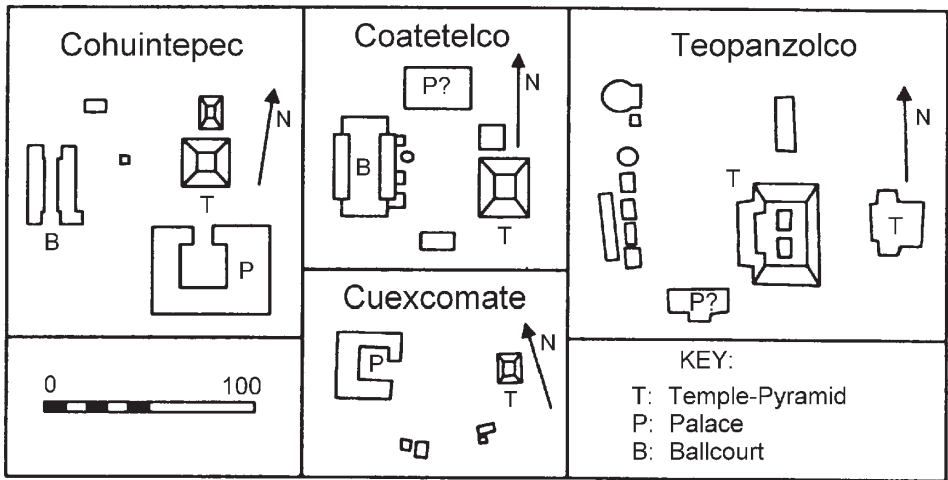


Figure 20: Central Plazas of Four Aztec-Period Provincial Cities in the Mexican State of Morelos
 Source: From Michael E. Smith, *The Aztecs*, 2nd ed. (Oxford: Blackwell, 2003), 176. Used with permission.

similarities of spatial patterns. Four of Steinhardt's eleven features of planning are spatial patterns: clearly articulated space in the form of streets, the ward system, accessibility of water, and siting. Most cities in ancient Mesoamerica share two kinds of spatial patterns. First, public architecture is usually concentrated in one central district—the epicenter—and planning is almost always limited to buildings in the epicenter, with unplanned surrounding residential zones. The Mayan city of Tikal (figure 19) illustrates this pattern (Teotihuacán, shown in figure 10, is a highly atypical Mesoamerican city that lacks this feature). Second, most temples and other large buildings in Mesoamerican urban epicenters are arranged around formal rectangular plazas (figures 2 and 19). These patterns suggest common concepts of urban design among the varied cultures of ancient Mesoamerica, from the Maya to the Aztec.

In contrast to general spatial patterns found throughout Mesoamerica, a much more highly standardized pattern is found at Aztec city-state capitals in the state of Morelos (figure 20), suggesting a higher level of planning. At these (and other) Aztec cities, the plazas are quite formal, the major temple-pyramid is always on the east side of the plaza, and other sides of the plaza are typically occupied by one or more of the following features: a palace, a ballcourt, or a row of small altars.⁶⁹ The resemblance of these plaza plans to the earlier city of Tula (figure 5) is not fortuitous; the Aztecs looked back to Tula as a source of ethnic identity and political legitimacy, and they copied the layout of Tula for many of their cities.

Yoruban cities (figure 21) exhibited a common spatial pattern: cities were walled, they were centered on a large royal palace, roads radiated



Figure 21: Plan of the Yoruban Town of Ado Ekiti

Source: Modified after Eva Krapf-Askari, *Yoruba Towns and Cities: An Enquiry into the Nature of Urban Social Phenomena* (London: Oxford University Press, 1969), 182. See also G. J. Afolabi Ojo, *Yoruba Palaces: A Study of Afins of Yorubaland* (London: University of London Press, 1966), 31.

out from the palace, a market was located adjacent to the palace, and residential zones were organized into lineage-based neighborhoods that served as administrative units.⁷⁰ As in the case of Mayan cities, each Yoruban city had a unique plan and layout, yet the spatial commonalities are pervasive. Individual city builders apparently selected from a common core of building types and spatial principles, but combined them in distinctive ways. It is not unreasonable to infer that this diversity within clear bounds was a specific planning goal in these ancient urban cultures.

Additional examples of standardized spatial layouts in ancient urban traditions include courtyards at Mycenaean cities, temple compounds in Cambodia (figure 6), administrative compounds at Wari cities in the Andes, the use of both orthogonal and radial principles at Inkan cities (figure 12), the temple-plaza-palisade pattern of Mississippian chiefdom towns (figure 4), orthogonal layouts based on north-south avenues at Teotihuacán administrative centers, and, of course, the use of orthogonal planning at Greek, Hellenistic, and Roman cities.⁷¹

Orientation and Metrology

Common building orientation within cities is discussed above; here, the issue is similarities in orientations among cities. Numerous ancient cities, in all parts of the world, were oriented to the cardinal directions.⁷² Standardized orientations among cities of a single urban tradition, such as that of ancient China, suggest a common model of urban layout. Numerous temples and other buildings in Mesoamerican cities were aligned 17 degrees east of north; in the words of Anthony Aveni, “[A]lignment studies reveal a widespread pattern of systematically deviated orientations.”⁷³ He uses this finding as part of an argument for the influence of astronomical alignments on city layouts. This is an area in need of additional quantitative research: how many and what kind of buildings should be considered (particularly in nonorthogonal cities, where there is a diversity of building alignments), and what is their degree of standardization (as measured, for example, by standard deviations)? Standardized noncardinal orientations have been reported for a number of cities in the Inkan and Puuc Mayan traditions, suggesting common planning principles.⁷⁴

The metrology of ancient cities—the identification of standard units of measurement—has seen some research,⁷⁵ but many of the results are controversial and not widely accepted. The mere identification of standard units of length would not necessarily imply urban planning, although it would suggest a level of political control necessary to define and enforce such standardization. More significant for urban planning—and more controversial—are claims that the dimensions of buildings were determined by symbolically significant numbers, such as the number of gods in the pantheon or the number of days in the solar year.⁷⁶

Degrees of Urban Planning

The discussion above should make it clear that there were varying degrees of urban planning among the ancient cities of the world. Some urban traditions—such as that of ancient China—exhibited a higher overall level of planning than other traditions, and within a given urban tradition, cities typically show a range of the degrees and types of planning. These are subjective judgments that are difficult to quantify, however. Does an orthogonal layout suggest more or less planning than formality and monumentality? Should standardization count more or less heavily than coordination among buildings? Nevertheless, the comparative assessment of the different dimensions of planning outlined above may provide clues to the social and political dynamics that produced the city plans recovered by archaeologists today.

One dimension of planning that is far easier to quantify is the extent or area of individual cities with evidence of planning. Clearly, a city whose entire area shows planning attributes such as orthogonal layouts (e.g., Teotihuacán; figure 10) appears more extensively planned than a city

in which planning is limited to the epicenter (e.g., Tikal; figure 19). The extent of area that shows planning can be measured and analyzed as either an absolute quantity (i.e., the number of hectares that were planned) or a relative measure (e.g., the planned areas as a proportion of the total city area). In a comparison of the sizes of Postclassic Mesoamerican cities, I found that the absolute area of the urban epicenter (i.e., the planned portions of cities) was strongly associated with the administrative level of cities; the most powerful capitals had the largest planned areas.⁷⁷ Similar analyses of other ancient urban traditions, and comparisons among different urban traditions, could help illuminate the nature of planning and political dynamics in early cities.

