

Ancient Mesopotamia at the Dawn of Civilization

The Evolution of an Urban Landscape

GUILLERMO ALGAZE

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The Synergies of Civilization

Propinquity and Its Consequences

Multiple repercussions would have arisen from the just-discussed differences in population density and distance between polities typical of southern Mesopotamia and areas on its periphery throughout the second half of the fourth millennium. These repercussions represent in effect socioevolutionary synergies that help explain why the earliest urban and state-level societies of southwestern Asia appeared in southern Mesopotamia and not elsewhere.

The first synergy arises from the greater concentration of polities that existed in the Mesopotamian alluvium throughout the seven-hundred-year or so duration of the Uruk period, as compared to neighboring areas. As Colin Renfrew and his colleagues (Renfrew and Cherry 1986) have repeatedly argued, the long-term presence of multiple polities within relatively short distances of each other invariably engenders important processes of competition, exchange, emulation, and technological innovation—processes that are archaeologically visible in changes in how commodities were produced in Mesopotamia of the Middle and Late Uruk periods. The impact of these mutually reinforcing processes has been explained by Robert Wright (2000, 165–68), who notes that in situations where antagonistic but mutually communicative polities exist, social and economic innovations that prove maladaptive in any one

society are likely to be weeded out more quickly than in less competitive settings. Conversely, innovations that prove advantageous are more likely to spread quickly across the various polities in competition, thus accelerating the pace of change of the system as a whole.

The second synergy arises from the greater proportion of the population of southern Mesopotamia that lived in towns and cities and their immediate dependent hinterlands through the Uruk period, as compared to the more dispersed settlement typical for surrounding areas at the time. This had several important consequences. The first is one that logically follows from the models of urban growth discussed above and was originally noted by Adam Smith ([1776] 1976 [I.i.1-3]): the assemblage of a critical mass of both producers and consumers is a necessary precondition for the division of labor and resulting economies of scale. Second, proximity between workers and employers lowers training costs and increases labor flexibility (Malecki 1997, 49), thus providing southern institutions quicker access than their competitors to skilled workers/builders/soldiers when needed.

Finally, increasing population density in towns and cities would have compounded the natural advantages of the alluvial environment by further efficiencies in transportation and communication arising from the increasingly compact arrangement of the inhabitants of the area throughout the fourth millennium. One such compounding efficiency falls squarely in the realm of Cronon's created landscape and was provided by the start of construction of minor irrigation canals across portions of the southern alluvium through the Uruk period. Some of these manmade canals are situated between the principal natural river channels that existed in the fourth-millennium alluvium and can be inferred from the presence of small, linearly arranged, villages dating to the Early, and, particularly, the Middle and Late Uruk periods. Examples have been detected both in the Warka (e.g., fig. 21) and Eridu-Ur areas (Pournelle 2003a, 11, figs. 2, 8, 2003b, 197, fig. 80; see also Wilkinson 2003b, 89; H. Wright 1981b, 326, fig. 18).

No doubt, the primary role of these small canals was enhancing agricultural production but, in addition, some of the canals served other productive uses as well. This is clear in the case of two groups of three small mounds each, which were recorded by Wright in the plain between Ur and Eridu. Arranged at right angles to each other, the mounds consisted largely of heaps of ceramic and kiln slag. Wright suggests, plausibly, that

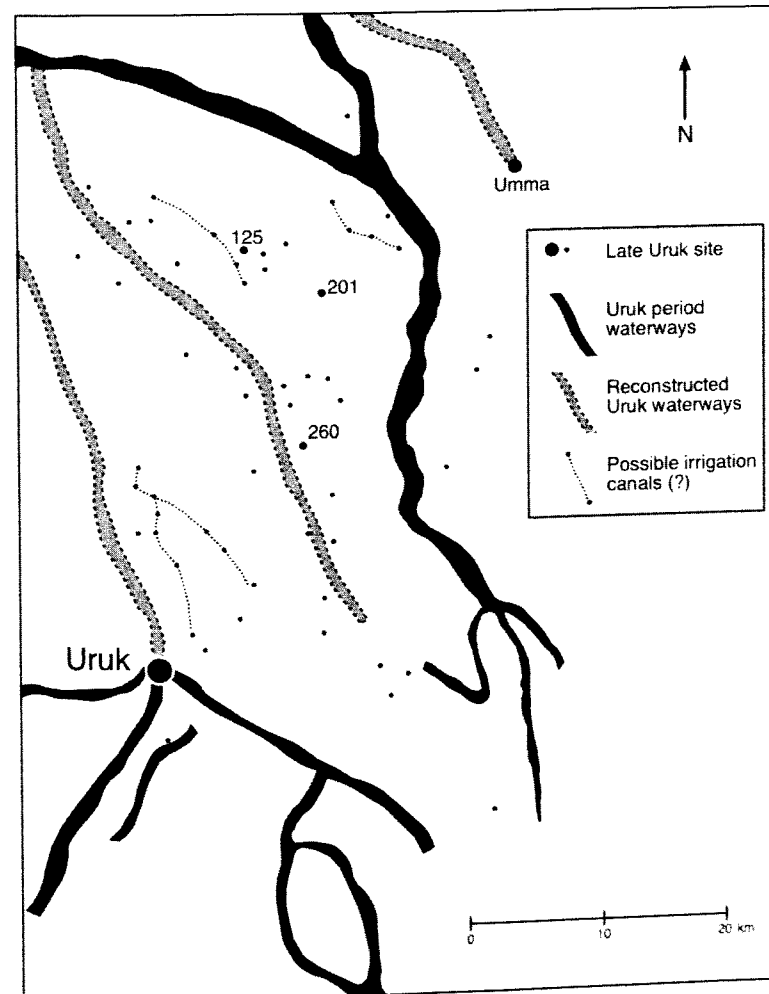


FIGURE 21. Location of Late Uruk period sites and principal waterways of the time in Warka survey area. Note the presence of linearly arranged villages, possibly indicating the existence of intervening man-made irrigation channels, in the alluvial plain between the main waterways of the time.

they represent the remains of specialized facilities for pottery manufacture lining the banks of two small intersecting manmade canals, no longer visible, which facilitated the transport of potting clay, wood, and other kindling for the kilns as well as the finished pots to and from nearby urban towns (H. Wright 1981b, 326, fig. 26).

Whether agricultural or industrial in purpose, the small manmade canals that started to dissect the alluvial plains of southern Iraq in the Uruk period served to extend the natural transportation advantages of the Mesopotamian landscape to areas beyond the natural flow of the rivers. In so doing, they reinforced ongoing urbanization processes in the alluvium. This effect, no doubt inadvertent, may be inferred from studies that clearly link reductions in transport costs of agricultural commodities in traditional societies to the expansion of existing agricultural boundaries and the movement of population into cities (Fujita and Krugman 1995, 520).

