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Cities, Surplus, and the State

A Re-evaluation

ABSTRACT Since at least the Enlightenment, the first cities have been commonly seen as products of a state or other kind of regionally organized polity that enabled the reliable production of a food surplus. In this paper, we re-evaluate the relationship between cities, regionally organized polities, and surplus based on data from the very early urban settlements of Jenne-jeno, San Lorenzo, and Liangzhu. These data clearly show that regionally organized polities were *not* necessary to feed these cities. The polities developed in reaction to urban life, often replacing more localized subsistence regimes that had provided greater autonomy for producers. We argue that decoupling regional polity formation from urbanization can provide a more accurate understanding of how cities first came into being.

KEYWORDS Urbanization; state formation; subsistence strategies; Jenne-jeno; San Lorenzo; Liangzhu

In 1950, V. Gordon Childe published 'The Urban Revolution' in *The Town Planning Review*. The sprawling article was an attempt to sum up Childe's view on the relationship between cities, states, and civilization that had long been a concern in his work (Childe 1951 [1936]; 1942). 'The Urban Revolution' is most remembered for its much-debated list of ten traits that could be used 'to distinguish even the earliest cities from any older or contemporary village' (Childe 1950, 9). What is sometimes forgotten is that Childe argued that cities could only produce monumental architecture, writing, astronomy, high art, and the other features on his trait list *because* of a radical shift in political structure that allowed for the production of a reliable food surplus. On its own, the 'low productivity of the rural economy' precludes urban development (Childe 1950, 10), but he thought productivity could increase via irrigation and other 'important inventions and discoveries' (Childe 1950, 9). These improvements would be planned, organized, and implemented by established 'ruling classes' who ensured that an adequate food surplus was generated (Childe 1950, 14). In short, Childe argued that cities are impossible without states.

More than seventy years later, it might seem anachronistic to begin an article with Childe's urban revolution. Even a cursory examination of the first three issues of the *Journal of Urban Archaeology* shows how much has changed since that time. Few archaeologists today use Childe's trait list, and considerable strides have been made in widening the definitions of cities and the regional polities that were often associated with these traits. We nonetheless begin this article with Childe because of his clear assertion that early cities were the end results of a *revolution*,

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the product of stable, surplus-generating institutions that made urban life possible. Norman Yoffee (2005) argues that long-held ideas in archaeology can slowly turn into taken-for-granted assumptions. Childe further developed and made explicit the taken-for-granted relationships between cities, surplus production, and the state that could be found in Western models of culture change from at least the Enlightenment. Although much of Childe's argument has been rigorously critiqued, we argue that his idea that feeding cities is only made possible by fundamental institutional change lingers (e.g. Scott 2017; Flannery and Marcus 2014).

This article evaluates the relationship between surplus food production, urbanization, and centralizing polities like states in the context of the world's first cities. We begin by discussing the associations made between surplus generation and state formation from the Enlightenment to the present. We then argue that states or other kinds of regionally organized polities that place significant subsistence decision-making in the hands of an urban elite were *not* necessary to create a surplus. When these kinds of polities occurred, they tend to be later developments, building off of more locally embedded innovations and infrastructure that emerged as cities first formed. In terms of food production, the origins of the state were thus in retooling — and even wilfully dismantling — pre-existing subsistence regimes that had successfully fed the first cities. We support our argument with three case studies of very early cities in northern Africa, East Asia, and Mesoamerica. Unbundling the state and other kinds of regionally organized polities from incipient urbanization provides both a more accurate understanding of the beginnings of cities and an explanation for some of the variability documented in early urban organizations (Fletcher 2020; Smith 2020a).

Cities, Food Surplus, and the State

We define cities as permanent collectives that have (1) large population size, (2) dense interpersonal interactions, and (3) high heterogeneity in the social roles of inhabitants relative to other collectives within a particular region. Population nucleation can be a critical driver of the energized crowding common to early cities (Martin 2017; Smith 2019). Yet we depart from Louis Wirth's (1938, 8) classic definition in its insistence on nucleation since low-density cities are also possible if sustained by a dense web of cross-cutting interactions (Fletcher 2011). More people spending more time together results in the intensification, reorganization, interdependence, and specialization that define city life (Costin 2001; Patterson 2005). If some people are spending more time making pottery, building houses, or writing, then they have less time available for subsistence activities. Efficiencies can be found — urbanites can and do find ways to fish, farm, or herd more effectively — but a universal aspect of urban centres is at least some dependency on outside producers (Allen 1997; Petrie and others 2016).