The Meaning of Early Urban Planning

The various expressions of urban planning reviewed above resulted from the deliberate actions of ancient rulers and their architects and builders. Effort and resources were invested in the coordination and standardization of urban buildings to communicate various kinds of messages. What kinds of messages were being sent, and to whom were they addressed? Amos Rapoport's model for levels of meaning in the built environment provides a useful framework to address these questions.⁷⁸ Rapoport identifies three levels of meaning in built environments: *high-level meaning* describes cosmological and supernatural symbolism that may be encoded in buildings and city layouts, *middle-level meaning* refers to deliberate messages about identity and status communicated by the designers and constructors of buildings and cities, and *low-level meaning* describes the ways in which the built environment channels and interacts recursively with behavior and movement. These levels are not independent and mutually exclusive, and in most cases individual cities and buildings conveyed meanings on two or three of the levels. Nevertheless, it is useful to separate them for purposes of analysis. The realm of urban meaning allows us to move from the mute data of city layouts to the intentions of rulers and builders, on one hand, and to the effects of city planning on urban visitors and inhabitants, on the other.

High-Level Meaning: Cities Built as Images

In Rapoport's scheme, high-level meaning relates to cosmologies, world-views, and the domain of the sacred. Such meanings are typically esoteric, known or understood by only a few people. There is a scholarly tradition of invoking high-level meanings as major forces that generated the layouts of cities and settlements in ancient societies. Most authors cite the work of Mircea Eliade,⁷⁹ who proposed four basic beliefs about the cosmological significance of settlements: (1) there is a parallel between the workings

of the heavens and life on earth; (2) the basic link between earth and the cosmos is the *axis mundi*; (3) the cosmos are laid out in four cardinal directions, and human constructions should imitate this; and (4) divination and augury are needed to identify and sanctify sacred space on earth.

Eliade's ideas about the expression of cosmological concepts in ancient city planning were influential, particularly through their presentation by Paul Wheatley,⁸⁰ and they remain popular today. In one interpretive tradition, these concepts are assumed to have been universal among early urban cultures,⁸¹ an interpretation that does not find empirical support (see discussion below). In another interpretive tradition, Rapoport uses Eliade's concepts as a starting point for the identification of a series of architectural and spatial features associated with cosmologically based urban planning.⁸² His list includes city walls with gates, orientation to the cardinal directions, vertical markers at the center, open sacred plazas, and tombs in key locations. Rapoport emphasizes cultural variation in the use of cosmological concepts in planning and shows how individual cities used one or more of these features.

Kevin Lynch developed similar ideas, apparently independently of Eliade.⁸³ His "theory of magical correspondences" is one of three "normative theories" of urban meaning: "This theory asserts that the form of any permanent settlement should be a magical model of the universe and the gods."⁸⁴ Lynch draws on data from ancient China and India to derive a set of "basic form concepts" of this cosmological model: axial lines of procession, encircling enclosure with gates, dominance of up versus down, grid layout, and bilateral symmetry.⁸⁵ He suggests that the use of these principles of urban layout reflects certain fundamental social values: "order, stability, dominance, a close and enduring fit between action and form—above all, the negation of time, decay, death, and fearful chaos."⁸⁶ Unlike Rapoport's emphasis on cultural variability, Lynch presents his scheme as a unified model of nonwestern urban planning that can be applied to some ancient urban traditions. I will argue below that many of the planning attributes mentioned by Rapoport and Lynch are better seen as operating on the level of middle-level meaning, not high-level meaning.

In a highly influential work, Wheatley applied Eliade's model to ancient Chinese cities. As described by Wheatley and others, the Chinese case provides a particularly good fit for Eliade's model.⁸⁷ The following kinds of evidence are available to scholars: textual descriptions of the kinds of cosmological beliefs described by Eliade; textual descriptions and idealized plans of the ideal, cosmologically grounded capital city (figure 22); descriptions of the deliberate efforts of kings to found and lay out their capitals in accordance with these cosmological models; and archaeological and textual evidence for the layouts of many capital cities.

Two other areas with documented ancient traditions of cosmologically significant urban design are South Asia⁸⁸ and the Khmer civilization of

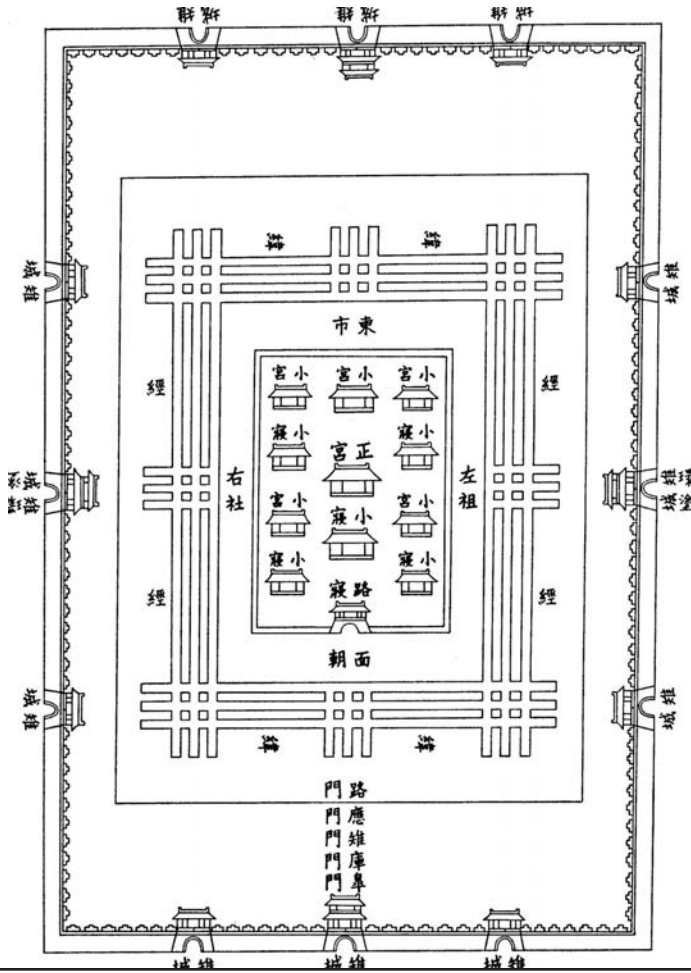


Figure 22: Idealized Plan of the Chinese Capital Wangcheng, Illustrating Features of the Chinese Cosmological Model of Urban Layout

Source: Modified after Paul Wheatley, *The Pivot of the Four Quarters: A Preliminary Enquiry into the Origins and the Character of the Ancient Chinese City* (Chicago: Aldine, 1971), 415.