The third synergy is related to the preceding and arises from the conjuncture of two linked processes: the increasing density of the urban landscape of Uruk Mesopotamia during the second half of the fourth millennium and the expansion of Uruk colonies and colonists across the Mesopotamian periphery at that time. In an earlier chapter I noted that these processes are related in that both are partly explainable in terms of evolving patterns of trade between southern Mesopotamian societies and polities at their periphery. A further correlation between the two processes may now be added: both involved a multiplication of the number of interpersonal interactions possible at every level of the Uruk world system (Algaze 1993, 2005a). This included contacts between people in ever closer physical proximity to each other within the growing cities themselves, between city dwellers and peasants in surrounding dependent rural settlements, between the various independent but, no doubt, mutually communicative urban polities that dotted the southern Mesopotamian lowlands through all phases of the Uruk period, between those polities and associated colonial settlements abroad, and, lastly, between Uruk colonists and the preexisting indigenous peoples in the areas into which they intruded. As interpersonal interactions multiplied, information flow would have been enhanced. In turn, this radically improved the possibility that unforeseen technological improvements and inventions would emerge in Uruk cities and the Uruk cultural sphere as opposed to elsewhere in southwest Asia.¹

Why this should be so is explained by Gerhard Lenski (1979, 16), a sociologist, and Joel Mokyr (1996, 71), an economist. Employing arguments that elaborate on Myrdal's observation about the relationship between knowledge and innovation and that mirror, but in a narrower context, Spencer's and Jacobs's ideas about the inherently open-ended and self-amplifying nature of social evolution (chap. 3), Lenski and Mokyr note that technological innovation is essentially a process of recombining existing elements of information so that the rate of innovation is bound to rise as the store, diversity, and flow of information increase. At a minimum, this means that the potential for innovation in the Uruk world system must have increased at an exponential rate many times greater than the actual increase in the number of people in Uruk cities, dependencies, and colonies, or in the stock of information within early Sumerian culture itself. It is not simply that in a larger population there will be proportionally more people lucky enough or smart enough to come up with new ideas (Korotayev 2005, 80), but rather it is that with each doubling of the number of people in contact, the number of possible vectors of interaction is actually squared (Krugman n.d.).² In reality, however, the increase in possible new ideas would have been dramatically greater than the mere square of the number of people connected by the Uruk urban and colonial network because each person would have actually possessed multiple elements of information capable of recombination at different times, and because interaction may take place between multiple individuals or groups at any one time. Since these imponderables are beyond the reach of archaeological data, it is simply not possible to quantify with any degree of precision the actual increase in the probability of innovation within the Uruk world of the second half of the fourth millennium. However, it stands to reason that that increase would have more closely conformed to the parameters of a quadratic growth curve rather than to those of an exponential one (i.e., the number of individual *pairs* of elements of information potentially free to interact at any one time would rise foursquare with the squaring of their basic number).³

Technologies of the Intellect

As the web of interpersonal communications became increasingly dense in southern cities that, by the second half of the fourth millennium, were

growing many times larger than peripheral population centers, and that were embedded in ever wider networks of relationships with foreign cultures as a result of the Uruk colonial network, the likelihood that unforeseen innovations would arise in southern cities and that advantageous inventions would be quickly diffused among them was greatly enhanced. In the Mesopotamian case, this does not appear to have taken the form of any significant new material technologies, although a plausible argument can be made for the invention of the wheel in southern cities at this time (see Bakker et al. 1999 for references and a discussion of available evidence). Rather, as noted earlier, when it came to material technologies, Uruk centers were better at adopting innovations made by others than they were in creating their own. Minimally, this applies to wool weaving, metal smelting, and the use of domestic donkeys as pack animals.

Where the Uruk world excelled, however, was in the realm of what the eminent social anthropologist Jack Goody (2000) has termed "technologies of the intellect" and what the equally notable sociologist, Michael Mann (1986), has termed "technologies of power." In the early Sumerian case, these "technologies" primarily consisted of new modes of social control, most notably new and more efficient ways to organize labor, increase economic production, and process and disseminate socially useful information. These interrelated "technologies of the mind," so to say, were as much a part of the emerging "created landscape" of early Mesopotamia as the new Uruk period irrigation canals and, once developed, arguably became the single most important source of developmental asymmetries between southern Mesopotamia and neighboring areas.

Without doubt, one of the most salient among the ideational innovations of the Uruk period was the *systematic* use of various types of dependent laborers receiving rations for the production of subsistence and sumptuary commodities and for building and agricultural activities. Borrowing a page from V. Gordon Childe, we may use the term "labor revolution" to describe this new way to reliably convert the muscle power of the many into socially useful commodities benefiting the few. Underlying this transformation was a conceptual shift in the way some categories of human labor were looked at in southern Mesopotamian societies. Southern elites came to view and use fully encumbered laborers in the same exploitive way that human societies, over the immediately preceding millennia, had viewed and used the labor of domesticated animals. This represents a new paradigm of the nature of social relations in human societies. I suspect that a comparable shift in the way in which

human labor is perceived (and exploited) is integral to all cases of early state formation, but in reality we do not know exactly when this perceptual change occurred in the Mesopotamian case. All we can say for certain is that it had already taken place by the end of the Uruk period, as can be observed in the Archaic Texts. Scribal summaries detailing the composition of groups of foreign and nativeborn captives used as laborers describe them with age and sex categories identical to those used to describe state-owned herded animals, including various types of cattle and pigs (Englund 1995a, 1998, 176–81). Because these parallels are repeated in numerous texts, they cannot be explained away as either accidents or scribal idiosyncrasies. Rather, it would appear that the two classes of labor (captive "others" and domestic animals) were considered equivalent in the minds of Uruk scribes and in the eyes of the institutions that employed them. Early Near Eastern villagers domesticated plants and animals. Uruk urban institutions, in turn, domesticated humans.

While available documentation is not sufficient to quantify the contribution of encumbered workers to the economy of Uruk city-states with any degree of precision, it would appear that their number was significant (contra Weiss 1989). One recently published Archaic Text fragment (Uruk IV script), for instance, is a summary of several smaller individual accounts and refers to a total of 211 male and female captive laborers (Englund 1998, 178–79, fig. 66). Admittedly, there is no way to know how representative this tablet is. However, a crude but perhaps useful measure of the relative importance of slaves and encumbered workers to the portion of the Uruk economy that was being recorded by state scribes may be obtained by looking at the frequency of attestations of the pertinent signs for the various types of captive laborers in the Archaic Texts (5,820 complete and fragmentary tablets to date, including Uruk IV and III scripts). This can be done because the sumerologist Robert Englund (1998, 70–71, 176–78) has compiled a comprehensive list of every known use of each non-numerical sign in the Archaic Texts. His compilation shows that the second most frequently mentioned commodity in these texts was female slaves (SAL), with 388 attestations (for comparative purposes, barley, the most frequently noted commodity, had 496 attestations). To this must be added 113 attestations of laborers described as male slaves (KUR₃) who are often qualified further as being of foreign origin (i.e., from the mountains), and at least 159 attestations of laborers in temporary or permanent captivity described by