Cities can also be defined by the significant political, economic, and social impacts that they have beyond their borders (Smith 2020b, 17). One of these impacts is the creation of a regular flow of foodstuffs from rural producers to urban consumers (Moreno 2007; Zeder 1991). Why outsiders fed early cities is an enduring question in archaeology. The classic answer is that they were obligated to do so by states that provided both the necessary infrastructure for agricultural intensification and the threat of force for non-compliance (Blanton 1982, 431; Barker 1999, 955; Trigger 2003, 62). States can be defined narrowly as regionally organized societies composed of a ruling class, a commoner class, and a highly centralized and internally specialized government (Johnson and Earle 1987, 246; Marcus and Feinman 1998, 4). More recently, scholars have offered alternatives to the bureaucratic state. Often more kin-based and heterarchical, the leaders of these polities tend to lean more on persuasion than coercion for surplus production (Campbell 2018; Bandy 2013). Alternatively organized polities are nonetheless still generally seen as necessary precursors to food surplus creation. Following Childe, cities are still seen by necessity as *products* of regional polity formation.

From the Enlightenment to Childe

The association of cities, food surplus, and the state can be traced to at least the Enlightenment. The scholars of this era sought to uncover the divine laws that propelled humans to a stage of reason from an original condition that Thomas Hobbes famously described as 'solitary, poor, nasty, brutish, and short' (2010 [1651], 212). Most believed that those living in Western Europe's growing cities represented the pinnacle of human progress (e.g. Kant 1996 [1784]; Locke 1956 [1690]; Smith 1970 [1776]), and often suggested that the creation of a society governed by reason would be made swifter by completing the urban transition in Europe.

Enlightenment thinkers identified previous stages of development from history or in living groups that were seen to be developing more slowly. The

Marquis de Condorcet (1933 [1795]), for example, divided history into nine epochs that began with 'Men United in Hordes', and Jacques Turgot (1973 [1750]) identified successive stages of hunting, pastoralism, and farming that preceded Europe's current era. In a 1756 treatise, Victor Riqueti Mirabeau argued that humans progressed through greater and greater levels of 'civility' to reach a stage of 'civilization'. Both words were rooted in the Latin term *civitas* for a community formed by the creation of a city ruled by law (Pagden 1988).

Enlightenment scholars set the stages of cultural development, but it was the late nineteenth-century cultural evolutionists who sought to better elucidate the mechanisms that moved groups from one stage to another (e.g. Frazer 1890; Spencer 1898, Tylor 1871). Lewis Henry Morgan and his book *Ancient Society* (1963 [1877]) proved to be particularly influential for those interested in what made the first civilizations possible. Morgan identified seven stages of cultural development that culminated with civilization, each associated with distinct iterations of seven institutions — subsistence, government, language, the family, religion, house life and architecture, and property. Particular varieties of these institutions interlocked to serve as 'obstacles which delayed civilization' (Morgan 1963 [1877], 6), until inventions and discoveries served as a catalysts for sudden, sweeping change that ushered in a new set of interlocking institutions that formed the next stable stage of cultural development (Morgan 1963 [1877], 4).

Morgan (1963 [1877], 263–64) argued that the transition to farming and herding allowed for surplus production and led to the creation of private property. These and other changes fostered the simultaneous development of cities, social classes, and states. For Morgan, cities were the *sine qua non* of civilization:

> Cities […] imply the existence of a stable and developed field agriculture, the possession of domestic animals in flocks and herds, and of property in houses and lands. The city brought with it new demands in the art of government by creating a changed condition of society. (Morgan 1963 [1877], 264)

Like his contemporaries (e.g. Tylor 1871, 18), Morgan therefore continued the Enlightenment tradition of linking together city and state formation at the inception of a civilization stage of development.