Cambodia.⁸⁹ Although the level of documentation is not as extensive as for China, in both of these areas there is enough textual, artistic, and archaeological evidence to establish the clear influence of cosmological principles on urban planning. Some scholars generalize from the Chinese, Indian, and Khmer cases to infer that ancient cities in all parts of the world were sacred places whose planning was based on cosmological principles.⁹⁰ These scholars interpret buildings and cities as “cosmograms,” or deliberate physical models of the cosmos. The level of empirical support for such interpretations—outside of the three cultures mentioned above—is quite low.⁹¹ In his cross-cultural analysis of ancient civilizations, Bruce Trigger concludes,

The desire to create cosmograms does not appear to have been as obvious or widespread in early civilizations as Eliade and his followers have maintained. . . . His general ideas seem to have been applied too dogmatically and in some cases without sufficient local warrant to the physical layout of structures.⁹²

Ethnographer Roy Rappaport agrees, suggesting that Eliade “overemphasized the significance of centers.”⁹³

For the archaeologist, working with little or no textual information on urban planning, there are two additional problems with universalistic interpretations of the influence of cosmology on city design. First, it is difficult, if not impossible, to infer the specifics of ancient religious beliefs, sacred symbolism, and cosmology in the absence of textual data.⁹⁴ In Trigger’s words, “Projecting culturally-specific ideas into the past by means of the direct historical approach or inferring them contextually, as Ian Hodder advocates, is a highly speculative, and largely unverifiable, operation.”⁹⁵ Even when we know something of the cosmological system of an ancient culture, there are no agreed-on methods for establishing that cosmological concepts were expressed in city layouts in the absence of written sources. A number of scholars have proposed that the ancient Maya used cosmological city planning similar to the Chinese, South Asian, and Cambodian cases, and I have criticized these accounts elsewhere for their poor empirical support.⁹⁶

A second problem with universalistic cosmological theories is that it is entirely possible that ancient people had a rich symbolic interpretation of city layout that in fact did not match the physical reality of city plans at all. For example, several early Spanish writers stated that the Inkan king Pachakuti had designed his capital, Cuzco, in the form of a giant puma, a sacred animal. Although modern scholars have tried to verify this statement by examining the plan of Cuzco (figure 23), scholarship now makes it clear that early authors were speaking metaphorically, not literally.⁹⁷ Indeed, it takes a highly vivid imagination to identify a puma in the street plan of Inkan Cuzco. A more extreme case is the modern Hindu city of Bhaktapur in Nepal. Local Brahmins drew an idealized map of the city in the form of a mandala, but this figure bears almost no physical resemblance to the actual city plan.⁹⁸ It does, however, provide a good description of the symbolism of architectural features, the routes of sacred processions, and the religious meaning of the city to at least some of its inhabitants. In the case of Cuzco, it is doubtful whether the Inkan people actually thought about their capital in terms of a puma, but in the case of Bhaktapur, it is clear that the idealized mandala does indeed describe indigenous views of city layout (the views of the Brahmin elites, at least). But an archaeologist confronting a plan of Bhaktapur would have no way to reconstruct the high-level meaning of the city plan in the absence of detailed historical records.⁹⁹

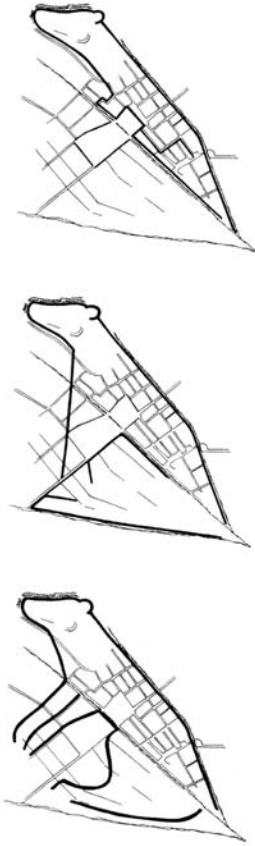


Figure 23: Modern Attempts to Verify Ancient Metaphorical Descriptions That the Inkan Capital, Cuzco, Was Designed in the Form of a Puma

Source: Modified after Graziano Gasparini and Luise Margolies, *Inca Architecture*, trans. Patricia J. Lyon (Bloomington: Indiana University Press, 1980), 48.

Middle-Level Meaning: Planning and Power

The cultural specificity of high-level meanings contrasts with the cross-cultural regularities of many middle-level meanings. In Rapoport's scheme, middle-level architectural meanings concern the transmission of messages about identity, status, and power. A number of the architectural manifestations of cosmological (high-level) meaning identified by Rapoport and Lynch—traits such as symmetry, axuality, plazas, and city walls—are more usefully viewed as expressions of middle-level meaning. Thus, although scholars may not know the specific symbolism and high-level meaning of, say, a particular temple or palace, we can nevertheless use information on the sizes, forms, and locations of ancient structures to

infer something about the power of the state, its control over labor, and the place of commoners within society; these are all middle-level meanings. Irrespective of the specific religious goals of ancient rulers and builders, many architectural and spatial features of ancient cities served to communicate middle-level meanings to various audiences, and cross-cultural analysis allows scholars to read those meanings today.

After reviewing a number of questionable accounts of the possible cosmological symbolism of Yoruban towns, Krapf-Askari concludes, "But, whether or not the town plan really derives from traditional cosmological ideas, it certainly reflects, with quite remarkable fidelity, the pattern of political realities within each settlement."¹⁰⁰ In other words, the high-level meanings of Yoruban towns are controversial and difficult to confirm, but the middle-level meanings provide reliable information about political dynamics within Yoruban polities. Not surprisingly, the clearest middle-level meanings of ancient cities derive from expressions of monumentality and formality. Trigger's definition of monumental architecture—buildings whose construction required far more labor and materials than required by the specific intended uses of the structures—is accepted by most archaeologists. Ancient rulers typically constructed large monuments as expressions of various types of political ideology.¹⁰¹

As noted above, archaeologists and architects have identified a number of architectural principles that recur in ancient capital cities throughout the world. These include long, formal, straight avenues (axiality) often used for processions; large open plazas for public gatherings and formal ceremonies; symmetrical arrangements of buildings; and walled areas of limited access with formal gates or entrances.¹⁰² Formal, monumental urban architecture communicates a number of messages, including the ability of the state to carry out large projects, convert disorder to order, and convince or force individuals to conform to societal needs. Joyce Marcus, however, cautions against a simple tendency to equate monumentality with power.¹⁰³ Although the construction of monumental architecture does demonstrate a certain level of power, one cannot assume, for example, that the largest monuments must have been built by the most powerful kings. Indeed, monuments such as Stonehenge show that impressive monuments can be built in the absence of powerful leaders and state organization.

The social importance of formality, monumentality, and other principles of planning in ancient cities lies partly in the effects that planned cities had on their inhabitants and visitors. People walking up the Street of the Dead at Teotihuacán or approaching the Forbidden City in Beijing could not help but be impressed by the scale and magnificence of the urban architecture. They would have readily understood some of the middle-level messages communicated by that architecture, even if they were foreign visitors who understood nothing of the specific symbolism of the

buildings and features. Similarly, modern scholars can “read” many of the middle-level meanings of ancient buildings and cities in the absence of knowledge of possible high-level symbolism and meaning.

Another aspect of the social importance of urban planning lies in its effects on the people who built and maintained the buildings. Scholars recognize the inadequacies of the popular “*National Geographic* magazine model” of ancient construction projects, in which huge gangs of slaves labored to build the pyramids, palaces, and other buildings under the whips of cruel overseers. We now know that the labor to build large monuments was typically organized as *corvée* labor, a regular part of people’s taxes to the state, and large construction projects were generally carried out in the agricultural off-season.¹⁰⁴ In a variety of historically documented cases, people developed a sense of identity with their city and ruler through their participation in such construction projects.¹⁰⁵ Commoner laborers took pride in their efforts, and thus the very processes of building, rebuilding, and repairing monumental architecture created some of the effects that the rulers and planners were trying to achieve—their political legitimation and support from their subjects. In this sense, the construction of monumental buildings was not simply a reflection of the political process; instead, the very act of building was a significant part of ancient political dynamics through its role in binding subjects to rulers. This is not to say that coercion was absent in the organization of labor for ancient construction systems. In fact, the disentanglement of these different kinds of labor recruitment and organization is a very difficult task in archaeology.

