Comparative Perspectives and Early States Revisited

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The lectures and seminars organized by The Center for Historical Research are offering opportunities to reexamine the histories and cultures of statehood in past societies and opening doors to new ways of thinking about "political forms, powers, and cultures." In this paper, I focus on the theories of V. Gordon Childe and Karl Wittfogel. The paper is a supplement to the other readings assigned for the seminar, in which I examine their theories based on the results of comparative archaeological studies.

Preliminary to this paper, I submitted a chapter ("Cognitive Codes and Collective Action at Mari and the Indus") in which I offered two Old World case studies based on theories developed by Richard Blanton (and colleagues). I also reflected on the major changes in our understanding of power structures in early states and referred to the concepts exclusionary and corporate strategies, hierarchy and heterarchy. As additional reading, I included Blanton's paper, "Cooperation and the Moral Economy of the Marketplace" published in 2013. In addition, my book, the Ancient Indus: Urbanism, Economy and Society, is available in the seminar library and provides some details on the Indus civilization. Its contents reflect the results of renewed archaeological excavations and surveys conducted throughout the Indus at the time I wrote the book and focused principally on research at Mohenjo-daro and at Harappa. Since that time new projects have been initiated and they will be touched upon in this paper where relevant. My analyses in the book and this paper are based primarily on material patterns viewed at different scales of analysis. They reflect on the complex ways in which Indus people engaged in everyday practices that were not administratively controlled.

Seminar Themes, New Approaches and the Indus Civilization

In distinction to earlier studies of states in which they were viewed as a single body that lacked engines and gears, current analyses give emphasis to an infrastructural base comprised of mid and lower level contributors as the forces that moved state's forward. My argument centers on cooperation, collective action, and networks, drawn from archaeological field research in the New and Old World, as core elements of state infrastructures. A view inclusive of these factors results in a more holistic understanding of early states in which one size does not fit all. Based on a comparative study in which the works of V. Gordon Childe and Karl Wittfogel are evaluated in the context of recent research in Mesopotamia, the Maya, Teotihuacan, and the Aztec, my primary case study is the Indus civilization, where artisans, merchants and agriculturalists formed the core of the civilization's infrastructure.

The new approaches, theories and concepts introduced in the general anthropological literature have changed our perspective on the Indus political economy. 1. First, studies of the Indus landscape, remote sensing data, and agro-pastoral studies have called attention to the civilization's ecological diversity. Its river system was not restricted to t he Indus Valley in Pakistan but extended into northwest India where it was joined by a second river system, the Ghaggar-Hakra, that flowed into the Lower Indus valley and ran parallel to the major Indus channel. Settlements situated on these rivers systems were landlocked. Other sub-regional polities were located along the coast of the

Arabian Sea, where they co-existed with Indus settlements. 2. Second, the overall rejection of the evolutionary ideal that civilization's developed in parallel over vast territories is in sharp contrast to the results of current Indus research that show regional variability in social organization and levels of complexity. 3. Third, the new theories and concepts stand as a ready comparative base from which to examine questions of hierarchy and heterarchy, exclusionary vs. corporate strategies, diversity of specializations and economies, consensual and [or cooperative net-worked decision making]self-organized political and economic infrastructures that were connected through collective action and social and economic networks. In this paper, I will address the third issue; for those interested in ecological and social variability throughout the Indus should consult Chapters 5 and 9 The Ancient Indus. References to these chapters and to sections in the Cognitive Codes paper are included here.

In the following, I evaluate Childe's theory against recent research in Old and New World contexts. These sections are followed by a discussion of Wittfogel's concept of water management in the light of the significance of water and its control in Mesopotamia, the Maya, Teotihuacan, the Aztec, and the Indus.

Comparative Studies and Evolutionary Theories

Craft and Water Management -V. Gordon Childe and Karl Wittfogel

Childe and Wittfogel viewed the development and control of certain technologies as primary vehicles that would lead to the social control and centralization of political economies. As is well known, for Childe they focused on a developed agricultural economy that offered the control of surplus production, whereas for Wittfogel, it was the management and control of water supplies. Looking back on their theories in the context of current comparative analyses, they viewed early states as powerful machines that drove self-aggrandizing leaders to consolidate political organization but ignored populations at the mid and lower level that moved civilizations forward and sustained them.

Childe. A Comparative Perspective

The theories and attribute lists developed by V. Gordon Childe are an enduring legacy that continues to influence archaeological studies. Re-examination of his long-held views is essential to an understanding of the intellectual history of archaeological research. Strongly influenced by Karl Marx, Childe focused primarily on the economic base of societies which he cast as sets of stages in human progress toward civilization. He famously set these in revolutionary terms, as Neolithic and Urban Revolutions, two technologies that were vehicles in the progression toward complexity. The Neolithic engine was the cultivation of plants and animals with its promise of a stable food supply and surplus sufficient to sustain densely populated settlements. Childe favored inventions such as monumental buildings, recording systems, useful sciences with which to administer revenues, and sophisticated art styles as the essential benefits gained from surplus production, but it was the development of craft specialization that provided the wherewithal of social and economic change.

The invention of new technologies were key factors in economic progress because they provided the power base from which elites could realize their personal ambitions (Trigger 1978, 200ff.) by controlling a productive labor force. In this view, the control of production, distribution and exchange, drawn from his knowledge of Mesopotamian administrative accounts and generalized to other societies, was accomplished by

exploiting an "army of specialized craftsmen" in which a concentration of social surplus allowed for the emergence of full-time specialists (Kohl 1996, 40). The control of specialist production effectively usurped the means of production and distribution from kin-based authorities thereby eliminating a competing power base. Inherent in the process was the absolute degradation of the population and concentration of wealth in the hands of a few. Urbanism, long-distance trade, and successive regimes naturally flowed from this framework.

Comparative Studies of Mesopotamia and Mesoamerica

There are major differences between these early views and more recent studies. Childe's macro-view of history failed to probe beneath the surface to investigate the "full range of networks, institutions, and relationships in which the whole population was implicated," (Adams 2004:50), thereby leaving out questions of diversity and the internal dynamics or social actions that lay beneath the bureaucratic accounts (Wright 2010). In the Near East and elsewhere, concentration of excavations on high mounded sections of sites, a search for monumental architecture and precious objects contributed to a biased data base and a distorted view of the history of early societies.

Evaluating the Mesopotamian Model

Recently translated documents from southern Mesopotamia (Ancient Babylon) and changed methodologies in archaeology are transforming conceptions about control in the Near East. Childe's understandings of the region's development and the early settlement in southern Mesopotamia became the model for a highly centralized state and the monopolization of labor. While recently translated texts indicate that some resources and labor were monopolized much as Childe had envisioned, they also have documented the activities of masses of people and "records of the common man" (Englund 1991:6). The administrative texts from Mesopotamia list large numbers of occupations in which people engaged in a variety of crafts. Men and women are listed as "reed weavers, wood workers, leather workers, bakers and cooks, potters, malters, brewers, shipwrights, basket makers, rope makers, and fullers" (Waetzoldt 1987:121) as well as copper smiths, gold and silver smiths, and felters (Steinkeller 1980).