Early twentieth-century scholars revolted against the unilinear expectations of the cultural evolutionists. Robert Lowie (1920, 427), for example, saw 'mottled diversity' in the world's cultures instead of the 'dull uniformity' of Morgan's model. Max Weber identified different types of cities, each with distinct relationships to surrounding settlements (1986 [1921]). There were thus now more evolutionary paths identified that led to different kinds of outcomes. The emphasis nonetheless remained on stages of development, and cities, states, and surplus creation remained inexorably bundled (e.g. Boas 1911, 7–8). Implicit in these models was Childe's urban revolution — 'the moment that the old political order proved insufficient and was superseded by a more tightly organized one' (Kroeber 1944, 72) — wherein states formed that were anchored by cities that drew in surplus production from a surrounding population.

Taking a Marxist approach to history, Childe (1951 [1936]) emphasized different modes of production that were overturned by what he called 'revolutions'. The shift to urban life was seen as sudden by Childe, with an excavation layer of 'modest huts' followed by a layer of 'truly monumental buildings' (Childe 1951 [1936], 117). In comparison to Morgan, many of the reasons that Childe offered for transitions to civilization were different. Of particular importance was Childe's portrayal of a domestic mode of production in villages built to fulfil only a household's needs. Creating a surplus thus required a fundamental change in production, one that people would need to be compelled to do. For Childe, the 'urban revolution' was one of the most transformative moments in human history.

After Childe

The idea that cities arose from the state's ability to generate a reliable food surplus continued into the neo-evolutionary models of the 1960s (e.g. Fried 1967; Service 1962), and was enshrined in major contributions of processual archaeology like Kent Flannery's 'The Cultural Evolution of Civilizations' (1972) and Allen Johnson and Timothy Earle's *The Evolution of Human Societies* (1987). The latter book was explicitly in dialogue with Morgan and the evolutionary thinkers of the mid-nineteenth century. Johnson and Earle (1987, 15) sought to better understand the causal sequences that led to the emergence of the bundled set of institutions typical of the 'upward spiral' of societal development. For the authors, the city was subsumed within a 'regional polity' stage, underlining their conviction that fundamental changes to the political economy were precursors to urban development.

Frustrations with the limitations of neo-evolutionary models came to a boil in the 1980s and 1990s. These frustrations led in two different directions. First, some scholars sought to improve the neo-evolu-

tionary framework by bringing in new kinds of data, improving the resolution of existing data, and more clearly articulating feedback loops. Some, for example, answered Carole L. Crumley's (1976, 59) call to more clearly differentiate 'state systems of settlement' from other kinds of core–periphery relationships (e.g. Champion 1989). In a second directions, others reacted against the restricting confines of terms like 'chiefdoms' and 'states', the associations that they engendered, and the limited number of pathways proposed for culture change in the neo-evolutionary framework (e.g. Yoffee 1993). Gregory L. Possehl (1990), for example, argued for alternative state organizations in the Indus region, as did Garth Bawden (1989) for the Andes. Although this latter research brought a greater diversity of political formations to the stage, the bundling of cities, regionally organized polities, and surplus food production remained unquestioned.

Early urbanization scholarship has further diversified over the past two decades. Some research continues to seek general evolutionary models of social complexity (Flannery and Marcus 2014; Prentiss, Kuijt, and Chatter 2009). Cities in these approaches tend to be of interest because they are indicators of a particular kind of state — often called the 'urban state' (Sabloff 2018, 5) — that are characterized by a suite of interrelated political, social, and economic relationships. A recent example of this approach is Scott G. Ortman, Lily Blair, and Peter N. Peregrine's 'The Contours of Cultural Evolution' (2018). The largest settlement population is used as a measure of social complexity in their macro-evolutionary modelling, both within the settlement in question and the 'larger settlement system' attached to it (Ortman, Blair, and Peregrine 2018, 194). The scholars identify a 'basin of attraction' in their modelling associated with cities that corresponds to state level societies (Ortman, Blair, and Peregrine 2018, 209). The long-term scaling properties of population aggregation are undeniable (Bettencourt 2013), but the authors' *a priori* bundling of city to state assumes rather than explores the relationship between polity formation and urbanization.