Low-Level Meaning: Negotiating the Urban Built Environment

Rapoport’s concept of low-level meaning concerns the recursive relationship between architecture and behavior: “People read environmental cues, make judgments about the occupants of settings, and then act accordingly.”¹⁰⁶ The effects of different modern urban built environments on people’s behavior, emotions, and experiences comprise a major topic of research today,¹⁰⁷ but this topic has only received limited attention for preindustrial and ancient cities.¹⁰⁸ The dynamics and effects of access and visibility operate, in large part, on the level of low-level meaning. Archaeologists have made some progress with formal access analyses of building plans, following the methods of Hillier and Hanson.¹⁰⁹ These studies relate degrees of access of spaces to variables like political control and ritual exclusion. Changing patterns of access—to cities, central administrative/ritual precincts, or individual buildings—can provide information on ancient social inequality and class structure.

Research on the visual properties of the urban built environment—*viewshed analyses*, in GIS terminology—can inform scholars about key

aspects of the political process. Archaeologists are starting to combine three-dimensional digital modeling of urban sites with theories of behavior in relation to the built environment. This research can produce new understandings of the way in which ancient urbanites viewed and used their urban surroundings in relation to processes such as political domination.¹¹⁰ As such work progresses, we will produce more informative reconstructions of how people used ancient cities.

Much political activity in ancient cities had a theatrical aspect. Kings, nobles, priests, and others undertook public processions, performed ritual dramas, and so forth. In some theoretical models, such royal performances are seen as portraying or displaying the power and authority of the rule and the state;¹¹¹ in other models, such performances themselves are held to constitute the ruler's authority.¹¹² Regardless of theoretical orientation, however, the theatrical dimension of early rulership was important, and aspects of it can be reconstructed through spatial and visual analysis of ancient city plans.¹¹³

The Interplay of Levels of Meaning: An Aztec Example

Rapoport's model of levels of meaning provides important tools for interpreting the social significance of ancient urban planning. Cities, buildings, and urban features typically communicated messages on two or three levels, and it can be difficult today to determine the relative importance of the various levels of meaning. An example from my own area of research—Aztec central Mexico—illustrates some of the complexities involved. The Aztec capital, Tenochtitlán, which was seen firsthand as a functioning city by the conqueror Hernando Cortés and his army in 1519, was one of the very few ancient cities in Mesoamerica to use orthogonal planning.¹¹⁴ How can we explain or understand this feature, which was quite rare in the Mesoamerican urban tradition?

Many authors attribute orthogonal planning in ancient cities to religious motives (high-level meanings), concentrating on the symbolic importance of the cardinal directions or the cosmological significance of the passage of the sun across the sky;¹¹⁵ these are examples of the universalistic approach to high-level meanings criticized above. Comparative research, however, suggests that low- and middle-level meanings account for the creation of orthogonal plans in a broad array of modern, historical, and ancient cities.¹¹⁶ Grid-plan towns were often set up because of the ease of surveying and laying out new towns, and/or because of cultural ideas of the convenience of orthogonal layouts, two factors that are best described as low-level meanings. In some recent rural Iranian towns, an orthogonal layout came about as formerly irrigated fields, which were orthogonal in plan, were filled in for houses and other buildings. Among ancient cities, there are numerous examples of orthogonal cities and

towns established as explicit statements of political authority (middle-level meaning) to demonstrate the power of the state and its control over territory, nature, or peoples. In some cases, historical documents are quite explicit about the political ends of such grid-plan towns.¹¹⁷

There is a body of literature on Aztec religion in which the layout of Tenochtitlán is attributed to high-level meanings relating to the cardinal directions, the path of the sun, and their role in Aztec myth and cosmology.¹¹⁸ Although such high-level meanings are well documented in texts, art, and artifacts for the central temple of Tenochtitlán—the “Templo Mayor”—there is little or no empirical support for extending these high-level meanings to the orthogonal layout of the city.¹¹⁹ Tenochtitlán was founded by the Mexica people in the fourteenth century on an island in a shallow, swampy lake. In the Aztec historical tradition, the act of foundation consisted of building a shrine to Huitzilopochtli, patron god of the Mexica. This shrine was rebuilt and expanded many times, and it grew into the huge Templo Mayor seen by the Spanish conquerors. It is conceivable that the city was laid out orthogonally around the initial shrine for cosmological reasons, although there is no explicit textual evidence for this interpretation.

Firmer empirical support can be gathered for an interpretation of the orthogonal plan of Tenochtitlán on the level of low-level meanings. The Mexica built rectangular agricultural fields called *chinampas* (sometimes inappropriately called “floating gardens”) to grow crops in and around the growing city of Tenochtitlán. As the city expanded demographically, these fields were filled in to create urban land for settlement.¹²⁰ Because the fields were laid out orthogonally for practical reasons, the easiest course of action in filling them in—and laying out canals, streets, lots, and buildings in the growing island city—was to follow the orthogonal field arrangement. Thus, it is entirely possible that the orthogonal plan of Tenochtitlán owed its origin to simple and practical factors of efficiency in creating urban space, not to cosmological schemes.

The spatial structure of Tenochtitlán was determined by the generally orthogonal courses of canals and causeways. Once the city had developed an orthogonal layout around these linear features, the city’s plan could have been given a cosmological interpretation by its rulers, priests, and planners. In other words, the cosmological meanings of the grid plan may have been created after the fact, applied to the preexisting city layout to promote the interests of the state and religious institutions. The use of religious settings and occasions in Tenochtitlán to promote messages of political ideology is well documented for other realms of the imperial capital, and perhaps a cosmological interpretation of its spatial structure was used in a similar fashion.¹²¹

Toward the end of the pre-Spanish life of Tenochtitlán, the Mexica rulers began promoting symbolic and material ties to the ancient city

of Teotihuacán to help legitimize their rule in a program of imperial ideology. They constructed temples in the ancient Teotihuacán style, buried ancient objects from Teotihuacán in new offerings, and engaged in a number of material strategies of aligning their capital with the ancient city.¹²² Because Teotihuacán was one of the only other cities in ancient Mesoamerica with an orthogonal layout (figure 10), it would not be surprising for the Mexican rulers to make explicit visual comparisons between the grid plans of the two cities to help promote their ideological claims of imperial legitimacy. If so, they were creating middle-level meanings for the orthogonal layout of their capital.

In sum, plausible arguments can be made for the importance of all three levels of meaning in the interpretation of the orthogonal plan of Tenochtitlán. In the absence of textual descriptions of the planning process, it is difficult (if not impossible) to assign these levels of meaning degrees of relative importance. My own opinion is that low-level factors of efficiency and practicality generated the orthogonal pattern of the city, which was later given political and cosmological significance by its rulers as their empire expanded. This interpretation, however, cannot be proven or disproven with our current knowledge.

Discussion

The Complexities of Research on Ancient Urban Planning

The approach to ancient urban planning described above addresses some of the limitations of traditional approaches to the subject. The categories of coordination among buildings and standardization expand consideration beyond the traditional focus on orthogonal planning, and the notion of degrees of planning transcends the old planned/unplanned dichotomy. Nevertheless, numerous obstacles remain for efforts to understand the nature of planning and its meaning in the earliest cities. One of the biggest difficulties, largely ignored in the discussion above, concerns changes that occur in city form throughout time. As pointed out by numerous authors,¹²³ many cities experience periods of both planned and unplanned growth. A formally planned city can take on attributes of an unplanned structure throughout time, as in the case of Roman towns occupied into the Anglo-Saxon period in Britain.¹²⁴ Alternatively, cities that grow without centralized planning can take on attributes of orderly layout, as in the case of Amarna (figure 9) or cities with semiorthogonal urban blocks (figures 7-9). This problem is particularly difficult for the archaeological study of cities with long occupation histories. Later construction

typically destroys, modifies, or covers earlier construction. Excavation encounters the final urban form first, and even if earlier layouts were preserved under later construction, it may not be feasible to excavate them due to budgetary constraints or the requirements of heritage programs.¹²⁵ The best urban archaeological sites, from this perspective, are cities that were built rapidly, occupied for a short period, and then abandoned; well-studied examples include Amarna in Egypt, the Inkan administrative center Huánuco Pampa, and the early Spanish city of Ciudad Vieja en El Salvador.