Some of the craft workers were attached to temple and palace organizations, while others worked independently. The process of recruitment was not uniform. Comparisons of specialists in different cities attest to an organized force that was based on conscripted laborers who worked in administrated workshops and others engaged in independent production that was carried out in households. Some craft workers were slaves obtained as booty in military victories, principally millers and weavers. They labored under the most repressive conditions but it was not the norm. Many craft specialists (potters and foresters for example) were conscripted on a seasonal basis, were not attached full-time to administrative workshops, and were free to engage in independent production (Steinkeller 1987, 1994, Wright 1996). Metallurgists who worked in a highly specialized technology producing prestige and utilitarian bronze and copper objects were free to distribute some of their products without intervention from the state (Neumann 1992). The documents are drawn from many different cities and though they demonstrate significant variation in levels of control and independence, "the overwhelming majority of craftsmen in certain periods (Ur III) [may have] worked at home, in their own workshops" and to a large extent were independent from the state (Steinkeller 1996, 252; also see Zettler 1992, Wright 2008).

The archaeological evidence offers a more extended view of craft production than the administrative accounts. This evidence shows that in household dwellings in the earliest settlements in the south (approximately 5,000 B.C.), tools and by-products from craft production were found in individual houses (Pollock 1999, 87). This pattern continued into later periods. In the Early Dynastic Period (2600 BCE) production tools for spinning and weaving along with other crafts were found in individual houses; in the following Akkadian (ca.2300 BCE) at Tell Asmar, a residential quarter included evidence for textile production as well as sculpting, engraving, lithic production and woodworking for household consumption (Pollock 1999, 137). Crafting tools were present at rural settlements outside of large cities (Adams and Nissen 1972). Finally, in the Old Babylonian period (mid-18th century BC) at the site of Abu Duwari (Stone and Zimansky 2004) ceramic, copper and cuprous slag, chipped stone debris, grinding stones and polishers, and bitumen (used as an adhesive and waterproofing) were dispersed throughout the city and residential areas (Stone and Zimansky, 62ff.).

Childe's prediction that surplus production and the development of craft specialists would provide a foothold for self-aggrandizing leaders to take control of the political economy is partially supported by the texts. The administration did derive power from the consolidation of certain crafts under their control in state-administered workshops. However, the recent re-examination of the texts and archaeological evidence has demonstrated that independent production was more the norm than attachment to a temple or palace workshop. Text also have shown that private and disposal property was held by local merchants and craft producers (Wright 2008)

Craft Specialists in the New World

. In preparation for this paper, I compared the results of craft specialization in the New World states of the Maya, Teotihuacan and the Aztecs because they revealed an amazing array of different organizational forms and the relevance of craft specialization to the power base of early states. Childe actually had little interest in states like the Maya, because he did not view them as a high culture.

A pattern common in Mesoamerican societies was the practice of multicrafting, a concept introduced by Kenneth Hirth (2009). Multicrafting contrasts with the division of labor and separation of production known from the administrative texts in southern Mesopotamia. However, it has much in common with the archaeological evidence from the residential settings at Tell Asmar and other sites, though the term multicrafting has not been used by Near Eastern scholars. In Mesoamerica, multicrafting occurs in a residential space, which could be an independent household or one attached to a major institution. It simply refers to production of many different crafts within the context of a common space, which could be courtyard, plaza, or other workplace (Hirth 2009). What is distinctive about it is that the work of specialists occurs in the context of domestic activities that co-exist with various forms of craft production. Men and women, kin related and unrelated individuals worked together in a system of negotiated responsibilities and social networks.

There was much variation in the types of objects produced, the control of their production by elites, the political or economic status of producers and their ability to distribute their products. Many of the skills possessed by the specialists required high levels of technical skill as Childe predicted. However, their attachment to centrally controlled workshops was not incompatible with periods spent working independently,

either for household consumption or for purposes of exchange. A general consensus is that specialists, to be discussed in more detail below, whether attached to administered workshops or engaged in production independently, often achieved substantial gain in economic or political status through their control of the production and distribution of their products and in some cases, had access to markets. Whether this means that major institutions lacked the power base Childe envisioned will be discussed at the end of this section and again, at the end of the paper.

The Maya

Many of the excavated Maya sites are ceremonial centers. They include palatial estates built around residential plazas. These large open spaces or courtyards were devoted to ritual feasts and meals controlled by high status families. Stelae commemorating the deeds and genealogies of Maya lords were placed in prominent spaces. The representation of blood relations in monumental imagery, the passing of sacred bundles and blood letting witnesses by individuals of the same lineage, and the burial of ancestors in compounds (McAnany 1994), indicate that displays of lineage bonds were critical to the identities of rulers and to strategies that enhanced and perpetuated the society (Gillespie 2000).

The Maya house structure was the basic building block of the society and its social organization. Its settlement plan was replicated at all levels of society, forming a symbolic template that mirrored the ceremonial settlement plan adopted by rulers (Demarest 2004). Typically, it included a courtyard grouping that consisted of two to four platforms with huts facing in an open courtyard or plaza. Areas of production (storage, sleeping) could be separated by internal rooms or take place in separate structures. As noted above, even royal palaces faced courtyards in the rectangular arrangements known from plaza groups.

A form of attached specialization that differs markedly from what Childe envisioned is best exemplified by the evidence from the Maya site of Aquateca (ca.600-830 A.D.). Aquateca is a ceremonial site, where "courtiers of the highest rank" (Inomata 2001, 329) lived and produced a variety of objects, some of which may have been controlled by the local lord. One example is from the so-called, House of Scribes, where mortars, produced from several different types of stone – chert, sandstone, limestone, igneous rocks—were found in association with pestles used for pigment preparation for writing. Other materials included shells, crafting tools of chert and obsidian, stone axes and obsidian. Debitage from human bone and shell working was present along with finished ornaments of the same materials. One of the shell ornaments included the title and name of the owner of the object. Alongside of the scribal implements, there was evidence for tools used in textile production, a craft known from written sources to have been conducted by females, and were located alongside of the scribal implements. A second example is from the House of Mirrors, also located in the ceremonial center. While the objects being produced were of the same type, the craft specialists used different materials and techniques. Mortars and pestles were made exclusively of chert and different types of paints were used for producing objects similar to those in the House of Scribes. The House also included polished stone axes, plaster smoothers, bone artifacts, alabaster pieces used for royal headdresses, and 200 pieces of a pyrite mirror.

What can we say about the nature of these specialists and their connection to Maya rulers? Judging by their proximity and the nature of objects produced, Takeshi

Inomata, the director of the excavations, believes that they were very close to the ruler (possibly related) and that their attachment to royalty likely included other activities. For one thing, production output was low judging by the quantity of associated debris, a factor suggesting that the individual engaged in part-time production and may have been aided by apprentice assistance. The two worked collaboratively in a multicrafting arrangement as members of the household. Additionally, it is known from iconographic descriptions that individuals associated with the court could engage in administrative tasks, diplomacy, or ceremonial activities. Each of the above indicates that beyond the technical skill involved in production, the craft producers in these royal settings possessed a deep understanding of religious ideologies. If so, the mastery of the symbolism behind the objects they produced could "lead to political power" (Inomata 2001, 332).