Other scholars are taking a more regional focus to examine in greater detail the various ways that cities and regional polities functioned and came into being. Seth Richardson's (2017) 'low-power' model for early Mesopotamia questions the reach of early states into more quotidian affairs; Linda R. Manzanilla (2017) emphasizes the importance of long-range kin-based networks in feeding Teotihuacan; Takeshi Inomata and Lawrence S. Coben (2006) explore the charismatic pull of urban performances in the ancient Americas. T. J. Wilkenson, Dan Lawrence, and their colleagues exemplify this approach in the Near East. In a number of recent papers (Lawrence and others 2016; Lawrence and Wilkinson 2015; Wilkinson and others 2014), the authors describe different kinds of urban centres and explore how environment change, settlement clustering, interregional exchange, and other factors led to the development and decline of cities over time. Their definition of cities is functional — based on the kinds of relationships that existed with a hinterland — and thus they explore the development of urban systems (Lawrence and others 2016, 2). Functional definitions usefully highlight the variability in urban–rural connections (Smith 2020b, 17), but in doing so tend to ossify these connections and project them across the life of a city.

Finally, scholars are re-envisioning early city life and the generation of political power (e.g. Kenoyer 2008; McIntosh 2005). In *Violence, Kinship, and the Early Chinese State*, for instance, Roderick Campbell (2018, 28) suggests that conventional definitions of the state are ill suited to showing 'how Shang society worked'. He tracks different actors who amassed and expended capital that flowed within and between warfare, ritual, and kinship networks. These interactions were centred in Shang cities like Anyang. In another example, Paul S. Goldstein (2003) has argued for the existence of a 'chicha economy' in the city of Tiwanaku in Bolivia. Competitive feasts featuring chicha, a beer made from maize and other ingredients, helped to maintain the rival kin-based collectives that structured life in the settlement and its hinterland. Approaches like these further open up the possibilities of urban life and a city's connections to the surrounding region. Yet they also tend towards static depictions of how a city and its associated polity functioned.

We have come a long way from Childe's urban revolution. The tendency to think in stages of cultural development nonetheless remains pernicious in archaeology (Jennings 2017). With recent research demonstrating that urbanization was often swift — cities could form over the space of just a few decades (Birch 2013) — there is now a heightened tendency to argue that regionally organized urban polities emerged in a fit of 'paroxysmal change' (Possehl 1990, 289). Whether emerging fast or slowly, city and polity are routinely seen to have arrived together in a 'Big Bang' (Pauketat 2007, 146) or 'sharp transition from one state of being to another' (Yoffee 2005, 230). If we see a state developing around an early city — albeit of a low-power variety — then we are apt to envision this state operating as such from the very beginning (e.g. Mattingly and Sterry 2020); if we see a more heterarchical or even egalitarian polity organizing the countryside, then its governance structure was also in place when a city first began to form (e.g. Green 2020).

Figure 2.1. Locations of the cities discussed in the text. Map by Justin Jennings.

In this article, we argue instead that mounting evidence suggests that agricultural and herding relationships may have been in flux for centuries after a city formed. States, if they emerged, altered already successful food-production regimes that sustained large, dense, and heterogeneous populations via the efforts of city residents and outside producers who enjoyed considerable economic independence. The food-production changes that occurred as more centralized polities formed sometimes increased food surpluses, but they were also routinely bids to control the countryside by centralizing authorities. These bids for greater control often marked an inflection point in the world's first cities that either spurred their expansion or precipitated their decline. Thinking of cities as dynamic assemblages rather than as more static stages of interlocking institutions can get us closer to the realities of the urban transition (Jervis 2018).

Three Case Studies on Cities and Surplus Food Production

To illustrate how food-production regimes could change, we briefly examine the subsistence trajectories of three of the earliest cities in their respective regions. The histories of Jenne-jeno, San Lorenzo, and Liangzhu demonstrate how major subsistence and political change did *not* occur in unison during a 'Big Bang' at the onset of urbanization (Fig. 2.1). We underline that the specifics of urbanization vary in each of these case studies, as they would with any examples chosen. We nonetheless argue that what happened in and around these urban centres clearly demonstrates that archaeology is poorly served by models premised on early cities being the necessary product of states or other kinds of regionally organized polities (also see Zamboni 2021).

Jenne-jeno

The city of Jenne-jeno was located in the south-west extreme of the Inland Niger Delta, a floodplain in the interior of northern Africa created by the Niger and Bani Rivers (Fig. 2.2) (Stone 2015, 42). First settled around 250 BC, Jenne-jeno at its height in AD 800 consisted of a 42 ha mound surrounded by smaller mounds — some 50,000 people lived within an afternoon's walk of each other (McIntosh 1993, 200; McIntosh and McIntosh 2003, 110; McIntosh and McIntosh 1993, 631; Stone 2015, 45). There were no palaces, great plazas, or even public buildings at Jenne-jeno (McIntosh 2005, 13), and no evidence for significant social stratification (Stone 2015, 166). The main mound was instead a 'rabbit's warren of weaving alleys between tightly packed compounds linked by walls' (McIntosh and McIntosh 1993, 632). The only public architecture was a recently added mud-brick wall that surrounded the site's main mound.