A second difficulty in the analysis of ancient urban planning is equifinality—the same urban forms can be generated by a variety of forces and processes, and these can be difficult to analyze archaeologically. The example of Tenochtitlán, outlined above, illustrates this point. Orthogonal layouts, as well as other spatial patterns, can be generated by a variety of forces—from the spiritual to the pragmatic—and it is not always possible to sort these out. The implications of this problem are twofold: first, archaeologists have to be careful to separate the empirical data of city layout from the social interpretations of those data; and, second, the data of urban layout are seldom if ever sufficient, in and of themselves, to understand the processes of planning or the significance or meaning of planning.

A more general version of this problem is that similar planning patterns in different cultures can arise for very different reasons. A comparison of planned cities in the Aztec and Inkan empires illustrates this point. Aztec Tenochtitlán and Inkan Cuzco were capitals of powerful empires. In both cases, there were architectural similarities between the capitals and their provinces in the forms and inventories of buildings, and in urban layouts. But when a broader array of evidence is considered, it becomes clear that these similarities had radically different origins. In the Inkan case, similarities arose from deliberately imposed imperial construction programs.¹²⁶ In the Aztec case, similarities in both building forms and city layouts (figure 20) predated the formation of the empire by several centuries, and can best be attributed to the basic cultural uniformity of central Mexican Aztec peoples and interaction among localized elite groups in the Early Aztec period.¹²⁷

Conclusions

The model presented above can help move scholarship away from ethnocentric notions of ancient urban planning. There was great diversity of urban form both within and among the urban traditions of the ancient world. Most ancient cities were planned in one way or another, but only a small portion exhibit the kind of orthogonal layout so common in the Classical Mediterranean world. Scholars need to take a deeper look at city plans and associated contextual data to tease out the various principles of

planning—and unplanned growth—that produced the cities whose ruins we study today. The options, procedures, and significance of planning are quite different for a ruler building a new city and a ruler inheriting an existing city full of old buildings and monuments.¹²⁸ For this reason, careful attention to chronology is essential in examination of ancient city form and city planning.

Although I believe that the basic principles and processes of planning and urban design discussed above were similar across cultures, their implementation and expression were different in each urban tradition. The approach suggested here needs to be extended and tailored to fit individual regions and individual cities. Its validity and usefulness can only be established through confrontation with the archaeological and historical records—the messy empirical reality—of specific ancient cities.

Notes

1. Amos Rapoport, “Levels of Meaning in the Built Environment,” in *Cross-Cultural Perspectives in Non Verbal Communication*, ed. Fernando Poyatos (Toronto: C. J. Hogrefe, 1988), 317-36; and Amos Rapoport, *The Meaning of the Built Environment: A Nonverbal Communication Approach*, rev. ed. (Tucson: University of Arizona Press, 1990).

2. Bruce G. Trigger, *Understanding Early Civilizations: A Comparative Study* (New York: Cambridge University Press, 2003), 28-39, reviews this concept, its justification, and the nature of scholarly documentation.

3. Richard G. Fox, *Urban Anthropology: Cities in Their Cultural Settings* (Englewood Cliffs, N.J.: Prentice Hall, 1977); and Joyce Marcus, “On the Nature of the Mesoamerican City,” in *Prehistoric Settlement Patterns: Essays in Honor of Gordon R. Willey*, ed. Evon Z. Vogt and Richard M. Leventhal (Albuquerque: University of New Mexico Press, 1983), 195-242.

4. Louis Wirth, “Urbanism as a Way of Life,” *American Journal of Sociology* 44 (1938): 1-24.

5. For example, see Harold Carter, *An Introduction to Urban Historical Geography* (Baltimore: Arnold, Edward, 1983), 10; A. E. J. Morris, *History of Urban Form: Before the Industrial Revolution*, 3rd ed. (New York: Longman, 1994), 8-10; Jorge E. Hardoy, *Pre-Columbian Cities* (New York: Walker, 1973), 523-25; E. J. Owens, *The City in the Greek and Roman World* (New York: Routledge, 1991), 1-30; Ferdinando Castagnoli, *Orthogonal Town Planning in Antiquity* (Cambridge, Mass.: MIT Press, 1971); Marc Van De Mieroop, *The Ancient Mesopotamian City* (Oxford: Oxford University Press, 1999), 83-94; and Dora P. Crouch and June G. Johnson, *Tradition in Architecture: Africa, America, Asia, and Oceania* (New York: Oxford University Press, 2001), 210-13.

6. Carter, *An Introduction to Urban Historical Geography*, 10.

7. Adam T. Smith, *The Political Landscape: Constellations of Authority in Early Complex Politics* (Berkeley: University of California Press, 2003), 225-26.

8. Smith, *The Political Landscape*, 226.

9. Keith D. Lilley, *Urban Life in the Middle Ages, 1000-1450* (New York: Palgrave, 2002).

10. Spiro Kostof, *The City Shaped: Urban Patterns and Meanings through History* (Boston: Bullfinch, 1991); and Spiro Kostof, *The City Assembled: The Elements of Urban Form through History* (Boston: Bullfinch, 1992).

11. Kostof, *The City Shaped*, 95-157.

12. Bruce G. Trigger, “Monumental Architecture: A Thermodynamic Explanation of Behavior,” *World Archaeology* 22 (1990): 119-32; Jerry D. Moore, *Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings* (New York: Cambridge University Press, 1996); and Joyce Marcus, “Monumentality in Archaic States: Lessons Learned from Large-Scale Excavations of the Past,” in *Theory and Practice in Mediterranean Archaeology: Old World and New World Perspectives*, ed. John K. Papadopoulos and Richard M. Leventhal (Los Angeles: Cotsen Institute of Archaeology, University of California, Los Angeles, 2003), 115-34.

13. Nigel Taylor, *Urban Planning Theory since 1845* (London: Sage, 1998); Peter Hall, *Cities of Tomorrow: An Intellectual History of Planning and Design in the Twentieth Century*, rev. ed. (Cambridge: Blackwell, 1996); and Thomas Hall, *Planning Europe's Capital Cities: Aspects of Nineteenth Century Urban Development* (London: Spon, 1997).

14. Trigger, *Understanding Early Civilizations*; Smith, *The Political Landscape*; and Gary M. Feinman and Joyce Marcus, eds., *Archaic States* (Santa Fe, NM: School of American Research Press, 1998).

15. Wendy Ashmore, "Construction and Cosmology: Politics and Ideology in Lowland Maya Settlement Patterns," in *Word and Image in Maya Culture: Explorations in Language, Writing, and Representation*, ed. William F. Hanks and Don S. Rice (Salt Lake City: University of Utah Press, 1989), 272-86, 272. Ashmore uses the phrase "site planning" as a synonym for *city planning*. She is not referring to what modern planners call *site planning*; see Kevin Lynch, *Site Planning* (Cambridge, Mass.: MIT Press, 1962). It could be argued that her phrase confuses the archaeological remains surviving today and studied by archaeologists (i.e., archaeological sites) with the dynamic ancient urban settlements whose characteristics archaeologists try to reconstruct from archaeological sites (i.e., cities and towns). For another definition of ancient planning based on intentions, see Martin Biddle, "The Evolution of Towns: Planned Towns before 1066," in *The Plans and Topography of Medieval Towns in England and Wales*, ed. M. W. Barley, Research Report no. 14 (London: Council for British Archaeology, 1976), 19-32.