The production of important ritual objects was not restricted to elites or individuals close to the ruler. Brigette Kovacevich (2013) offers examples from Copan and Cancuen (ca. 650-810 A.C.) in which elites and non-elites engaged in the production, distribution and consumption of jade objects which circulated in institutional and domestic spheres for consumption and for gifting. At Copan multi-patio compounds produced a similar range objects, suggesting a uniformity of social groupings among patio groups in compounds. In some patio groups, both elites and commoners engaged in shell carving that was produced for the royal court (Aoyama 1995, 1994). At Cancuen, Kovacevich (2013) identified community activity areas, where large quantities of jade, greenstone (a less valuable stone related to jade) and quartzite debitage were found at different stages of production. Several workers, most likely comprised of multiple family members, may have worked on different steps in the production sequence, including children who served as apprentices. And in some cases, the final step in the production sequence was completed by an elite artisan, perhaps to add prestige to the end product and its producer.

Teotihuacan

At Teotihuacan in the Valley of Mexico living spaces differed from Maya structures. Although there were central courtyards, they were organized in apartment compounds that were occupied by "household" groups that were attracted to the city for its commercial opportunities (Carballo 2013, 113) and its amenities. The city's elaborate hydraulic system, magnificent gridded site plan, and monumental structures (see my later discussion) most likely caught the attention of people throughout the region.

Most production took place in apartment compounds that were inhabited by dozens of individuals. They were independent producers who disbursed their materials freely. The objects produced included obsidian blades and other stone tools, lime plaster used for stuccoing walls and mural painting, cotton textiles made from sources brought in from some distance away in Morelos. In some barrios more than one craft was practiced, such as weavers who wove cloth and tailors who sewed garments. Although the people at Teotihuacan imported ceramic trade wares from outside of the city, they produced ceramic incense burners in household workshops for local distribution. Archaeologists working at Teotihuacan believe that these living and crafting arrangements, along with barrio rituals, cemented social and political bonds at Teotihuacan (Manzanilla 2002) David Carballo believes that the control of craft production was organized at an

"intermediate, corporate-kin scale, rather than by the noble heads of barrios or by temple or state institutions." (2013, 132).

A possible exception to this pattern is the obsidian industry in which production was discovered in several locations beyond the apartment compounds. At an obsidian quarry near Teotihuacan workers produced performs and tools and brought them back to the city for finishing work. At another location associated with the Pyramid of the Moon and Ciudadella, special purpose dart points and symbolic objects were produced as well more mundane objects, such as shell ornaments. These objects appear to have been commissioned by leaders. Craft production at Teotihuacan, outside of commissioned work, could be described as commercial. Many of the objects they produced were consumed in the city and others were exported great distances. No one has ever found a marketplace where these activities took place, but it is clear that major industries existed at Teotihuacan and people came there for commercial opportunities. David Carballo advocates a less strict interpretation of commercial practices at Teotihuacan, perhaps applicable to other early societies as well. He makes reference to Elinor Ostrom's proposal that "face-to-face interaction, mutual monitoring, and sanctioning in organizing collective economic relations of an intermediate scale" are a better fit for the corporate groups and guildlike organizations that existed at Teotihuacan. These interpretations suggest that the political economy and social arrangements were mediated among "the household and state or market" (Carballo 2013, 131).

Unlike the Maya and later Aztecs, there apparently were no royal courts at Teotihuacan and as far as is known, craft production was conducted among corporate kin groups and guild-like trade organizations. Although the works of crafters may have been taxed, there is no indication of state control of production.

Aztecs

Otuma is an Aztec city-state in the Late Postclassic. It was first occupied in AD 1357-1409 AD and in 1428 became the largest Post-Classic city-state in the basin of Mexico. Based on archaeological evidence from survey, limited excavation, and ethnohistoric sources, Otumba has been described as dependent upon "intensive agriculture, specialization and a complex division of labor, taxation, markets and merchants." (Nichols 2013, 49). Deborah Nichols survey at Otumba (along with Thomas Charlton) was directed specifically to debates about the sociopolitical and commercial dimensions of early states in general and the Aztecs more specifically. A complex of factors has contributed to debates about the level of sociopolitical control among Aztec leaders and the degree of independence among individual households and merchants.

Before jumping ahead to present the archaeological evidence at Otumba, it is important to look first at the types of sellers recorded in historic sources. They included producer-vendors, itinerant regional merchants, and pochteca (Nichols 2013, 53), each of which was connected to different types of social and political organization. Producer vendors sold goods manufactured in households and wild and cultivated foods directly to consumers in the marketplace. Regional merchants were "independent middlemen" who sold foods and goods that they procured in wholesale lots. Producer-vendors and regional merchants belonged to corporate landholding groups (capolli) and engaged in subsistence and craft production. They "supplied most of the goods sold in Aztec marketplaces." (Nichols 2013, 53). The pochteca were professional merchants who traveled in caravans carrying exotic raw materials which they imported and traded

throughout a wide geographical sphere that extended beyond the Aztec frontiers. Although they were private entrepreneurs, they were "politically and militarily valuable to rulers, served as spies, ambassadors and judges in market places as needed (Nichols 2013, 54). The pochteca had a high social status in which they were not quite nobles but not commoners either. They paid tribute in goods to the crown and were capable of amassing considerable wealth (Nichols 2013, 55).

The archaeological evidence at Otumba is from the Late Post-Classic. Six craft industries were identified that included different materials and technologies. Like Teotihuacan, the craft specialist barrios are examples of neighborhood organizations that were known for the specific crafts they produced. The archaeologists were able to identify the specific barrios where objects were produced from the finished products and manufacturing debris. Several different crafts were identified and estimates made of their level of productivity. Seven different obsidian workshops were identified in which craft activity and household artifacts were intermixed. Obsidian was procured from different sources, one of which was imported and another from a local source. In one workshop large numbers of obsidian blades were being produced based on the quantity of production debris, which was estimated to have been a million, sufficient for local consumption, surrounding villages, and beyond the valley. There also were piles of blades made for everyday use that were mixed with domestic refuse, including a small altar, patio, and postholes for a temporary structure. Elsewhere a concentration of obsidian manufacture was a lapidary located in residential workshops, where ear-spools and lapidary tools were produced for trade in rural villages outside of the center. Another household contained ceramic figurines and figurine molds, along with musical instruments, like flutes and whistles, and mold made long-handled censers. The large quantity of these finished objects and debris, all of which were used in Aztec household rituals, were beyond the needs of an individual household and sufficient for the people who lived in the small barrio where the production took place and elsewhere. Finally, maguey fibers were found in nearly ever household along with spindle whorls, whorl molds, weaving tools and possibly materials for dyeing maguey fiber.

The Indus

In the Cognitive codes paper I addressed the issue of craft specialization in the Indus civilization. Rather than approaching the problem from the perspective of exclusionary power, that is the control of specialists and centralization of states, I used the evidence as a vehicle for identifying the social and economic infrastructure of the civilization. Without going over the same details, I used evidence from studies of ceramic production to identify different types of specialists. The technologies used to produce ceramics were not uniform throughout the city and the contexts of their production varied. One group had arrived at the site in the earliest period of settlement and produced ceramics in an ordinary pit kiln. Over time, they gradually developed more sophisticated firing methods in the form of updraft kilns. These potters produced vessels in their households, worked independently, and distributed their goods within the local community. Other potters fashioned high fired stoneware that was produced in small containers, producing ceramic bangles that were inscribed with Indus script. In this workshop production was separate from residential areas and took place in a walled enclosure, which has been interpreted as an industrial craft under administrative control.