The Niger River flooded every year around Jenne-jeno's mounds, creating a rich mosaic of pasture, farmland, swamps, and lakes that changed annually. The subsistence strategy that exploited these microenvironments throughout Jenne-jeno's 1600-year occupation remained largely consistent (Stone 2015, 156). The staple foods were domesticated African rice, domesticated cattle, and fish (McIntosh and McIntosh 1980, 178; Monroe 2018, 398; Stone 2015,

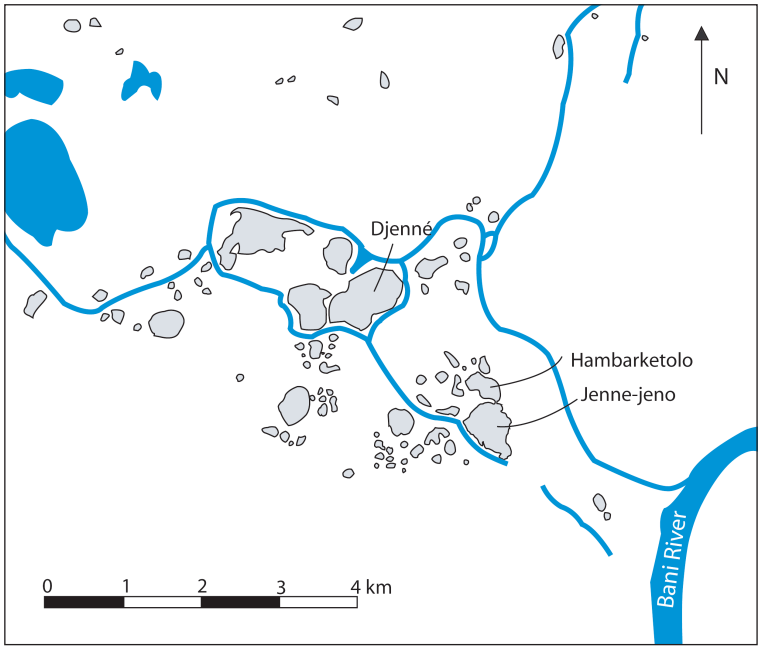

Figure 2.2. Map of the maximal extent of some of the mounds in the vicinity of Jenne-jeno. Djenné would grow in size after Jenne-jeno was abandoned. Map by Justin Jennings.

48). Sheep, goats, millet, sorghum, and other domesticates augmented these staples, as did a wide variety of wild plants and animals that were available from the lush delta (MacDonald 1995, 291–315).

Jenne-jeno grew from a seasonally occupied settlement that was founded by migrant people from the north of the region whose members had contrasting subsistence strategies (LaViolette and Fleisher 2004, 334; MacDonald 1999, 337–42). One group might emphasize farming, while another would emphasize fishing. Exchange between these and other groups allowed for greater specialization (Stone 2017, 4). Evidence of ironworking, and thus interregional connections, is present from the site's earliest stages as iron ore had to be brought in from outside the delta (LaViolette and Fleisher 2004, 334). When the population surged after AD 400, there were rice farmers, blacksmiths, cattle and caprine herders, potters, fishers, and other specialists living throughout Jenne-jeno's mounds (McIntosh 2005, 106–07). As the population grew, each specialized group intensified production over time in their particular area of focus in order to obtain more of the goods provided from others.

The drive to specialization had its limits. Recent osteological and isotopic analysis of cattle remains, for example, suggest that most were raised locally in small herds that were used to complement other subsistence strategies (Stone 2017, 10). The diverse faunal and botanical assemblages across the site may also speak to wider participation in subsistence activities. A blacksmithing family might therefore have spent much of its time making tools for others, but the family also appears to have spent time fulfilling at least part of its subsistence needs. As people moved to Jenne-jeno, most settled in smaller mounds that ringed the main mound. The families that lived on a smaller mound often shared an economic specialty, but pottery styles and other features suggest intense interaction between the mounds that made up the Jenne-jeno complex (McIntosh and McIntosh 1980, 18).