16. Simon P. Ellis, "Prologue to a Study of Roman Urban Form," in *Theoretical Roman Archaeology: Second Conference Proceedings*, ed. Peter Rush, vol. 14, Worldwide Archaeology Series (Brookfield, Vt.: Avebury, 1995), 92-104, 93.

17. Peter Lacovara, *The New Kingdom Royal City* (London: Kegan Paul, 1997), 1, 76-80.

18. Nancy S. Steinhardt, *Chinese Imperial City Planning* (Honolulu: University of Hawaii Press, 1990); and Castagnoli, *Orthogonal Town Planning in Antiquity*.

19. Carter, *An Introduction to Urban Historical Geography*, 8.

20. Robert L. Scranton, "Group Design in Greek Architecture," *Art Bulletin* 31 (1949): 247-68, 248.

21. Anthony F. Aveni and Horst Hartung, *Maya City Planning and the Calendar*, American Philosophical Society, Transactions, vol. 76, pt. 7 (Philadelphia: American Philosophical Society, 1987).

22. Edmund N. Bacon, *The Design of Cities* (New York: Viking, 1967), 68-69.

23. Steinhardt, *Chinese Imperial City Planning*, 150-54.

24. Joshua C. Taylor, *Learning to Look: A Handbook for the Visual Arts*, 2nd ed. (Chicago: University of Chicago Press, 1981), 65-68, 95.

25. Steinhardt, *Chinese Imperial City Planning*, 5-12.

26. Barbara L. Stark, "Formal Architectural Complexes in South-central Veracruz, Mexico: A Capital Zone?" *Journal of Field Archaeology* 26 (1999): 197-226, 205.

27. Kevin Lynch, *The Image of the City* (Cambridge, Mass.: MIT Press, 1960).

28. See R. Barry Lewis, Charles Stout, and Cameron B. Wesson, "The Design of Mississippian Towns," in *Mississippian Towns and Sacred Spaces: Searching for an Architectural Grammar*, ed. R. Barry Lewis and Charles Stout (Tuscaloosa: University of Alabama Press, 1998), 1-21. It is often argued that urban settlements are only found in states, not chiefdoms, and thus Mississippian towns should be eliminated from considerations of urbanism; for example, Paul D. Welch, "How Early Were Cities in the Eastern United States?" *Journal of Urban History* 30 (2004): 594-604. The functional approach to urbanism followed here, however, admits Cahokia and other Mississippian sites as fully urban settlements based on the administrative and religious urban functions based in their central towns. On Mississippian towns, see Timothy R. Pauketat, *Ancient Cahokia and the Mississippians*, Case Studies in Early Societies (New York: Cambridge University Press, 2004); Lewis, Stout, and Wesson, "The Design of Mississippian Towns"; and William R. Swagerty, "Urban Indians before Columbus" (review essay), *Journal of Urban History* 26 (2000): 493-507.

29. Trigger, "Monumental Architecture."

30. Jacques Dumarçay and Pascal Royère, *Cambodian Architecture, Eighth to Thirteenth Centuries*, Handbook of Oriental Studies, sec. 3, Southeast Asia, vol. 12 (Leiden: Brill, 2001).

31. Castagnoli, *Orthogonal Town Planning in Antiquity*; and Kostof, *The City Shaped*.

32. Kent V. Flannery, "The Origins of the Village as a Settlement Type in Mesoamerica and the Near East: A Comparative Study," in *Man, Settlement, and Urbanism*, ed. Peter J. Ucko, Ruth Tringham, and G. W. Dimbleby (Cambridge: Schenkman, 1972), 23-53.

33. Others have argued that the residential neighborhoods of Mohenjo-Daro do indeed exhibit true orthogonal planning, with the successive use of different alignments; see Michael R. N. Jansen,

"Mohenjo-Daro: Type Site of the Earliest Urbanization Process in South Asia," in *Urban Form and Meaning in South Asia: The Shaping of Cities from Prehistoric to Precolonial Times*, ed. Howard Spodek and Doris Meth Srinivasan, vol. 31, Studies in the History of Art, Center for Advanced Study in the Visual Arts, Symposium Papers XV (Washington, D.C.: National Gallery of Art, 1993), 35-51. Mohenjo-Daro and other Harappan cities clearly exhibit various types of nonorthogonal planning, and several overall features of these cities (e.g., the citadel and major avenues) are laid out orthogonally; see Jonathan Mark Kenoyer, *Ancient Cities of the Indus Valley Civilization* (Karachi, Pakistan: Oxford University Press, 1998). Nevertheless, the residential neighborhoods seem to fit better in the category of semiorthogonal urban blocks.

34. Leonard Woolley and P. R. S. Moore, *Ur "of the Chaldees": A Revised and Updated Edition of Sir Leonard Woolley's Excavations at Ur*, rev. ed. (Ithaca, N.Y.: Cornell University Press, 1982).

35. Barry J. Kemp, "Bricks and Metaphor. In: Viewpoint: Were Cities Built as Images?" *Cambridge Archaeological Journal* 10 (2000): 335-46.

36. B. Erickson and T. Lloyd-Jones, "Experiments with Settlement Aggregation Models," *Environment and Planning B: Planning and Design* 24 (1997): 903-28.

37. David O'Connor, "The City and the World: Worldview and Built Forms in the Reign of Amenhotep III," in *Amenhotep III: Perspectives on His Reign*, ed. David O'Connor and Eric H. Cline (Ann Arbor: University of Michigan Press, 1998), 125-72; and David O'Connor, *City and Cosmos in Ancient Egypt: The New Kingdom Evidence* (London: Athlone, 2006).

38. René Millon, *Text*, pt. 1 of *The Teotihuacan Map*, vol. 1 of *Urbanization at Teotihuacan, Mexico* (Austin: University of Texas Press, 1973).

39. Roland Fletcher, "Seeing Angkor: New Views of an Old City," *Journal of the Oriental Society of Australia* 32-33 (2000-2001): 1-27.

40. Castagnoli, *Orthogonal Town Planning in Antiquity*; and Bryan Ward-Perkins, *Cities of Ancient Greece and Italy: Planning in Classical Antiquity* (New York: Braziller, 1974).

41. Sibyl Moholy-Nagy, *Matrix of Man: An Illustrated History of Urban Environment* (New York: Praeger, 1968) 18.

42. Castagnoli, *Orthogonal Town Planning in Antiquity*, 95-122.

43. *Ibid.*, 56-93.

44. Nicholas Cahill, *Household and City Organization at Olynthus* (New Haven, Conn.: Yale University Press, 2001).

45. Steinhardt, *Chinese Imperial City Planning*; Paul Wheatley, *The Pivot of the Four Quarters: A Preliminary Enquiry into the Origins and the Character of the Ancient Chinese City* (Chicago: Aldine, 1971); Spodek and Srinivasan, *Urban Form and Meaning in South Asia*; Dumarçay and Royère, *Cambodian Architecture*; and Fletcher, "Seeing Angkor."

46. Eric P. Uphill, *Egyptian Towns and Cities*, Shire Egyptology (Aylesbury, UK: Shire, 1988); Barry J. Kemp, *Ancient Egypt: Anatomy of a Civilization* (New York: Routledge, 1991); and Kemp, "Bricks and Metaphor."

47. Kemp, "Bricks and Metaphor." See also Lacovara, *The New Kingdom Royal City*, 22-23.

48. Van De Mierop, *The Ancient Mesopotamian City*; and Charles Gates, *Ancient Cities: The Archaeology of Urban Life in the Ancient Near East and Egypt, Greece, and Rome* (New York: Routledge, 2003).