Another example was the production and use of seals. Seals are associated with trade and merchant exchanges. Stylistic elements of seal iconography indicate that the images were sufficiently distinctive to identify the work of regional artisans. Recent studies by one of my graduate students, Adam Green (n.d.), has employed an unusual methodology utilizing time lapse photography to identify the "hands" of specific artisans.

The distinctiveness of production sequences and clustering of the number of artisan producers complements the regional variation that presents itself when the seals are observed outside of the Indus proper. On the Arabian Peninsula, "breakaway" entrepreneurs have been identified based on hybrid forms of the seal technology. The hybrid nature of the seals is based on their shape, the symbols represented on them, and the altered forms of writing inscribed on their exterior surfaces.

I included Richard Blanton's "Cooperation and the Moral Economy of the Marketplace," to follow up on my interest in the diversity of specialized craft workers and seal producers and users. I am not looking for a marketplace but rather am intrigued by Blanton's ideas about individuals that make their way at sites of anti-structure. It is the unstructured nature of the seal makers and Indus merchants that recommend the cooperation approach as a vehicle for understanding how goods are mobilized among different interest groups and promote collective action and decision-making. As expectations of crafters and merchants move beyond service to the palace and garner their own profits, we enter a world of multi-layered contexts of institutions, communities and kin. Long thought to be disintegrating forces, independent craft producers and merchants, like the pastoralists at Mari, played significant roles in shaping ancient states.

Wittfogel. A Comparative Perspective.

Karl Wittfogel believed that the development of water management systems was a causative factor in the emergence of states. Looking world wide toward geographical regions with low precipitation levels and rivers, he believed that the construction of large-scale construction of canals or floodwater irrigation required bureaucratic control. A basic assumption was that the introduction of water management would inevitably establish a hierarchically bounded society that served the ambitions of a few powerful individuals. Bureaucratic rule would by-pass the knowledge base of ordinary farmers and their control of water resources.

It is unclear just exactly how far Wittfogel would take his theory if he had been aware of the variety of water systems that developed worldwide in antiquity. To give him credit, he was well aware of the social distinctions that governed organizational structures and the different forms of control that would develop. In a division of societies into sub-types in Oriental Despotism" (1957), he distinguished between "compact" hydraulic societies, represented by Egypt and Mesopotamia that were dependent upon irrigation and floodwater inundation, and "loose" or "marginal hydraulic societies". Hydraulic societies that Wittfogel cateogrized as "loose" were dependent upon small-scale irrigation and rainfall (1957). The Lowland Maya fell into a "marginal" category because their organization (here he seems to be referring to political organization) was influenced by hydraulic agriculture in adjacent cultures. In a somewhat feeble attempt to rescue his hydraulic theory, he described the monumentality of the Maya as the result of adopting the organizational strategy of neighboring hydraulic societies.

More than fifty years of research has radically challenged the restriction of water systems to riverine irrigation and channelization. Investigations in the Old and New World have identified a variety of systems, usually stemming from the ecological conditions in which human settlement took place. The Mesopotamian and Egyptian environments closely fit Wittfogel's hydraulic vision. Although numerous societies throughout history had experimented with water holding devices, such as tanks and reservoirs, terrace systems and chinampas, none came to mind in his hydraulic model and they did not fit into any of his subgroups.

Wittfogel's subtypes appear to have been an effort to rescue his causative hypothesis. In his initial proposal, civilizations developed in environments where riverine systems would require management by a bureaucratic elite. Based on the extant evidence, his singular focus on irrigation or floodwater systems could not accommodate those civilizations that lacked large-scale water works. In spite of the fact that there are flaws in his theory, they have not stemmed the flow of interest in his hydraulic theory.

The anthropologist, Clifford Geertz, once said that certain concepts come to haunt scholarship well beyond their original utility. They tend to recur again and again, but in each era are modified to more closely fit the existing evidence. They may, of course, be discarded altogether.

Wittfogel's idea is one of those to have emerged again and again. Archaeological research has both supported and rejected Wittfogel's conclusions. In the early days, some of the negative criticisms were based on questions of "fact." Given the amount of evidence available at the time, he overstated his case. While the archaeologists, William Sanders and Barbara Price (1968), supported Wittfogel's causative formula. They argued that irrigation technology was a catalyst for development of complexity in Mesoamerica, even though they had limited evidence, at the time. Robert Adams, on the other hand, in his studies of Mesopotamia favored an agency oriented approach based on community interdependencies and integration of resources. Finally, in Flows of Power, Vernon Scarborough (2003), takes a comparative perspective on water management by examining the evidence from civilizations with water systems that did not employ "classic irrigation schemes." These include examples of water capturing systems that were under local management by farming communities and others controlled by a centralized bureaucracy.

Hierarchy and Heterarchy, Accretional and Expansionistic Development

Based on cross-cultural ethnographic and archaeological evidence, Scarborough has set out two organizing principles applicable to water management systems (Scarborough 2003, 11-12). Rather than assuming that water resources require bureaucratic control, he uses the concepts of hierarchy and heterarchy to distinguish between organization that is centralized and vertically controlled and corporate, horizontally controlled and managed by interest groups.

These principles mirror a concept of power that I introduced in my paper, "Cognitive Codes and Collective Action at Mari and the Indus"(referred here as Cognitive Codes), in which I used Mari and the Indus as case studies to illustrate two forms of power, exclusionary (in which leaders monopolize sources of power) and corporate (in which decisions are shared among groups within the society). Exclusionary power and corporate strategies often co-exist in the same society. I noted that the

complexity of leadership and its power in early states can be both hierarchical and heterarchical, concepts introduced by Carol Crumley (1995). Heterarchy can be defined as "the relation of elements to one another when they are unranked or when they possess the potential for being ranked in a number of different ways" (1995, 3). Even in a despotic state, local hierarchies and "nodes of social power" can be complementary (Brumfiel 1992, Janusek 2008). Susan and Roderick McIntosh employed the heterarchy concept in their interpretation of evidence from the Middle Niger site of Jenne Jeno (400 A.D. to 1100 A.D.), a self-organized community in which multiple authorities existed, none of which monopolized power (R. McIntosh 2003); and in other African examples (S. K. McIntosh 1999).

A second principle in the context of water management is temporal and involves whether water control developed accretionally, based on the slow, stable development of the agrarian resource. Modifications to the landscape are based on fewer risks than the more rapid expansionist approach. The accretional approach tends to produce "complicated interdependences between groups and their environment" and are heterarchical (Scarborough 2003, 13). In distinction, an expansionistic approach is "highly hierarchical" in its organization. Expansionist approaches radically exploit resources, take management risks, and engage in innovative technologies. Their "rapid agrarian growth usually accompanies major population increases" (Scarborough 2003, 13).

In Cognitive Codes the long-term development and sustainability of the pastoralist Sim'alite tribe at Mari was accretional. Decision-making within the tribe was based on "negotiations among members". In distinction, the structure of organization between the king and other subjects grew out of an expansionist approach. In the Indus we saw different forms of specializations that developed accretionally while innovations in material forms and production techniques developed as the civilization expanded.