Status differences at Jenne-jeno may have been held in check by what Roderick McIntosh (2005, 206) calls a 'heterarchical grid of authority'. McIntosh proposes the development of a mutually reinforcing network of overlapping political, economic, and social relationships that grew organically with the city. The competing desires of the subgroups that made up Jenne-jeno worked to level any status gains that might accrue to certain families, and the grid was further reinforced by a shared ideology of mutual cooperation and respect that was broadly similar to the one that guides actions in the region today (McIntosh 2000, 161).

The relative egalitarianism between Jenne-jeno's residents was maintained throughout the city's frenetic growth from AD 400 to 800. Paradoxically, the first monumental construction at Jenne-jeno — the wall around the main mound that was built at the beginning of the ninth century AD — may have been the first sign of the fraying of the settlement's heterarchical grid of authority (McIntosh and McIntosh 1995, 55). The wall came at a time when trans-Saharan trade routes offered the opportunity for some residents to garner unprecedented wealth (Cisse 2010, 275). Walls, at least later in West African history, were symbols of urbanism, status, and power (Haour 2005, 153–55), and placing a wall that separated Jenne-jeno's main mound from its satellite communities was an act of distinction likely to disturb the pre-existing relationships that cut across the settlement.

Two-thirds of the main mound's satellites were abandoned by the very beginning of the first millennium AD (McIntosh 1998, 246). A few of Jenne-jeno's families moved inside the walls, but most scattered into non-specialized, more self-sufficient villages (McIntosh 1983, 196). Urban renewal in the twelfth century transformed the city, carving out space for a newly anointed chief and his palace (McIntosh 1998, 245). When Jenne-jeno's chief converted to Islam in AD 1180, he moved his palace, and likely by now his mosque, to the nearby site of Djenné. Over the next decades, the remainder of Jenne-jeno's population would follow the chief or disperse into the countryside (McIntosh 1995, 392–93).