49. Marc Van De Mierop, "Reading Babylon," *American Journal of Archaeology* 107 (2003): 257-75.

50. William H. Isbell and Gordon McEwan, eds., *Huari Administrative Structures* (Washington, D.C.: Dumbarton Oaks, 1991); John Hyslop, *Inka Settlement Planning* (Austin: University of Texas Press, 1990); and Graziano Gasparini, "The Pre-Hispanic Grid System: The Urban Shape of Conquest and Territorial Organization," in *Settlements in the Americas: Cross-Cultural Perspectives*, ed. Ralph Bennett (Newark: University of Delaware Press, 1993), 78-109.

51. Michael E. Smith, "The Archaeology of Aztec City-State Capitals: Four Views of Aztec Urbanism," in *El Urbanismo En Mesoamérica / Urbanism in Mesoamerica*, ed. William T. Sanders and Robert H. Cobean, vol. 2, Proyecto Urbanismo En Mesoamérica / The Mesoamerican Urbanism Project (University Park and Mexico City: Pennsylvania State University and Instituto Nacional de Antropología e Historia, in press).

52. Joseph Rykwert, *The Idea of a Town: The Anthropology of Urban Form in Rome, Italy, and the Ancient World* (Cambridge, Mass.: MIT Press, 1988), 26.

53. James C. Scott, *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, Conn.: Yale University Press, 1998). See also Kostof, *The City Shaped*.

54. Kostof, *The City Shaped*, 159-207.

55. Kevin Lynch, *A Theory of Good City Form* (Cambridge, Mass.: MIT Press, 1981), 373-89.

56. Kostof, *The City Shaped*, 183-84; Nezar Al Sayyad, *Cities and Caliphs: On the Genesis of Arab-Muslim Urbanism* (Westport, Conn.: Greenwood, 1991); Stefano Bianca, *Urban Form in the Arab World* (New York: Thames and Hudson, 2000); and Norman J. Johnston, *Cities in the Round* (Seattle: University of Washington Press, 1983) 13-20.

57. Phil C. Weigand, "The Evolution and Decline of a Core of Civilization: The Teuchitlán Tradition and the Archaeology of Jalisco," in *Greater Mesoamerica: The Archaeology of West and Northwest Mexico*, ed. Michael S. Foster and Shirley Gorenstein (Salt Lake City: University of Utah Press, 2000), 43-58; and Phil C. Weigand, "The Architecture of the Teuchitlán Tradition in the Occidente of Mesoamerica," *Ancient Mesoamerica* 7 (1996): 91-102.

58. Yigal Shiloh, "Elements in the Development of Town Planning in the Israelite City," *Israel Exploration Journal* 28 (1978): 36-51; and Aharon Kempinski, "Fortifications, Public Buildings, and Town Planning in the Early Bronze Age," in *The Architecture of Ancient Israel: From Prehistoric to the Persian Periods*, ed. Aharon Kempinski and R. Reich (Jerusalem: Israel Exploration Society, 1992), 68-84.

59. Graham Connah, "African City Walls: A Neglected Source?" in *Africa's Urban Past*, ed. David M. Anderson and Richard Rathbone (Portsmouth, N.H.: Heinemann, 2000), 36-51; James D. Tracy, ed., *City Walls: The Urban Enceinte in Global Perspective* (New York: Cambridge University Press, 2001); and Horst de la Croix, *Military Considerations in City Planning* (New York: Braziller, 1972).

60. Jerry D. Moore, "Pattern and Meaning in Prehistoric Peruvian Architecture: The Architecture of Social Control in the Chimú State," *Latin American Antiquity* 3 (1992): 95-113; Steinhardt, *Chinese Imperial City Planning*; and Michael E. Smith, *The Aztecs*, 2nd ed. (Oxford: Blackwell Publishers, 2003), 220-26.

61. Clifford Geertz, *Negara: The Theatre State in Nineteenth Century Bali* (Princeton, N.J.: Princeton University Press, 1980), 109-20; and G. J. Afolabi Ojo, *Yoruba Palaces: A Study of Afins of Yorubaland* (London: University of London Press, 1966).

62. Mark W. Lake and Patricia E. Woodman, "Visibility Studies in Archaeology: A Review and Case Study," *Environment and Planning B: Planning and Design* 30 (2003): 689-707; and Constantinos A. Doxiadis, *Architectural Space in Ancient Greece*, trans. Jaqueline Tyrwhitt (Cambridge, Mass.: MIT Press, 1972).

63. Kemp, *Ancient Egypt*, 205-17; Moore, *Architecture and Power in the Ancient Andes*, 153-64; William Cavanagh, "Empty Space? Courts and Squares in Mycenaean Towns," in *Urbanism in the Aegean Bronze Age*, ed. Keith Branigan, vol. 4, Sheffield Studies in Aegean Archaeology (Sheffield, UK: Sheffield Academic, 2002), 119-34; and Takeshi Inomata, "The Classic Maya Palace as a Political Theater," in *Reconstruyendo La Ciudad Maya: El Urbanismo En Las Sociedades Antiguas*, ed. Andrés Ciudad Ruiz, María Josefa Iglesias Ponce de León, and María del Carmen Martínez Martínez (Madrid: Sociedad Española de Estudios Mayas, 2001), 341-62.

64. David Wheatley and Mark Gillings, "Vision, Perception and GIS: Developing Enriched Approaches to the Study of Archaeological Visibility," in *Beyond the Map: Archaeology and Spatial Technologies*, ed. Gary R. Lock, Nato Science Series A: Life Sciences (Amsterdam: IOS Press, 2000), 1-27.

65. Steinhardt, *Chinese Imperial City Planning*.

66. Ciudad Ruiz, Iglesias Ponce de León, and Martínez Martínez, *Reconstruyendo La Ciudad Maya*; and George F. Andrews, *Maya Cities: Placemaking and Urbanization* (Norman: University of Oklahoma Press, 1975).

67. Graziano Gasparini and Luise Margolies, *Inca Architecture*, trans. Patricia J. Lyon (Bloomington: Indiana University Press, 1980); and Hyslop, *Inka Settlement Planning*.

68. Van De Mierop, *The Ancient Mesopotamian City*, 63-84.

69. Smith, "The Archaeology of Aztec City-State Capitals"; and Michael E. Smith, *Aztec City-State Capitals*, Ancient Cities of the New World series (Gainesville: University Press of Florida, in press).

70. Eva Krapf-Askari, *Yoruba Towns and Cities: An Enquiry into the Nature of Urban Social Phenomena* (London: Oxford University Press, 1969); and Ojo, *Yoruba Palaces*.

71. Cavanagh, "Empty Space?"; Dumarçay and Royère, *Cambodian Architecture*; Isbell and McEwan, *Huari Administrative Structures*; Hyslop, *Inka Settlement Planning*; Lewis, Stout, and Wesson, "The Design of Mississippian Towns"; Thomas H. Charlton, "The Influence and Legacy of Teotihuacan on Regional Routes and Urban Planning," in *Ancient Road Networks and Settlement Hierarchies in the New World*, ed. Charles D. Trombold (New York: Cambridge University Press, 1991), 186-97; and Castagnoli, *Orthogonal Town Planning in Antiquity*.

72. Wheatley, *The Pivot of the Four Quarters*, 423-42.

73. Anthony F. Aveni, "Archaeoastronomy in the Ancient Americas," *Journal of Archaeological Research* 11 (2003): 149-91, 163. See also Aveni and Hartung, *Maya City Planning and the Calendar*.