A classic example specific to water management is a small scale society in Bali dependent on rice-paddy terracing. The system is heterarchical and hierarchical. Water temples are located at key nodal points where intervillage networks regulate water temples at the regional level. Scheduling of water allocations is also managed by a temple structure that maintains control of a system of weirs and dams and is responsible for scheduling planting and harvesting (Lansing 1991). While local farmers control resources in consultation with other farmers, in a form of consensual authority elaborated upon by Clifford Geertz (1959), they also interact with the high priest, at the pinnacle of temple authority, though not the state (Lansing 1991). A measure of the power of the local groups is the level of organization they maintain in times of conflict, when the centrally organized system yields to local temples in order to keep the system operational by scheduling and managing the system until normalcy returns.

Whether the system in Bali developed slowly (accretion) or rapidly (expansion) is uncertain and can only be determined through archaeological evidence. While older temples have been discovered, there is no clear stratigraphic or cultural link to the present system. However, based on the technical knowledge required to make the system work, it seems most likely that it began at a small scale and expanded over time.

Mesopotamian and Mesoamerican models

Evaluating the Mesopotamian Model

Robert Adams was one of the first archaeologists to test the hydraulic model in a study comparing the development of early states in Mesoamerica and Mesopotamia (1966) in which he challenged Wittfogel's model. He later developed a large-scale, long-term study of landscape and waterways in southern Mesopotamia. In Mesopotamia, he rejected the model based on archaeological evidence for the periods that led up to the earliest settlements and development of the state at the site of Uruk. Evidence for canalization of water systems did not occur until several hundred years after initial settlement of the city and they were in a much smaller scale than Wittfogel envisioned. For the earliest settlement, Adams identified a cluster of sites that included the city and areas distant from the alluvial plain, where a network of small-scale settlements fanned out on to increasingly less fertile land. He interpreted the cluster of settlements as specialized, economically differentiated communities of farmers, fishers, and herders that were engaging in the exchange of local resources in the micro-environments they occupied. These coordinating distributional networks at Uruk were the beginning of a configuration of interdependent large and small settlements throughout the alluvium in which differentiated communities pooled their resources. This cooperative organization continued in later periods (Adams 1981, Pollock 1999). The earliest evidence for canals is in the much later Early Dynastic period in the mid-third millennium B.C.

Since Adams early work, Near Eastern archaeologists have not developed research projects devoted directed at the validity of Wittfogel's hydraulic model to Mesopotamia. However, the adoption of new techniques and methodologies based on remote sensing satellite imagery has produced an abundance of new data based on GIS (Geographical Information Systems). Adams studies were limited to the alluvial plain, since the delta area was under water during his surveys. Using satellite-based remote sensing data, limited excavations, and survey records, Jennifer Pournelle (2003, 2007) explored the delta system. Her studies have shown that large portions of the south were covered with marshlands. Uruk itself was situated among the marshlands and was built on a turtle back, a land form that stands above water in marshes. Pournelle has drawn a reconfigured landscape comprised of marshlands with resources known to have been used for subsistence and craft production that included reeds, wild birds and animals, fish and grazing areas. It was not a static environment, however, since early settlements coped with conditions of shifting environments. Located at the edges of marshes, settlements retreated from the shoreline and moved northward. It was not an optimal location for irrigation agriculture but was rich in marsh resources.

Adams evidence and Pournelle's clearly document the heterarchical beginnings of Mesopotamian settlement, while Adams evidence from the Early Dynastic, documents the expansion of a nascent system in later statehood. By that time, the civilization had already developed a writing system, created monuments and established a strong temple structure (Pollock 1999)

Water systems in Mesoamerica

The Maya

The Maya civilization is located in an ecologically diverse region but one in which human's exploited the natural environment to their advantage and developed a number of different water systems. In general, settlements were located in semi-tropical

environments in which heavy rainfall occurred during eight months of the year, followed by four months of drought. Agriculture depended on degrees of rainfall, soils and elevations. Here, I focus on the three types of water systems, bajos, reservoirs and agricultural terraces.

Bajos are karst depressions that have been transformed into wetlands or shallow lakes that capture water during months of drought. The earliest bajos in the Early Preclassic Period (ca. 1,000 BCE) were located on the margins of natural depressions. Bajos were used for drinking needs and domestic purposes but it is unclear whether they were used for agricultural purposes in the early period. With later population expansion in the Classic Period, they may have been used for agricultural purposes. They are considered "the most significant and long-lasting environmental change documented in the pre-Columbian world" (Dunning et al 2002, 267). They also are the most ubiquitous water resource. It is estimated that "60 percent of the southern Lowlands" would have been covered by wetlands and bajos (Lucero et al 2014).

Reservoirs are a second water system. The reservoirs, at least those subject to study, are associated with major centers and perhaps the best-documented are three at the major center of Tikal. The system appears to have developed accretionally. During initial occupation of the region in 600 BCE, settlers made a small-scale modification to natural springs located at the head of a natural ravine. The ravine was widened and dammed during this initial occupation and served as a water system. As the population at Tikal increased, a new system was engineered as the result of failed attempts to direct seasonal runoff from the original spring. Instead, the flow of a nearby arroyo was redirected to a series of artificial tanks or reservoirs that were built in a descending chain of artificially dammed tanks. In order to increase storage capacity, the tanks were widened (Scarborough et al 2012, 1240ff.) and the fill derived from these modifications was used in pyramid construction and other structures. The new construction occurred at the peak of Tikal's population in AD 650-AD 800.

Of the three reservoirs built during this period, the Palace Reservoir was larger than one at the Temple. A dam dividing the two was as used as a "coffer", a device that facilitated dredging, repairs and maintenance. A third reservoir was south of the two reservoirs and is described as one of four "bajo-margin" tanks, possibly associated with farming whereas the two other reservoirs appear to have been used for drinking water and household production.

A third system is at the site of Caracol in Belize. Caracol is located on an area of karst topography covered by a semitropical forest, a canopy that has impeded on-the - ground survey. The earliest settlement dates to 600 BCE (Chase etal 2013, 20). By 650 AD the population had increased to 100,000, numbers that exceeded those of most other settlements. Sometime between 550-800 AD, there was an expansion of an already existing agricultural terrace system that entailed a large number of farmsteds situated atop mounds. Water was collected in underground storage units. To facilitate distribution of materials, a causeway was built that led to the epicenter at Caracol. It extended beyond a 60 km. radius of the city.

There are heterarchical and hierarchical aspects to the growth and maintenance of these water systems. The bajo system grew accretionally and none of the published accounts suggest that they were centrally managed. The reservoir system at Tikal could also have been managed by local individuals at the onset of their construction, but clearly

they required complex engineering and coordination by a managerial elite. The success of the project and maintenance of the terraces at Caracol may have started out accretionally (though I could not find any published accounts concerning its initial construction), but it eventually was managed by "elite(s) that implemented different strategies" which enabled the spread of prosperity throughout the population. The excavators at Caracol consider the expansion of the terracing system and its accompanying innovations a key to the supremacy of city and the migration of populations to the city (Chase etal 2013, 151). The expansion occurred long after the was first settled.

Teotihuacan

The location of the city of Teotihuacan near the San Juan River presents a different set of circumstances. Even though Sanders and Price (1968) were unable to provide direct evidence for any form of hydraulic system in their early surveys, the topic has continued to be of interest. In the mid 1980s, there was a breakthrough when segments of irrigation ditches that appeared to have been remnants of an early hydraulic system were discovered. The ditches were located under areas of the Oaxaca barrio, over which later occupants constructed residential dwellings that were present from as early as the Terminal Formative period (Nichols 1987).