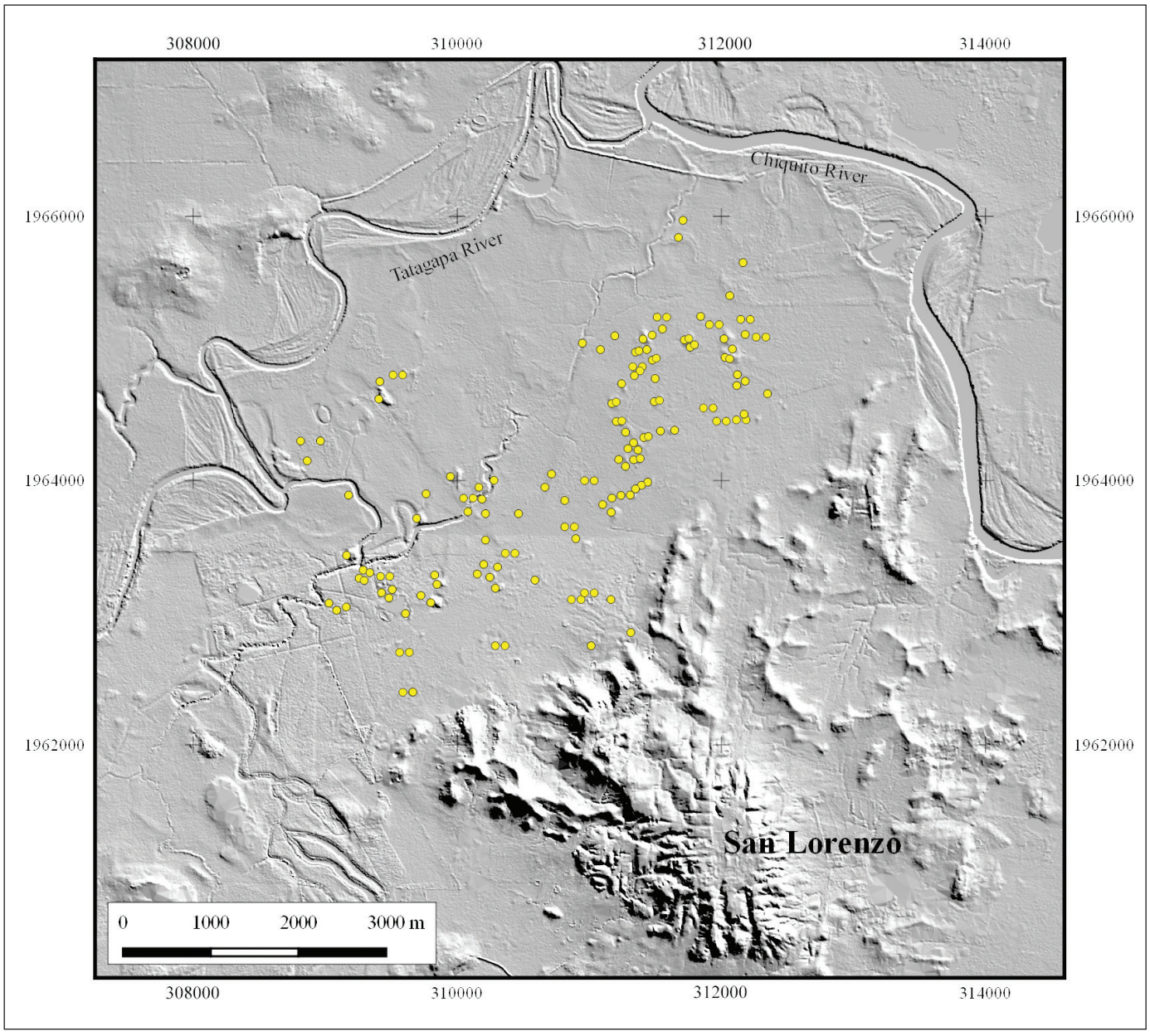

Figure 2.3. LiDAR model of San Lorenzo and the northern plain. The yellow dots on the northern plain represent low-lying residential mounds. From Ramírez-Núñez and others 2019, fig. 4.

The move to Djenné may have been spurred by destructive flooding that disturbed rice cultivation and other aspects of local subsistence (McIntosh 1983, 197). Yet the move was also an opportunity for the new line of chiefs to place some aspects of the economy more firmly in their hands. Djenné's herding strategy, for example, was a complete reversal from the herding strategies employed at Jenne-jeno (Stone 2015, 178). Strontium analysis demonstrates that the focus shifted from locally raising cattle in surrounding pasture to an almost exclusive emphasis on highly mobile animals that were raised far away and driven to the city (Stone 2017, 10–11).

San Lorenzo

The Olmec are often considered Mesoamerica's first 'civilization' and credited with the earliest writing, stratified society, religion, and majestic artwork and architecture (Geller 2006). San Lorenzo was the first Olmec city. Located some 60 km from the Gulf Coast in eastern Mexico, the site was situated on a modified salt hill that sat above the surrounding floodplain (Fig. 2.3). By 1000 BC, San Lorenzo covered some 700 ha, with as many as 18,000 inhabitants crowded on or around the hill (Arieta Baizabal and Cyphers 2017, 70; Ramírez-Núñez and others

2019, 385). Elites resided near the top of the hill, with commoners living on its terraced sides and in smaller mounds on the plain below (Cyphers 1996; Zurita Noguera 1997). Among the most impressive of the elite residences was the 'Red Palace', a 400 m^2 edifice with an attached workshop of basalt sculptors (Blomster 2010, 137).

The top of the hill at San Lorenzo is littered with more than one hundred stone sculptures that portray deities, elites, and the relationships between them. Since quality lithic material was lacking in the surrounding wetlands, the sculptures were made from basalt imported from the Tuxtlas Mountains some 150 km away (Cyphers 1996; Hazell 2011, 31–34). The largest of these sculptures were ten enormous heads carved from stones that weighed up to 28 tons each. The basalt was also used for a seemingly more utilitarian purpose: creating grinding stones. The quarrying, dragging, and floating of basalt to San Lorenzo demonstrates the emerging elites' ability to coordinate considerable pools of labour (Diehl 2004).

Although first imagined as a largely empty ceremonial centre, work over the last few decades has confirmed that San Lorenzo was much larger, more densely populated, and heterogeneous than previously believed. Most scholars now agree that San Lorenzo was the oldest city in Mesoamerica (e.g. Clark 2008), with hereditary leaders whose influence extended across the surrounding countryside (Flannery and Marcus 2000; Blomster 2010). Like in other cities, San Lorenzo's greater degree of aggregation and specialization required the generation of a reliable food surplus. This food was obtained largely from the land surrounding the city (VanDerwarker 2006). San Lorenzo was approaching our definition of a state in AD 1000, but was this political organization in place when the city first emerged?