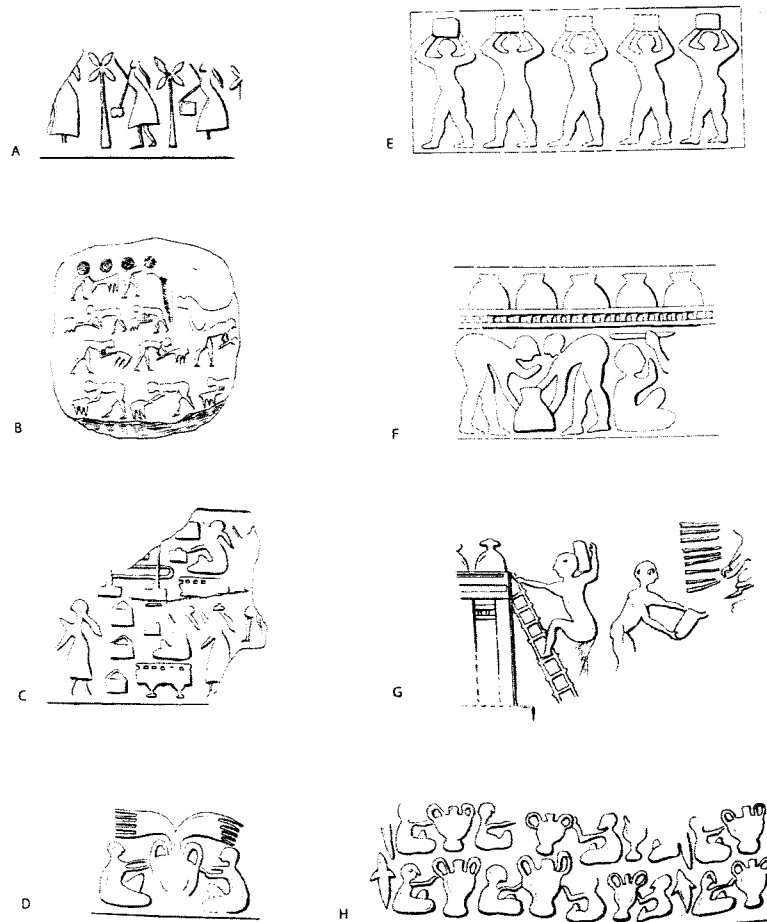


FIGURE 22. Uruk seal impressions depicting labor scenes. Agricultural labor (A, B, D, H); weaving (C); porters (E); filling of granaries (G, H). Not to scale.

means of the pictograms ERIM or SAG+MA, visually indicating that they represented some sort of yoked or shackled class of people (Nissen, Damerow, and Englund 1993, 74).

A less direct measure of the importance of encumbered labor to the Uruk economy may also be available. Many of the Archaic Texts record disbursements of textiles and grain to individuals and presumably represent rations given to some sort of fully or partly dependent workers (Englund 1998, 178–79, fig. 67). Again, the contribution of such workers

to the Uruk economy cannot be gauged with any precision. However, if we presume that Nissen (1976) is correct in assuming that the ubiquitous beveled rim bowls (fig. 23) were used as ration bowls, their incidence in Uruk cities in amounts so large that they frequently defy quantification suggests that the number of workers receiving state rations in return for their labor in southern Mesopotamia during the second half of the fourth millennium must have been quite substantial indeed.

In practical terms, the perceptual shift in how human labor was conceptualized meant that Uruk elites probably had a greater variety of encumbered laborers at their disposal than did their northern counterparts, that they could extract more energy from those laborers, and that they were better able to move them around as needed at little cost—an ability often identified as a key factor in economic development (Krugman 1995, 19). More important, it also means that Uruk elites could organize laborers in nontraditional ways so as to take advantage of increases in productivity and other economies of scale arising from (1) the specialized production of commodities and (2) the integration of procurement, production, and distribution activities in related industries (forward and backward linkages) under a single organizational structure.

The available archaeological record does provide evidence for these organizational quantum leaps. The start of specialized production of commodities, for instance, can be directly inferred from the well-documented shift to standardized ceramics that is observable throughout the Uruk period (Nissen 1976). The moldmade beveled rim bowls already noted are only one of the many mass-produced pottery types that become typical at this time. The overwhelming portion of the Uruk ceramic repertoire, in fact, consists of vessels made on the fast wheel by specialized producers. Comparable changes based on task specialization and standardization can also be seen in the way other commodities were produced at the time. As noted earlier, minimally this includes how wool was processed (Englund 1998; Green 1980; Nissen 1986) and metals cast (Nissen 2000).

Attempts to integrate economically related activities under a single organizational structure, in turn, are also inferable from available data. Just over twenty years ago, the archaeologist Rene Dittmann (1986) published an innovative study of the iconography of Uruk glyptic from Susa in which he sought to gain insights into how labor was organized and controlled at the time by plotting the associations and superimpositions of images within the corpus of sealings and sealed devices from the site.

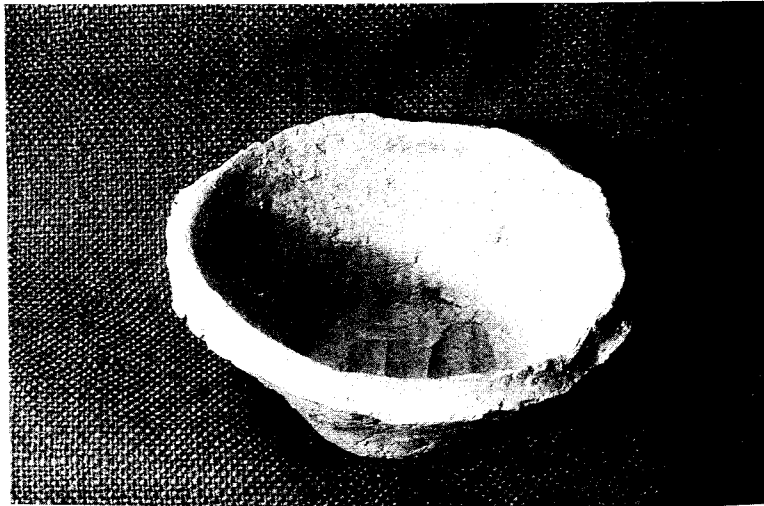


FIGURE 23. Uruk beveled rim bowl from Chogha Mish, Iran.

His basic premises were (1) that the glyptic represented the bureaucratic records of state administration in Susa, (2) that scenes depicting laborers performing specific productive activities stood for discrete organizational groupings recognized by the city's administrators, (3) that images depicting specific individuals and distinctive buildings associated with those activities stood for the institutions managing their labor and reaping its rewards, and (4) that the hierarchical relationship between the labor groupings and institutions alluded to in the seal narratives can be inferred when different seals are impressed on single devices, with later superimposed impressions reflecting the actions of higher level authorities.