Indications of irrigation have subsequently been found during excavations in other sectors of the city, confirming the construction of an extensive irrigation system. These canals were abandoned by the original inhabitants of the barrios. Archaeologists believe that the Teotihuacan state took possession of their land in order to maintain control of economically important resources (Evans and Nichols et al in press).

An ambitious program of hydraulic remodeling occurred sometime between 300 BCE-AD 250 in a major transformation of the landscape with the dual purpose of reorienting the course of the San Juan River and realigning of the Street of the Dead (named by the Aztecs when they visited Teotihuacan some thousand years later). The grid was oriented on a north-south axis and aligned with the Cerro Gordon in front of which the Pyramid of the Moon was positioned. The natural course of the San Juan River ran diagonal to the axes of the Street of the Dead. The project was undertaken in order to align it with the city grid and to modify the drainage slope to control runoff. Reservoirs also were constructed to collect water for use in dry seasons.

These landscape changes served several ends that contributed to the city's success. Located in an arid environment, the control of water may have been brought about by the influx of populations many of whom were involved in commerce. Craft producers in the barrios sold their wares within the city and abroad, construction workers produced lime and applied it to interior walls of residential, administrative and religious buildings, and merchants imported fine crafts and natural resources and exported local products.

Changes did not occur all at once but were based on the continuation of building programs that were begun in earlier periods. In a final phase, the grid and the water system were aligned perfectly with a building program at the south end of the city in the Ciudadela. Its focal point was a monumental temple to honor the Feathered Serpent, a god associated with water. This ingenuous alignment of the temple with the course of the San Juan grew out of iconographic depictions in which the god-like feathered serpent was depicted in control of water. While the construction of the two mile long canalized river

course follows the city's grid, it also represented a "sacred orientation" (Evans. 2009, 2010, Evans and Nichols etal In press).

The landscape changes engineered by the people at Teotihucan served several ends toward the city's success. Located in an arid environment, the control of water may have brought about the influx of populations. Over 1,000 people lived in the south along the alluvial plain; others occupied well-drained marsh areas around springs. Visitors that came from the west and the south gained easy access to the city as they followed along the course of the canals.

The hydraulic system at Teotihuacan was built by accretion over several hundred years and expanded over time. Its initial stages most likely occurred under circumstances in which barrio residents tapped in to the water system. Early settlers would have been aware of the seasonal variation in rainfall and the need to make the most of available water sources. It is less clear whether in later periods when the city leaders appear to have had a major hand in implementing an elaborate vision of the city plan, in which the river was realigned to conform to the alignment of streets and monuments, whether corporate groups continued to manage aspects of the system. The scale of the later construction projects and the major modifications to the San Juan River suggest a well-coordinated plan that required centralized planning. Still, Evans and Nichols see both heterarchical and hierarchical aspects to management, in which construction and maintenance of the massive project was controlled by corporate groups and overseen by the rulers. This interpretation follows from the blending of iconography and engineering (hetrophany and hydrology). Possessing some resemblance to the water temples at Bali, they were quick to point out that Teotihuacan and Bali were governed by different institutions; on the one hand, temple priests in Bali, and on the other, the state.

Aztecs

The Aztecs were located in the Basin of Mexico where a system of raised field farming (chinampas) developed. An in-depth study was undertaken at the site of Xaltocan by Christopher Morehead and Charles Frederick (2014). The site began as a small hamlet in AD 600 and expanded into an independent kingdom in the Early and Middle Postclassic (AD 900-1350). The chinampas at Xaltocan occupied a lagoon at Lake Xaltocan. The raised field system drew on water from the lake by channeling spring water and other sources from the Cuahuhtitlan River.

Water was channeled into individual fields through a canal system. One consisted of linear arteries that were connected to freshwater springs, while another transported water into the core of the system. From there, an additional set of canals channeled water into individual fields. The system was complex and covered over 1500 hectares. In spite of the need to engineer water through the three-part extensive system, Morehart and Frederick (2014) believe that the entire system could have been managed by collectivities of farmers.

Xaltocan was conquered by an alliance of kingdoms in the late fourteenth century AD. While some residents of the city fled to other towns, others remained. It was later incorporated into the Aztec Empire. The chinampas were abandoned and not reinstated by the Aztecs. As Morehead and Frederick point out, however, the collapse of the chinampa system should not suggest that it was under direct control of the Xaltocan state before it was conquered (2014). Investigation of the environment after conquest

indicates that the degradation of the lake environment most likely was the result of the diversion of the Cuahuhtitlan away from Lake Xaltocan after conquest.

When the Aztec descended into the region, there was a pre-existing concept of governance referred to as city states. The Mesoamerican city states were not identical to those in ancient Greece. The concept here refers to a political unit ruled by a lord, who governed over a dependent hinterland. In rural areas of the Aztec empire, there were agricultural terraces, apparently managed from farming communities. The systems that existed at the Aztec capital, Tenochtitlan, are described by archaeologists as based upon mutualistic relations in which "elites promoted intensive and large-scale hydraulic agricultural systems…as a way of securing urban food supplies and tribute and of consolidating their control over both regional elites and commoners. Commoners, in turn, received access to highly productive and relatively low-risk agricultural lands, which were in increasingly short supply" (Williams 1989). The construction of chinampas was not uniform, suggesting that these were locally managed, even if "politically planned" (Carballo etal 2014, 121).

Hydraulic Systems and Comparative Dynamics

The comparative analyses of water systems in Mesopotamia and Mesoamerica have demonstrated the flawed nature of Wittfogel's causative theory. In Mesopotamia, Adams outright rejection of the theory was based on evidence from his settlement pattern data. The lack of evidence for irrigation technology in the Uruk period at its initial settlement on the plain did not substantiate Wittfogel's expansionistic model. He favored an accretional (using the terms I have applied in my discussion of water management) development of society in which growth was based on the development of organizational networks of specialists that occupied different environmental zones. This conclusion was based in on-the-ground evidence for neighboring settlements located in different micro-environments.

The evidence from Mesoamerica turns on a different set of evidence that was based on the initial studies of Sanders and Price in the Basin of Mexico and others in the Maya Lowlands. While Sanders and Price did not have the evidence in support of Wittfogel's theory, subsequent surveys and others undertaken at Pennsylvania State University provided concrete evidence for the manipulation of watercourses at Teotihuacan. Using Scarborough's principal of accretional development as a benchmark for water systems that are small scale and probably based on attempts by local, corporate groups, the evidence beneath the Oaxaca barrio, to obtain water for domestic use is an example. The later expansion of this system, on the heels of an influx of people into the city in its later history is of an entirely different sort and indicative of a city-wide plan that was engineered by a individuals with the ability to garner the support for a large-scale irrigation system. The realignment of the San Juan River would have been a major undertaking and one that likely involved displacement of groups in its path. Clearly, it was planned and engineered by a powerful group. Evans (et al In press), in differentiating between the political organization of the system at Teotihuacan to the temple organization at Bali, are explicit in attributing the expansion of the irrigation system at Teotihuacan to a "state."