74. Gasparini, "The Pre-Hispanic Grid System"; and Aveni and Hartung, *Maya City Planning and the Calendar*.

75. Eleanor Mannikka, *Angkor Wat: Time, Space, and Kingship* (Honolulu: University of Hawaii Press, 1996); and R. Bruce Drewitt, "Measurement Units and Building Axes at Teotihuacán," in *Teotihuacán: Nuevos Datos, Nuevas Síntesis, Nuevos Problemas*, ed. Emily McClung de Tapia and Evelyn C. Rattray (Mexico City: Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México, 1987), 389-98.

76. Saburo Sugiyama, "Worldview Materialized in Teotihuacán, Mexico," *Latin American Antiquity* 4 (1993): 103-29; and Mannikka, *Angkor Wat*.

77. Michael E. Smith, "City Size in Late Postclassic Mesoamerica," *Journal of Urban History* 31 (2005): 403-34.

78. Rapoport, "Levels of Meaning in the Built Environment"; and Rapoport, *The Meaning of the Built Environment*.

79. Mircea Eliade, *Cosmos and History: The Myth of the Eternal Return*, trans. Willard R. Trask (New York: Harper & Row, 1959), 5-12.

80. Wheatley, *The Pivot of the Four Quarters*.

81. For example, John B. Carlson, "A Geomantic Model for the Interpretation of Mesoamerican Sites: An Essay in Cross-Cultural Comparison," in *Mesoamerican Sites and World-views*, ed. Elizabeth P. Benson (Washington, D.C.: Dumbarton Oaks, 1981), 143-216; David Carrasco, *City of Sacrifice: The Aztec Empire and the Role of Violence in Civilization* (Boston: Beacon, 1999); and Wheatley, *The Pivot of the Four Quarters*.

82. Amos Rapoport, "On the Nature of Capitals and Their Physical Expression," in *Capital Cities, Les Capitales: Perspectives Internationales, International Perspectives*, ed. John Taylor, Jean G. Lengellé, and Caroline Andrew (Ottawa, Ont.: Carleton University Press, 1993), 31-67, 43-52.

83. Lynch, *A Theory of Good City Form*, 73-81.

84. *Ibid.*, 73.

85. *Ibid.*, 75-79.

86. *Ibid.*, 79.

87. Arthur F. Wright, "The Cosmology of the Chinese City," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford, Calif.: Stanford University Press, 1977), 33-73; Steinhardt, *Chinese Imperial City Planning*; and Wheatley, *The Pivot of the Four Quarters*.

88. Spodek and Srinivasan, *Urban Form and Meaning in South Asia*; John McKim Malville and Lalit M. Gurjal, eds., *Ancient Cities, Sacred Skies: Cosmic Geometries and City Planning in Ancient India* (New Delhi: Indra Gandhi National Centre for the Arts, 2000); and John M. Fritz, George Michell, and M. S. Negaraja Rao, *Where Kings and Gods Meet: The Royal Center at Vijayanagara, India* (Tucson: University of Arizona Press, 1984).

89. Michael D. Coe, *Angkor and the Khmer Civilization* (New York: Thames and Hudson, 2003); Fletcher, "Seeing Angkor"; Dumarçay and Royère, *Cambodian Architecture*; and Mannikka, *Angkor Wat*.

90. Carlson, "A Geomantic Model for the Interpretation of Mesoamerican Sites"; Carrasco, *City of Sacrifice*; Wheatley, *The Pivot of the Four Quarters*; and Rykwert, *The Idea of a Town*.

91. Michael E. Smith, "Did the Maya Build Architectural Cosmograms?" *Latin American Antiquity* 16 (2005): 217-24.

92. Trigger, *Understanding Early Civilizations*.

93. Roy A. Rappaport, *Ritual and Religion in the Making of Humanity* (New York: Cambridge University Press, 1999).

94. Kent V. Flannery and Joyce Marcus, "Cognitive Archaeology," *Cambridge Archaeological Journal* 3 (1993): 260-70; and Kemp, "Bricks and Metaphor."

95. Bruce G. Trigger, "Cross-Cultural Comparison and Archaeological Theory," in *A Companion to Social Archaeology*, ed. Robert W. Preucel and Lynn Meskell (Oxford: Blackwell, 2004), 43-65, 59; and Ian Hodder, ed., *The Archaeology of Contextual Meanings* (New York: Cambridge University Press, 1987).

96. Ashmore, "Construction and Cosmology"; Wendy Ashmore and Jeremy A. Sabloff, "Spatial Orders in Maya Civic Plans," *Latin American Antiquity* 13 (2002): 201-15; Michael E. Smith, "Can We Read Cosmology in Ancient Maya City Plans? Comment on Ashmore and Sabloff," *Latin*

American Antiquity 14 (2003): 221-28; and Smith, "Did the Maya Build Architectural Cosmograms?" For other examples of universalist interpretations of ancient planning based on the concepts of Eliade, see Jeffrey Soles, "The Functions of a Cosmological Center: Knossos in Palatial Crete," in *Politeia: Society and State in the Aegean Bronze Age*, ed. Robert Laffineur and Wolf-Dietrich Niemeir, vol. 12, Aegaeum (Liège, Belgium: Université de Liège, 1995), 405-14; and the papers in Malville and Gurjal, *Ancient Cities, Sacred Skies*.

97. Monica Barnes and Daniel Slive, "El Puma De Cuzco," *Revista Andina* 11, no. 1 (1993): 79-102.

98. Niels Gutschow, "Bhaktapur: Sacred Patterns of a Living Urban Tradition," in Spodek and Srinivasan, *Urban Form and Meaning in South Asia*, 163-83, 170.

99. Several additional factors hinder the analysis of the high-level meanings of ancient cities. First, because modern cities have lost their high-level meanings, this is a foreign concept for modern authors; see Rapoport, "On the Nature of Capitals and Their Physical Expression." As a result, one often finds one of two extreme (and contradictory) interpretations: dismissal of the concept of high-level meanings for cities or facile acceptance of the concept with little empirical evidence. Second, there is a long tradition of overstressing the role of religion in ancient societies. Popular accounts often suggest that ancient peoples were fundamentally different from modern peoples in their preoccupation with the gods or with death. For example, many popular authors have gone along with the exaggerated and ethnocentric observations of the ancient Greek author Herodotus, who said of the Egyptians, "They are religious to excess." See discussion in Robert J. Wenke, *Patterns in Prehistory: Humankind's First Three Million Years*, 4th ed. (New York: Oxford University Press, 1999), 461-64. This view of the excessive religiosity of ancient peoples goes against the findings of comparative anthropology; see Trigger, *Understanding Early Civilizations*, 410-13. When applied to cities and urban planning, this biased view of ancient peoples translates into an exaggerated emphasis on the religious and symbolic aspects of city layout.

100. Krapf-Askari, *Yoruba Towns and Cities*, 42.

101. Trigger, "Monumental Architecture," 119-32.

102. Richard E. Blanton, "Continuity and Change in Public Architecture: Periods I through V of the Valley of Oaxaca, Mexico," in *Monte Alban's Hinterland, Part II: Prehispanic Settlement Patterns in Tlacolula, Etla, and Ocotlan, the Valley of Oaxaca, Mexico*, ed. Stephen A. Kowalewski, Gary M. Feinman, Laura Finsten, Richard E. Blanton, and Linda M. Nicholas, vol. 23, *Memoirs* (Ann Arbor: Museum of Anthropology, University of Michigan, 1989), 409-47; Marcus, "Monumentality in Archaic States"; Trigger, "Monumental Architecture"; and Rapoport, "On the Nature of Capitals and Their Physical Expression."

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