Preliminarily, two broad sets of correlations are immediately apparent from Dittmann's work. At Susa, scenes depicting ideologically charged activities, such as combat and the performance of religious rituals, most commonly associate with a larger-than-life male figure typically thought to represent a "priest-king" or "city ruler," while scenes depicting various types of economic activities, such as agricultural labor and the storage of agricultural products, the transport of commodities, the herding of caprids and bovines, and the processing of wool and dairy products are most commonly associated, in turn, with buildings with niched façades, generally thought to represent temples and/or palaces on the basis of parallels with excavated architecture. It is this latter linkage that is imme-

diately pertinent to the present discussion. More specifically, the visual association in the sealed devices of particular institutional symbols and specific commodity production sequences, for instance, those depicting herding and the various stages of textile production (fig. 14), can plausibly be interpreted to mean that the benefits accruing from the vertical integration of sequential economic activities were well understood by whatever controlling institution or institutions were represented in the seals by the niched structures.

The second ideational technology appearing in Uruk cities by the second half of the fourth millennium is less ambiguous. Closely related to the changes in commodity production and labor organization just discussed, it consisted of new forms of record keeping that were exponentially more expressive than the simpler systems used by contemporary societies elsewhere and that were capable of conveying knowledge across space and time with much greater efficiency than any and all rival systems in existence at the time. This contention is borne out by a comparison of the very different glyptic, reckoning, and writing practices that were in use contemporaneously in southern Mesopotamian cities and peripheral polities during the second half of the fourth millennium.

Starting with the glyptic. Seal impressions on clay have traditionally accompanied the movement of goods across the Near East starting already in prehistoric times and were also used from the very beginning as an oversight mechanism for stored goods in the area. They served as a crude means of accounting identifying the senders of the commodities to which they were attached, the individuals or groups responsible for the storerooms that they sealed, or the individuals or functionaries disbursing stored commodities (Fiandra 1979; von Wickede 1990). Glyptic continued to be used in similar fashion well into the historic periods, and a substantial corpus of evidence exists for both early Sumerian and peripheral societies of the second half of the fourth millennium. For southern Mesopotamia, pertinent evidence is provided by thousands of cylinder seal impressions, and a much smaller number of actual seals, recovered in Uruk sites in southern Iraq and Khuzestan and in Uruk colonial settlements in northern Iraq, northern Syria, and southeastern Anatolia (Amiet 1961, 1972; Boehmer 1999; Delougaz and Kantor 1996; Pittman 2001; Strommenger 1980). A glyptic corpus of comparable size but consisting mostly of stamp seal impressions and seals is available from a handful of Late Chalcolithic sites across the north and northwest periphery of Mesopotamia, most notably Arslan Tepe in the Anatolian

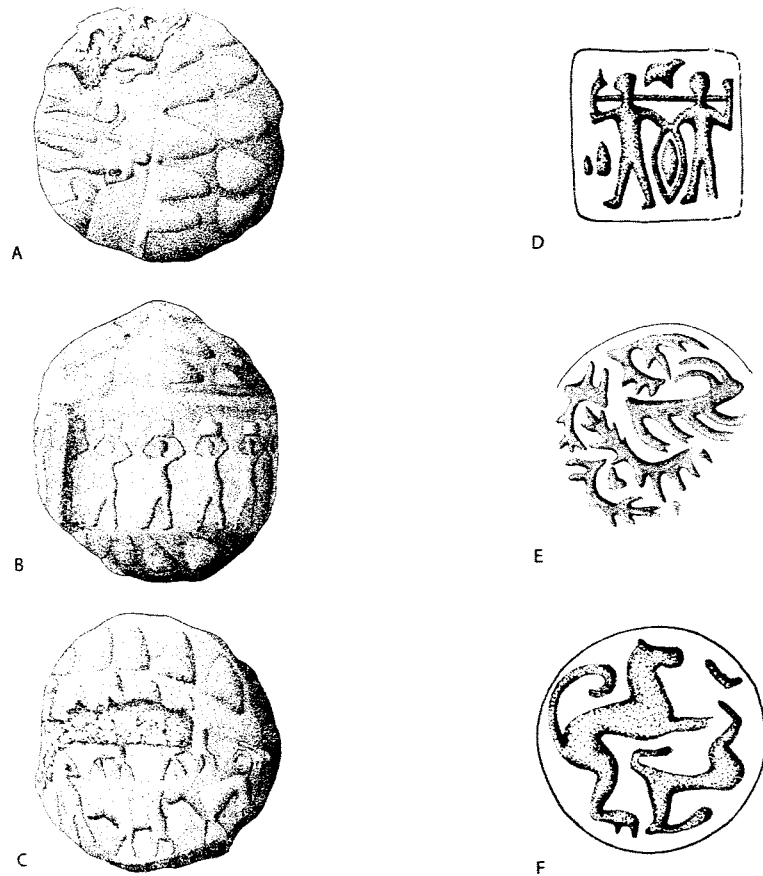


FIGURE 24. Middle/Late Uruk period impressed ball from Chogha Mish, Iran, showing the impressions of three different cylinder seals on its surface (A–C). Various Late Chalcolithic stamp seal impressions from Arslan Tepe VIA (D–F). Not to scale.

highlands (Ferioli and Fiandra 1983 [1988]), and Tepe Gawra in the Zagros piedmont of northern Iraq (Rothman 1994, 2002).

Comparing these two bodies of contemporary glyptic data is instructive. Immediately striking is the fact that owing to their larger size and lateral orientation, the cylinder seals used by southern polities in the second half of the fourth millennium lent themselves better to the expression of complex linear visual narratives than the smaller stamp seals of various sizes and shapes used by contemporary polities in the north.

Uruk glyptic was thus engineered to convey much more—and better organized—information than the glyptic used by their northern counterparts, a point made by Nissen (1977) many years ago and recently rearranged in greater detail by Schmandt-Besserat (2007). Equally important, the numerous mid- and late-fourth-millennium sealings found discarded at various locations within Late Chalcolithic levels at Arslan Tepe (periods VII and VIA) commonly bear the impression or impressions of but a single seal (e.g., fig. 24d–24f). A similar case obtains in the contemporary Late Chalcolithic levels of Tepe Gawra (Levels IX–VIII). At both sites, impressions of more than one seal on a single sealing surface are exceptional (Fiandra 1994, 168; M. Frangipane, personal communication, 1999; M. Rothman, personal communication 1999). In contrast, as noted earlier in reference to Susa, contemporary glyptic procedures in Middle and Late Uruk cities and their colonial outposts regularly exhibit the imprints of multiple seals, particularly in the case of balls and bullae (Delougaz and Kantor 1996; e.g., fig. 24a–24c). This difference in sealing practice decisively reversed earlier trends toward increasing complexity in glyptic use that had in fact favored the north until the first half of the fourth millennium (Oates et al. 2007, 593) and is relevant because the number of impressions of different seals in a single sealing gives us a glimpse of the number of agents and, possibly, witnesses involved in whatever transaction is being recorded. In addition, if Nissen (1977) and Dittmann (1986) are correct in seeing the seals as encoding information about the hierarchical ranking of specific authorizing individuals and the institutions they worked for, then the much greater frequency of complex devices with multiple impressions of different superimposed seals in Middle and Late Uruk centers can be taken as a proxy for the greater number of levels of bureaucratic control and accountability that existed within those centers, compared with the then much smaller northern sites (Pittman 1993).