The evidence presented from the pre-Aztec polity at Xaltocan presents a somewhat different picture of the organization of water systems. The system of

reclaiming soil from lake bottoms at the site was an innovative technology that drew on the natural environment. Chinampas or floating gardens (and sometimes referred to as raised field farming) is a long-standing method of cultivation in the Basin of Mexico. Farmers at Xaltocan also channelled water through a canal system. Although the system was extensive, Morehart and Frederick (2014) believe that the water system could have been managed by collectivities of farmers. Interestingly, when members of the triple alliance, out of which the Aztecs took major leadership, conquered Xaltocan, the chinampa system was not reinstated. Changes in the river system may explain why it was abandoned, but it does seem likely that leaders of the emerging Empire would have preferred neutralizing any local power bases at Xaltocan.

The Aztecs continued to draw on the technical knowledge developed before they entered the region. Still, even here, there was room for farming communities to manage local sources, at the same time that elites were implicated in large-scale hydraulic works in, apparently, mutually advantageous system involving tribute and control over elites and commoners. Using Scarborough's principles it was indeed an expansionistic state that drew on pre-existing water technologies.

Our knowledge of Maya systems of water control is the most robust and varied. Located in ecologically diverse zones but demonstrably in semi-tropical environments subject to months of drought, the Maya turned to the existing environment in order to fashion innovative systems of water sources. The bajos in the Early Preclassic (ca. 1,000 BCE) took advantage of the karstic terrain to dig below the surface to capture water. The same system was used in the later Classic Period for agricultural purposes. There does not appear to be any indication that the technology could not be managed by corporate groups. Other systems, though, benefitted as states expanded, even though they initially were built on a small scale. The massive Reservoirs at Tikal are a prime example of the initial use of springs for water provisioning and the later construction of a more sophisticated system of reservoirs complete with increases in the size of the tanks for increased storage capacity and elaborate dams to accommodate the influx of population in AD650-AD800. Even then, the bajo-margin tanks may have been managed by local farmers. The great terraced system at Caracol was expanded across an area within a 60 km. radius from the city, as the city expanded to 100,000.

The evidence for water control systems described in these case studies span a large segment of time and space. They do not support Wittfogel's original hydraulic theory though all converge on the significance of water in the development of the civilizations discussed. Starting from the original theory and using Scarborough's two principles advances our understanding of the technologies behind the control of water systems and provides a more richly textured understanding of the organizational strategies developed in the past. In the case studies presented we can offer little support for the inevitability of bureaucratic control in the early settlements in Mesopotamia, the Maya, or Teotihuacan. It is only the Aztec, who adopted an already existing technology, gained bureaucratic control in an artful strategy of consolidation of control over commoners and elite alike.

The Indus Civilization

There is not much to contribute to studies of water management in the Indus civilization and its riverine systems. More promising is the engineered water systems in the interior of Indus cities but even these require more study. .

. Located at the center of two river systems, the best known, the Indus River in the Indus Valley, for which the civilization was named, is located in present-day Pakistan. It flows from the Himalayas, and in ancient times along with five other rivers, the Jhelum, Chenab, Ravi, Beas, and Sutlej. After branching in their upper riches, they came together in a single flow of the Indus River at the Panjnad. The Beas is now a dry river bed. A second system, the Ghaggar-Hakra, also has its origins in the Himalayas. The hyphenated name reflects the presence of present-day political boundary between Pakistan and India. Neither river is perennial. The Ghaggar is located in northwest India; as it flows into Pakistan, the Hakra continues as it flows across the border into the lower Indus valley. Studies of these two systems have been less concerned, if at all, with Wittfogel's hypothesis, but more directly with their hydrology as they relate to the five major Indus cities.

The evidence is uneven. My discussion will be confined to the Indus system and the Hakra, since they are most relevant to the two major centers at Mohenjo-daro, in the Lower Indus, and Harappa, in the Upper Indus. Separation of the Upper and Lower Indus Basins is a function of a major structural geological fault. A long-term study of the geomorphology of the Lower Indus was conducted by geologists, geomorphologists and archaeologists in an effort to identify evidence for water control. For our purposes, I focus on the period between 2,600 and 1,900 BCE, when Mohenjo-daro was occupied. In spite of extensive geomorphic surveys, Landsat and serial photographic mapping, and historical data, no evidence has been found for canals or embankments, although the overburden of geological events in subsequent periods may have obscured the evidence. The system was dynamic and aggrading. Sediments built up and altered the contours of the plain. Louis Flam, an archaeologist who has surveyed large portions of the Lower Indus, believes that cultivation was timed to coincide with flooding cycles and shifts in the location of its flow. These shifts in floodplain contours would need to be monitored in order to plan locations of fields for cultivation. The situation was sufficiently dynamic that the city may have been abandoned when the river shifted its course, either because it put the city in a potentially hazardous position (Flam 1993, 287) or the floods shifted away from the city (Jorgensen etal 1993, 326). They reject earlier theories in which the construction of dams were proposed (Raikes and Dales 1977) and major tectonic disturbances (Lambrick 1967). The geologists also identified a second river in the Lower Basin. This course, the Nara Nadi, entered the basin from the northeast and is considered to be the Hakra River (Mughal 1981, 1982, Flam 1993). Flam suggests that it was subject to seasonal floods and deposited sediment over a large area, eventually skirting the Thar desert southward.

These interpretations support geo-archaeological investigations of the depositional characteristics of the alluvium based at studies in the city of Mohenjo-daro itself. All indications there support a pattern of breaching of natural levees that restricted the fluvial channels. This process involved "overbank deposits" in which channel flows were confined, events that result in cutting the natural flows of the river and dispersing water over a widely flooded area (Balista 1998, 130). There was no evidence for attempts to control these events or channel water to fields.

Before reviewing the evidence for the water systems in the interior of Indus cities, I turn now to the evidence from Harappa and the Indus River and its branching courses. . The conditions in the Upper Indus offer similar challenges in reconstructing the ancient water system and efforts to control the Indus and its branching courses. Harappa itself was on the Ravi River. The earliest settlement at the site was on a landform within a meander channel that became an oxbow lake (Belcher and Belcher 2000) and later evolved into a terraced river plain overlooking the lake. A second river, the now dry bed of the Beas River, ran parallel to the Indus and was an active stream in Indus times. Eighteen Indus sites flank the inner and outer banks of the Beas and were essential to its regional economy and agriculture. Reconstruction of the timing of settlement demonstrates that movement on to the Beas plain occurred after stabilization of the stream and the eventual entrenchment within the Beas channel. Mounds distributed along this landscape were built on or at the margins of doabs that result from migrating stream movements that discharge sediments on these higher surfaces. The location of settlements associated with the doabs, provided a natural refuge from channel sedimentation and lateral migration of the river (Schuldenrein et al 2004). Thus far, we have not identified canals or any other forms of water management on the Beas or the Ravi.

Indus Cities and Water Management

There are other types of water management that were not addressed by Wittfogel, as was evident in the Mesoamerican data, but it is equally true in the Indus. The public amenities and ornamental water features in Indus cities were without equal for their time. Though most elaborately presented at Mohenjo-daro, amenities such as wells and bathing platforms have been discovered at Harappa. Wells prepared with the same engineering technology were found at small rural settlements along the Beas. In Gujarat, an area with very low rainfall and no extensive river systems like the Indus, the builders at Lothal and Dholavira (a major Indus city) used their superior engineering skills to develop community-wide systems of water storage tanks such as one at Lothal and a rock cut reservoir at Dholavira, in which steps descend down to the bottom of the reservoir. There is no evidence for feeder canals that draw water on to agricultural fields. At Dholavira, the stepped entry into the reservoir is suggestive of community-wide economic activities (Wright 2010).