An examination of ways of recording and disseminating information that transcend mere iconography reveals even more glaring disparities. Particularly telling is the fact that no Late Chalcolithic site has yet provided evidence for the existence of indigenous systematic reckoning and writing systems comparable in their complexity to those that evolved in southern Mesopotamian Uruk sites during the second half of the fourth millennium. This process started in earnest in the later part of the Middle Uruk period and the earlier part of the Late Uruk period (ca. 3400/3300 BC) with the introduction, in seemingly quick succession, of

hollow seal-impressed balls filled with tokens and seal-impressed numerical notation tablets (figs. 24a–24c and 22b and 25, respectively). The Late Chalcolithic counterpart to these southern devices are but a single unimpressed numerical notation tablet from “northern Middle Uruk” contexts at Tell Brak (fig. 26b) and a few rounded tallying slabs found in an indigenous administrative complex at Arslan Tepe (period VIA). The slabs (fig. 26a) have evenly sized indentations on their otherwise blank surfaces, presumably representing numbers, and apparently served as mnemonic devices (Liverani 1983 [1988], figs. 1–4).

Because the Tell Brak or Arslan Tepe devices were not impressed with seals, they carried only a fraction of the information that could be transmitted by the more elaborate token-filled balls and numerical notation tablets of southern societies at this time, which overwhelmingly relied on complex combinations of numbers and superimposed layers of iconic images (seal impressions). Moreover, unlike the more complex southern systems, the mnemonic devices of Late Chalcolithic societies were incapable of communicating any information beyond their immediate institutional and temporal context.

The divergence in the efficiency and complexity of the accounting and information processing systems possessed by groups in each of the



FIGURE 25. Seal impressed Late Uruk period numerical notation tablet from Chogha Mish. Scale indicated.

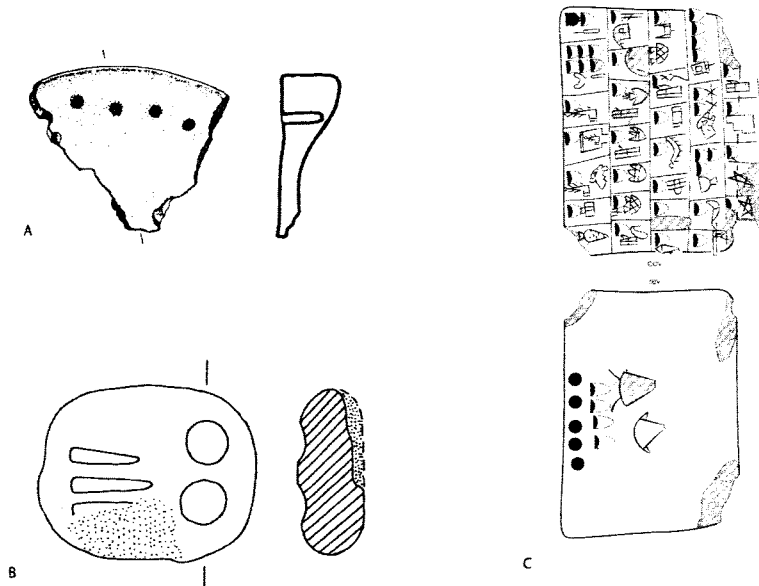


FIGURE 26. Late Chalcolithic numerical mnemonic device from Arslan Tepe VIA (A): unimpressed Late Chalcolithic numerical notation tablet from Tell Brak (B); and Late Uruk pictographic tablet from Uruk/Warka [cattle account: Uruk IV script] (C). Not to scale.

two areas (and, by inference, the differences in the scale and complexity of their economies) becomes particularly marked by the very end of the Uruk period (ca. 3200/3100 BC) with the appearance in the south of the earliest tablets with pictographic writing (i.e., the Archaic Texts in Uruk IV script: approximately 1,900 out of approximately 5,820 Archaic tablets and fragments [Englund 1998, 86]; e.g., fig. 26c). This took place contemporaneously with the Arslan Tepe VIA remains, as shown by available radiocarbon dates (Wright and Rupley 2001). Almost all of these pictographic tablets were simple accounts recording flows of commodities. They thus served the same basic function as the seal-impressed lumps of clay available to Late Chalcolithic societies and as the more elaborate impressed balls and numerical tablets of earlier phases of the Uruk period in the south. Even though these tablets are not fully comprehensible to us (Damerow 2006), they are profoundly revolutionary in terms of what came before. By using pictograms to represent objects amenable to illustration and as rebuses (singly or in combination) to denote abstract concepts and verbs not amenable to concrete depiction, these

tablets were now capable of recording commodity flows of significance to controlling institutions in a manner that allowed for the expression of nuances of time, location, persons involved, administrative action effected, and that was fully transmissible through space and time within the confines of early Sumerian culture. As Robert Englund (1998, 2004) has noted, even the earliest pictographic tablets show that by the end of the Uruk period southern scribes had developed the ability to abstract and summarize detailed data about collections and disbursements of goods and labor in a form usable by themselves at a later time, by higher-level supervisory officials at any time, and by later generations of similarly trained bureaucrats. The significance of this development was succinctly summarized by Michael Hudson (2004), who notes that “[b]y quantifying . . . resource flows, accounting became a management tool for forward planning” (see also Steinkeller 2004). Planning, in turn, allowed Late Uruk urban administrators to deploy available labor and resources so as to maximize their future revenues and power. In this sense, writing was a key component of the “labor revolution” of Uruk Mesopotamia alluded to above. To the extent that it was so, the renowned anthropologist Claude Lévi-Strauss (1964, 292) was disturbingly correct when he noted that “[t]he primary function of writing, as a means of communication, is to facilitate the enslavement of other human beings.”⁴

But the importance of writing in early Mesopotamian civilization went much further than accounting for resources at hand and planning for future gain. A small but critically important proportion of the earliest Archaic Texts consists of thematically and conceptually arranged word lists (“Lexical Texts”) that, no doubt, served as scribal training exercises. These compilations provide unique insights about many aspects of the material, social, and ideological world of early Sumerian urban dwellers that are not generally referenced elsewhere (Englund 1998, 2004). More to the point, they presuppose the existence of a formally constituted and self-perpetuating scribal profession (and class?) dedicated to the transmission of knowledge across generations. Aided by scribes, early Sumerian elites and institutions would have had better and more detailed access to the accumulated knowledge of earlier generations than their rivals in neighboring areas, where the lack of comparably accurate and efficient forms of communication systems meant that the past would only be known through fallible human memories and ever mutable oral traditions (Goody 2000).

Bluntly put, this meant that by the final phase of the Uruk period, the

web of interpersonal communications across the Uruk world was being thickened by interaction not only between the living but also, and for the first time in human history, between the living and the dead. Equally important, because writing is a form of “cognitive scaffolding” or “external memory” that permits individuals to perform cognitive tasks above and beyond those normally possible by the unassisted brain (Mouck 2004; Lévi-Strauss 1964, 291), the presence of a scribal class in Uruk cities guaranteed that, as a group, Sumerian elites would have been more likely than their peers elsewhere to possess the problem-solving tools and institutional memory that are needed to efficiently integrate larger populations and more diverse territorial realms, to successfully react to recurring environmental perturbations and social threats, and to profitably recognize and take advantage of opportunities for gain arising in a more unpredictable manner.⁵

There is no mystery to understanding why a scribal tradition first appeared in the context of early Mesopotamian cities that were fast-growing in demographic density and socioeconomic diversity. Studies of modern cities show that expanding population density commonly leads to a disproportionately large expansion in the size of communicative sectors of the managerial institutions in those cities. The reasons for this are explained by John Kasarda (1974), a sociologist, who notes that in human societies, as in biological organisms, increasing size exacerbates particular system problems and often results in disproportionate growth in sectors serving to solve those problems. According to Kasarda, the most critical problem faced by large-scale social systems is articulating communications between their parts. For this reason, as they grow increasingly large and diverse, complex societies divert an ever larger proportion of their human resources to collecting, processing, and transmitting information. Though Kasarda never considered the possibility that his insight could be applicable to premodern urbanism, the emergence of a scribal profession in the Uruk period is itself evidence that the managerial multiplier Kasarda identified for modern cities was at work in fourth-millennium southern Mesopotamia as well, where cumulative innovations in the way knowledge was manipulated provided the nascent city-states of the time with what, arguably, became one of the most important competitive advantages they possessed over contemporary polities elsewhere, in which comparable breakthroughs in accounting, accountability, classification, and access to information (current and past) appear to have been absent.

The Urban Revolution Revisited

Just as there is a connection between increasing population size and the likelihood that a culture will develop formal mechanisms and institutions to ensure efficient communications, increases in the efficiency of communication, once effected, themselves feed the evolving urban process. Economic geographers have implicitly understood this since the time of Adam Smith ([1776] 1976, 13–15 [I.i.1–3]), who observed that gains in the efficiency of communication always act as a spur for economic specialization and growth in human societies. At the same time, Smith also noted that equally important gains in economic specialization and differentiation could be obtained from reductions in mobility costs arising from advances in transportation efficiency. It follows logically from Smith's insights that human settlements will naturally tend to grow to the maximum size afforded by the technologies for communication and transportation possessed by their population at any one time and, further, that the introduction or development of new technologies to convey commodities and information will result in additional settlement expansion (Hawley 1986, 7). The reasons for this are explained by Amos Hawley (1986, 65–66), noted above, who observed that social units engaged in specialized functions are necessarily spread over space, which naturally decreases the efficiency of information flow and increases the cost of value-added production and services. Thus, increases in communication efficiency and reductions in mobility costs always result in gains in economic specialization and differentiation—processes that, as noted earlier, are central to the origins and growth of urban societies. It is not difficult to see how the Sumerian takeoff relates to the processes described by Smith and Hawley: it involved both enhanced communication efficiency in the form of new reckoning and writing systems and reductions in mobility costs as population across southern Mesopotamia became increasingly concentrated, production facilities consolidated, and production itself standardized.

A further source of savings in mobility costs must also be considered in any attempt to evaluate why the takeoff happened when it did: improvements in the facility for overland movement in and out of the alluvium in the Middle–Late Uruk periods as a result of the introduction of domesticated donkeys and, possibly, wheeled carts (Bakker et al. 1999). While these new transportational technologies were shared by a wide cross section of contemporary ancient Near Eastern societies (Kohl 2001) in the mid- and late fourth millennium, they must have affected southern Uruk

polities with disproportionate intensity. This is explained by the process of circular and cumulative causation, which implies that the adoption of a new technology, for instance, a new mode of transport, will affect societies with varying developmental trajectories very differently, depending on when exactly the technology is introduced in the cycle of mutual determinations that always exists between population growth, market size, innovation, and increasing returns from new economies of scale.

Against this background, it is easy to understand why the domestication of donkeys, which, when used in caravans, are capable of carrying substantially more cargo overland over much greater distances than unassisted humans, must have had a greater impact on Uruk societies than on neighboring Late Chalcolithic polities. Only in the south did advances in overland travel complement both the natural advantages in ease of transport of the area and the compounding of those advantages by the start of construction of modest manmade canals (fig. 21). Moreover, and more importantly, only in the south were both of these processes reinforced and compounded further by advances in commodity production using task-specialized labor and in the ability to transmit information accurately across time and space. Thus, southern societies would have been better situated than their competitors to profitably exploit the new opportunities for export provided by donkey caravans in the fourth millennium.

Some circumstantial evidence for the role of donkeys in Uruk trade actually exists. In a recent synthesis of available faunal evidence for equid remains in Upper Mesopotamia from the fourth and third millennia BC, Emmanuelle Vila (2006), a paleozoologist, notes that Uruk sites in northern Syria (e.g., El Kowm-2, Sheikh Hassan, Mashnaqa) generally exhibit higher relative frequencies of equid bones in their faunal assemblages than later Early Bronze Age sites in the same area, and this applies not only to immediately post-Uruk levels in small Upper Mesopotamian sites but late third-millennium levels in fully urban centers in the area as well, such as Tell Chuera, for example. She notes further that the majority of those bones can be identified as domestic donkeys (*Equus asinus*). A similar pattern appears to exist in Uruk sites on the Turkish side of the border, for instance, at Zeytinlibahçe Höyük, some 5 kilometers downstream from Hacinebi. Preliminary analysis of the faunal remains from the earliest Uruk level yet found at Zeytinlibahçe (two rooms forming part of a storehouse of Middle Uruk date built using rîemchen bricks) shows that asses appear to have been unusually common at the time.⁶ The site's excavator, Marcela Frangipane, interprets

this as reflecting “an emphasis on trading or movements of people and/or goods” (Frangipane et al. 2004, 40, figs. 11–12). In my opinion, this explanation is likely correct and is applicable not only to the Zeytinlibahçe data but also to the otherwise difficult-to-explain equid data found by Vila in Uruk outposts in Syria.

Be that as it may, by making it possible for southern traders and colonists to travel northward in large numbers while carrying loads of trade items for the first time, donkey caravans added fuel to a cybernetic process of economic development that had already been underway for centuries in southern Mesopotamia but that had until then been based largely on intraregional trade.