The full range of water management technologies is most evident at the city of Mohenjo-daro. Major portions of the city were built of baked brick, a condition that has resulted in preservation in many parts of the city. Visitors to Mohenjo-daro are instantly aware of the engineered networks of brick lined drains, wells built with specially designed bricks, platforms specifically designed for bathing, sewage outlets, and sump pits. These public amenities were widespread throughout the city and although they were present in most neighborhoods, there were significant differences in the placement of sump pits or other types of sewage that most likely emitted natural odors that were unpleasant. Where sewage outlets were not available, people improvised by placing large ceramic pots at the edge of courtyards for disposal of household and perhaps personal waste. It was a technically sophisticated system that required extensive planning and maintenance. In many locations, retaining walls and platforms were built to stabilize foundations against groundwater that was only 5 meters below the surface. The over 700 wells in the city constituted a major water supply.

At Mohenjo-daro the construction of these amenities coincided with the building of a well-planned city oriented in a north-south axis. Its construction appears to have taken place all at once, but its side streets were less planned. We do not have evidence for an early settlement at Mohenjo-daro, just its sudden expansion, complete with a plan for streets, housing, and the control of a water system throughout the entire city. Like at Teotihuacan, the suddenness of the city's appearance seeks a sweeping causal explanation of the kind offered by Wittfogel's theory.

Michael Jansen, whose team conducted a major study of the city's construction and its water supply, knows the city of Mohenjo-daro better than any other scholar at present. He views the inspiration for the construction of these amenities as a technological innovation that brought fresh water and a sophisticated disposal system to many of the city's residence, perhaps a "sophisticated attempt to imitate nature artificially by means of ornamental water features" (Jansen 1993, 18). He does not ascribe this impulse to a great man with a vision but to the arousal of a mythical veneration of water, perhaps even deification, that was drawn from universal human experiences.

> "Of all the primeval elements that combined to generate life, it was water that most influenced the evolution and existence of earth's flora and fauna and, finally, the human species down through the countless ages to the present." (Jansen 1993, 13).

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The evidence from the Indus offers very little with respect to Wittfogel's theory, since we can only guess how its cities controlled its river systems. The public amenities in its cities is worthy of future study. The research at Tikal especially brings to mind the importance of long-term studies of water management in cities. Also, the continued investigation of the oxbow lake at Harappa and the doabs at Beas sites might provide insights into the use of water sources in the earliest settlements in the Upper Indus. Restrictions on archaeological at present greatly hamper the research, although remote sensing studies are continuing.

The evidence for water control systems described in these case studies spans a large segment of time and space. They demonstrate the flaws in Wittfogel's original hydraulic theory though all converge on the significance of water in the development of

civilizations discussed. Starting from the original theory and using Scarborough's two principles advances our understanding of the technologies behind the control of water systems and provides a more richly textured understanding of the organizational strategies developed in the past. In the case studies presented we can offer little support for the inevitability of bureaucratic control in the early settlements in Mesopotamia, the Maya, or Teotihuacan. It is only the Aztec, who adopted an already existing technology, that were able to expand the system and develop an artful strategy of consolidation of control over commoners and elite alike that could support the thesis.

Archaeological Perspectives on Cooperation

Childe and Wittfogel conceived of the control of craft production and water management as defining factors in the development of early states. In distinction, recent research has turned the two upside down only to find them diversified and decentralized. Like those liminal spaces in the marketplace, pastoralists, craft producers, merchants, and groups engaged in water management carved out social spaces and established ties of sufficient political and economic import that limited exclusionary rule. The diversity of corporate strategies among pastoralists at Mari, craft producers and merchants in the Indus, and water management systems in Mesopotamia, among the Maya and Aztecs, and at Teotihuacan and the Indus drive us to reconsider earlier assumptions that have moved theory-building forward. In light of the variable landscapes and political and cultural organizations described here, it is probably time to stop and think again about the kinds of societies that existed in the past and those most vulnerable to demise or decline, then and now.

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1 introduction: comparative perspectives on islamisation. (pp. 1-18). A. C. S. Peacock.Â 4 the conversion curve revisited. (pp. 69-80). Richard W. Bulliet.Â Throughout the Umayyad and early Abbasid eras, Islam was the minority religion amongst a majority of Christians, Jews and Zoroastrians. Yet, while it was the numerical minority, in terms of cultural capital identifying as Muslim provided social, professional and even monetary benefits. During the Abbasid period (750â€“ 934), it is likely that the majority of the population still officially identified as non-Muslim;Â¹ however, it is during this era that textual evidence for conversion and assimilation begins to increase. Wright, R. (Accepted/In press). Comparative Perspectives and Early States Revisited. In J. L. Brooke, & J. Strauss (Eds.), State Formations: Histories and Cultures of Statehood Cambridge University Press. Comparative Perspectives and Early States Revisited. / Wright, Rita. State Formations: Histories and Cultures of Statehood. ed. / John L. Brooke; Julia Strauss. Cambridge University Press, 2017. Research output: Chapter in Book/Report/Conference proceeding â€º Chapter (peer-reviewed). Wright, R 2017, Comparative Perspectives and Early States Revisited. in JL Brooke & J Strauss (eds), St... eralism is that states or provinces are prohibited from seceding from the federal union. Elazar & Greilsammer, supra note 4, at 101; Carl J. Friedrich, Admission of New States, Territorial Adjustments, and Secession, in STUDIES IN FEDERALISM 753, 770 (Robert R. Bowie & Carl J. Friedrich eds., 1954).Â be empowered to deal with national affairs and the state gov-ernments with local affairs, indicates how these powers should be divided. Hence, federal systems divide governmental powers differently.Â CONsTrriTUIONS IN COMPARATIVE PERSPECTIVE 131, 132 n.5 (Marian C. McKenna ed., 1993). 27. Madison's Notes on the Proceedings in the Federal Convention, May 31, 1787, 1 FARRAND, RECORDS OF THE FEDERAL CONVENTION OF 1787 (1911), at 53. 1994]. Cultural Perspectives on Comparative HRM. B. Sebastian Reiche, Yih-teen Lee & Javier Quintanilla, IESE Business School. Introduction Over the past few decades, increased globalization of business transactions, the.Â In contrast, the cultural perspective has concentrated its attention on the cultural distinctiveness of practices, beliefs and values shared by a community. Culture and values are associated with the national culture of a country as boundaries that allow interaction and socialization within them. Scholars have analysed the influence of these national cultural values, attitudes and behaviours on business and management styles (Hofstede, 1980; Laurent, 1986; Trompenaars & Hampden-Turner, 1997). Comparative historical research is a method of social science that examines historical events in order to create explanations that are valid beyond a particular time and place, either by direct comparison to other historical events, theory building, or reference to the present day.[1] Generally, it involves comparisons of social processes across times and places.Â The comparative-historical method can be seen in The Familial State: Ruling Families and Merchant Capitalism in Early Modern Europe.