CHAPTER NINE

Conclusions: The Mesopotamian Conjecture

As by means of water-carriage a more extensive market is opened to every sort of industry than what land-carriage alone can afford it, so it is upon the sea coast, and along the banks of navigable rivers, that industry of every kind naturally begins to subdivide and improve itself, and it is frequently not till a long time after that those improvements extend themselves to the inland parts of the country. —Adam Smith, *The Wealth of Nations*

If anything is clear from the foregoing chapters it is that we must acknowledge that processes of social evolution are always the result of both regional and transregional patterns of interaction (Kohl 1987b). A case in point is provided by the roughly parallel development of early state and urban polities in Upper and Southern Mesopotamia during the first half of the fourth millennium BC. Because complex social systems can neither exist nor evolve in isolation, and because there is in fact substantial evidence for contacts between these two areas going as far back as the Neolithic period (H. Wright 1969; Connan 1999), this lockstep development is best explained as the result of processes of competitive emulation fueled by interaction between otherwise independent polities in the two regions. In this, the formative phases of Mesopotamian civilization now appear similar to those of Mesoamerica with its multiple but distinct regional traditions of social complexity (the Maya, Monte Alban, Teotihuacan) developing independently but roughly in tandem as a result

of comparable socioevolutionary processes made widespread by extensive long-distance contacts (Marcus 1998).¹

When seen against this background, the Sumerian takeoff and the intrusion of Middle and Late Uruk settlers into parts of Upper Mesopotamia represent, in fact, a sharp reversal of the preexisting historical trajectory of northern societies. If we are to understand why the balance of urbanization, social complexity, and power in the ancient Near East shifted so decisively to the southern alluvial lowlands of Mesopotamia in the second half of the fourth millennium BC, we must delineate the sequence of mutually reinforcing necessary and sufficient conditions that came together in the south at that time but were absent (in the aggregate) from neighboring contemporary social groups. Only then can we begin to elucidate why the Sumerian takeoff took place at all, why it occurred when it did, and why comparable developments failed to materialize in Upper Mesopotamia, an area that only a few centuries before had appeared as poised for an urban takeoff as the south or elsewhere in southwest Asia.

Early on the stage was set by advantages in productivity, reliability, and ease of transport inherent to the "natural landscape" of southern Mesopotamia. Absent in the aggregate from neighboring regions, these advantages can be considered as the initial set of necessary conditions in the conjuncture. No doubt, the most important of these advantages was ease of transport. As the economist Pierre Desrochers (2001b, 31) insightfully notes, "[T]he overwhelming fact about past trends is that a general reduction in the transportation costs of both goods and information has always tended to encourage geographical concentration rather than discourage it."

The divergent developmental sequences of southern and northern Mesopotamia through the fourth millennium are very much a case in point. The centrality of transport in structuring this divergence becomes clear when we contrast the two areas at the time and the locational circumstances of the main settlements in each area. Those of the south, as already noted, invariably lined the banks of waterways. So, for that matter, did many of the known large Late Chalcolithic settlements across the north. Nineveh, Brak, and Samsat, for instance, are all situated along the principal navigable waterways crisscrossing the area. Each controls a historical fording place where the principal east-west overland routes across Upper Mesopotamia intersect the rivers (Algaze 1993 [2005a]). Paradoxically, however, water transport, the same factor that fostered

interaction between early centers in the closely intertwined fourth-millennium fluvial system of the south, limited interaction in the north, where the major waterways were both quite distant from each other and too deeply incised for multiple channels to exist or to allow for the construction of artificial canals linking the cities to their hinterlands.

The vast intervening plains across the north also impeded both interaction and agglomeration, at least in comparison to the south. The historian Edward Whiting Fox (1971, 25) reminds us quite clearly that geography matters in history, because the units of economic organization cannot be larger than the radius of practical transport prevailing at any one time, and because that economic radius will, more often than not, limit the extent of regular social contact. Thus, even after the introduction of donkeys and carts in the mid-fourth millennium, limitations inherent to overland travel across the Upper Mesopotamian plains imposed enduring natural limits to population agglomeration away from the rivers (Wilkinson 1995). Whereas geography in the south both permitted and encouraged linearly arranged agglomerations based on boat and barge transport, and whereas irrigation agriculture provided the practical means to support such enlarged populations, the geography and rainfall patterns of the northern plains encouraged population dispersal instead so as to maximize the amount of territory under cultivation. Thus, without a way to defeat the friction of overland travel by means of more efficient communication, *in the aggregate*, the geography of the northern plains naturally tended to foster smaller agglomerations than were possible in the south, and significantly more dispersed ones as well.

Under these circumstances, a critical mass of compact and closely interacting peer polities such as existed throughout the Uruk period in alluvial Mesopotamia failed to form across the hinterlands of northern Mesopotamia as a whole in the fourth millennium. Absent this critical mass, processes of intraregional exchange, competition, and emulation would have been less likely to occur in northern Mesopotamia than was the case in contemporary southern Mesopotamian societies. At the same time, however, northern societies would also have had both less need and less ability than their southern counterparts to engage in bulk external trade with its many social ramifications. Less need because Upper Mesopotamian societies were generally situated in areas closer to the principal bulk resources they needed, such as timber for instance, which could therefore be obtained locally without substantial organization. And less ability, because the means of transportation available to

northern societies away from the rivers simply did not lend themselves to the cost-effective movement of anything other than low-bulk, high-value exotics. In contrast, for southern societies, the rivers provided a particularly efficient mode of channeling and distributing both episodic trade in exotics and recurring transfers of bulk commodities.

Accordingly, the initial protourban social systems of the north were not likely to expand significantly in size beyond a certain threshold, because of the "tyranny of friction" or, when they did, as in the thus far unique case of Brak, they were not likely to endure. Nor were the early northern centers likely to significantly enhance their productivity relative to that possible in the south because they lacked the critical mass of closely packed populations to permit much specialization of labor or to encourage the development of new, more complex technologies of communication, such as proved fundamental for the Sumerian takeoff. This left an indelible mark on the historical development of the north because those types of social synergies were in fact precisely what was required in order for northern social systems to successfully circumvent the inherent constraints of their geographical framework.

Indigenous city-states comparable (in complexity, if not always in scale) to those that had thrived in the south since the fourth millennium did emerge across the Upper Mesopotamian plains sometime just before the middle of the third millennium (Weiss 1990; Wilkinson 1994), eight hundred years or so after the Sumerian takeoff. This time lag reflects the operation of processes outlined by Adam Smith in the epigram that introduces this chapter, whereby economic activity and its multipliers first arise in coastal/riverine areas as a result of advantages provided by cheap transport and only at a later time diffuse into inland areas where higher transportation costs prevail. Indeed, it was only by adopting forms of economic production and social organization derived from southern models and, eventually, by embracing full-fledged southern-style writing systems (Postgate 1988), that Upper Mesopotamian polities of the Early Bronze Age were able to marshal the organizational efficiencies needed to overcome the natural friction of overland travel across their hinterlands that had prevented their Late Chalcolithic predecessors from forming enduring regionally organized societies such as emerged in the south.

Stated simply, the initial—and precocious—experiment with urbanism in Upper Mesopotamia represented by sites such as Brak in the first half of the fourth millennium ultimately failed because urbanism in the north was only possible as a created landscape: it became viable only as

a result of innovations in communication and labor control created elsewhere. In southern Mesopotamia, on the contrary, urbanism was a logical outgrowth of natural and socially created synergies that compounded and reinforced each other from the very beginning.

In the end it turns out that the sociologist Karl Wittfogel (1957), who initially noted the close correlation that exists between early Old World civilizations and major river systems, was right but for the wrong reasons. Rivers were indeed central to the development of early Mesopotamian civilization, but not so much as a source of irrigation water, as he argued, but rather because of their role as conduits of transportation for subsistence commodities, building materials, necessary resources, and sump-tuary goods. After all, in Mesopotamia as along other old world river basins where pristine civilizations formed, cities emerged not at random along the courses of the rivers but rather in fertile areas downstream, where a minimal threshold of access to local agricultural resources was ensured and where, more importantly, transport costs were lowest and access to diverse resources within the river's watershed and information about them was highest (Bairoch 1988, 12). This is not a particularly new conclusion in the context of ancient Mesopotamia. Forty years ago, in his study of canals and irrigation in Umma at the time of the Ur III Empire, the assyriologist H. Sauren (1966, 36) concluded that the role of canals in allowing for efficient transportation within the empire was as important as their role as conduits of irrigation water. Sauren's conclusion is as valid to discussions of the origins of ancient Mesopotamian cities as it is to the analysis of early Mesopotamian imperial administration. Though there are exceptions (mostly so-called disembedded capitals established *de novo* by political fiat), the importance of rivers and waterborne transport to the emergence and growth of many urban societies is elegantly explained by Felipe Fernández-Armesto (2001, 182), a historian, who notes "civilizations of scale can only be built with concentrated resources. Resources can be concentrated only by means of good communications. And for almost the whole of history, humankind has depended for long-range communications on waterways."

And yet, natural advantages derived from geography and environment do not explain in and of themselves the crystallization of early Mesopotamian civilization—or that of any other pristine civilization for that matter. In the final analysis, environmental and geographical factors are only permissive, not prescriptive. Whether individuals and groups react to environmental changes and take advantage of geographical possibilities.

and how they do so, are always constrained by culturally determined perceptions of opportunities and threats at any one time. These, in turn, are partly shaped by available technologies and capital (both human and material). Moreover, the present is also shaped from the past by inherently unpredictable accidents and innovations that add an element of indeterminacy to any attempt at historical prognostication (or explanation). For these reasons, history displays a wide range of results of the interaction of societies and their environment, and this range can only become greater and more unpredictable as the density and intensity of social interactions grows in increasingly complex societies. Nonetheless, environment and geography do constitute important selective pressures that often impose an important measure of directionality on human affairs, as Edward Fox (1971, 1989) has repeatedly and persuasively warned us. The reason for this is explained by Joel Mokyr (1990), who notes that environmental factors commonly act as "focusing devices" that limit the range of options that are perceived as viable by individual societies at any one time and that powerfully influence the direction that those societies take in their search for technological innovations.

Against this interplay between indeterminacy and directionality, the natural advantages of the southern Mesopotamian landscape merely provided a backdrop wherein some social responses became more likely than others. In light of the diversified but dispersed resources prevalent in southern Mesopotamia throughout the late fifth and fourth millennia BC, and given the naturally reduced cost of mobility in the area, one of the most probable such responses was for pre- and protohistoric elite individuals and groups to specialize in the production of a limited number of commodities for which they had comparative advantage owing to their location within the alluvial environmental mosaic of the late fifth and fourth millennia and to engage in trade with differently specialized local rivals from relatively early on. By the same token, the absence of important necessary resources from the Mesopotamian environment, most notably roofing-grade timber and metals, also made it likely that early southern elites would seek to engage in trade with foreign counterparts in areas where such resources occurred naturally. This, however, had to await, first, the accumulation of surpluses, human capital, and productive capacity accruing from the earlier stage of largely internal exchange, and second, the domestication of the donkey, which both enlarged the geographical horizon of southern elites and physically enabled them to engage in bulk export trade for the first time in their history and

to establish colonies in far away strategic locations of the Mesopotamian periphery.

We can only speculate about the historical consequences of these early patterns of trade, but I would suggest that their self-amplifying social ramifications would have created a situation in which the parallel development of multiple competing independent centers was a likely outcome, which may well help explain why competing city-states continued to be the most characteristic political formation of alluvial Mesopotamia long after the end of the Uruk period. However, while trade may have been a powerful force underlying the emergence of such centers, it was by no means the only form of interaction between them, as is shown by the fact that martial themes, the taking of prisoners, and even scenes depicting sieges of fortified cities are repeatedly depicted in Uruk iconography (e.g., Amiet 1961, pls. 46–47, nos. 659–61; Boehmer 1999, fig. XXVI, pls. 11–27; Brandes 1979, 117–73, pls. 1–13; Delougaz and Kantor 1996, 146–47, pls. 150–51). Indeed, it stands to reason that as external trade grew in importance through the Uruk period, competition over access to trade routes would have increased. In an earlier chapter I argued that competition between the emerging city-states of Uruk Mesopotamia for access to external resources may well explain many aspects of the "Uruk expansion" into southwestern Iran and various parts of Upper Mesopotamia. Here, it may be added that such competition was likely also a prime source of conflict within the alluvium itself, as probably depicted in the glyptic. This matters because, as already noted, political fragmentation, economic competition, and warfare often promote accelerated social change. A case in point is suggested by Patricia Crone (1989, 161), who argues that political fragmentation and interpolity competition were crucial for what she perceives as the unique vitality of developmental rates in European polities of the late medieval and early modern eras as compared with those characteristic of other areas of the world at that time: "Far from being stultified by imperial government, Europe was to be propelled forward by constant competition between its component parts." Such is likely to have been the case in ancient Mesopotamia as well.

In any event, in turning to trade and colonization earlier and more intensively than neighboring societies, elite individuals and institutions in alluvial Mesopotamia surely had no understanding of the long-term developmental consequences of the actions they were undertaking. Rather, trade simply became an efficient way to accomplish in the southern

context what elites naturally want to do in all human societies, namely, sanction existing social inequalities, extend the amounts and varieties of commodities and labor at their disposal, and increase their political power.

In this light, the Sumerian takeoff became, in effect, an unanticipated consequence of long-term trade patterns that differentially favored the development of societies in the alluvial lowlands of Mesopotamia over polities in neighboring regions. This trade was inherently asymmetrical in its impact because, with some exceptions, it involved the import of raw or only partially modified resources from highland areas of the ancient Near East that required further processing before they could be incorporated into the economies of southern cities and the export of multistage value-added manufactured commodities from those cities. At first, the trade was spurred by differences in productivity that favored the south and that were largely the result of geographical and environmental factors—what Cronon refers to as the “natural landscape.” Once a significant measure of exchange was in place, however, further conditions expanding and compounding the competitive advantages of Sumerian societies now arose mostly from the “created landscape” ensuing from the social ramifications of the trade. One such condition was provided by synergies derived from the greater density of population in rapidly urbanizing Uruk polities possessing ever larger markets and ever larger and more diverse pools of skilled and unskilled labor, usable, as needed, for commodity production, or building or agricultural activities, as soldiers engaged in warfare against local rivals, or as colonists and emissaries sent to faraway lands.

In turn, synergies derived from greater density and larger labor pools were compounded and expanded by the only sufficient conditions in the conjuncture: socially created organizational efficiencies delivering ever increasing returns to scale from an ever more specialized labor force and allowing for exponentially more efficient and more accurate ways of conveying information across space and time. More than anything else, these social innovations, which took place, no doubt, within the context of palace and temple “households” controlling substantial resources and labor, explain why complex, regionally organized city-states emerged earlier in southern Iraq than elsewhere in the Near East, or the world.