The San Lorenzo area was occupied by as early as 1800 BC (Cyphers, Zurita Noguera, and Rodríguez 2013; Ramírez-Núñez and others 2019). Families built low artificial mounds on the floodplain that acted as island residences during seasonal inundations (Ramírez-Núñez and others 2019). These semi-sedentary settlers established their rights to specific spots in the area through land claims that appear to have been respected by those who came later (Arnold III 2003; 2012; Symonds, Cyphers, and Lunagómez 2002; Ramírez-Núñez and others 2019). Artefact scatters around these residential mounds suggest a subsistence strategy that mixed fishing, hunting, gathering, and minimal cropping or gardening of root crops (Symonds 2000, 42). Oxbow lakes were of particular importance since fish, turtles, and other food resources could be stored alive until needed (Arnold III 2009; Ortiz and Cyphers 1997).

San Lorenzo started growing rapidly in 1200 BC. The existing subsistence regime, buttressed by an increase in swidden and levee farming *could* have fed San Lorenzo's growing population (Borstein 2001), and it appears that much of the food flowing into the city over the next two hundred years came from a mix of hunting, gathering, fishing, and gardening (Killion 2013; VanDerwarker 2006). Initially, only a sliver of land was dedicated to maize cultivation (Cyphers 1996). Yet the production of a maize surplus was becoming more critical to the ceremonies that justified the city's existence.

Artefact assemblages at El Remolino and other surrounding villages suggest that San Lorenzo's emerging elites could neither coerce an agricultural surplus from the countryside nor held a strong monopoly on obsidian and other valued long-distance goods (Wendt 2005; 2017). Gleaning a food surplus from the countryside — and the commoners who were moving into the city — instead required persuasion. This persuasion came in the form of ritually charged feasts that emphasized the elite's role in harnessing supernatural forces (Diehl 2004; Rosenswig 2007). A critical feature of these feasts was maize beer (Seinfeld, von Nagy, and Pohl 2009). Grinding maize required San Lorenzo's basalt mortars, and maize-beer production was labour- and resource-intensive (Jennings 2008). Commoners had to be convinced to not only bring more food into the growing city, but also bring in more maize and then convert that maize into beer.

The drive for increased maize production ran counter to entrenched hunting, gathering, and fishing traditions (VanDerwalker 2006). Common property regimes would have organized broad swaths of the landscape, for example, and larger collectives were required to build and repair fish fences and other features (Coe and Diehl 1980). Since parts of the floodplain attracted different aquatic animals throughout the year, families needed broad access to the landscape (Arnold III 2009, 407). The labour relationships, scheduling, and property rights of intensive maize production disrupted many of these traditional subsistence rhythms. Internal tensions rose.

Despite these conflicts, San Lorenzo peaked in population by 1000 BC, and maize became the dietary staple soon after. The city nonetheless appears to have lost its lustre. In the centuries that followed, many residents dispersed into the countryside or decamped to the newer nearby city of La Venta with its monumental core that dwarfed what San Lorenzo had to offer (Pool and Loughlin 2017). San Lorenzo's elites responded to their city's population decline by sponsoring more feasts and incorporating more maize imagery into ritually

charged sculptures (Killion 2013). The escalating demands for surplus led to further political instability. Much of the city's statues may have been mutilated and buried amidst internal disruptions during San Lorenzo's slow decline from 900 to 400 BC (Arnold III 2009).

Liangzhu

China has a long history of urbanism that begins in the Neolithic period. Population nucleation, agricultural intensification, craft specialization, and social stratification are associated with the emergence of some of the earliest cities in the Yangtze River Delta (Liu, Qin, and Zhuang 2019b, 7–8). One of these cities was Liangzhu, a settlement located along the Dong Tiaoxi River in the hills that surround the delta (Fig. 2.4) (Liu, Qin, and Zhuang 2019b; Wang and others 2017). By the mid-third millennium BC, Liangzhu was home to 30,000 people who lived in some six hundred settlement clusters surrounding the almost 2 km² Mojiaoshan Complex (Liu, Qin, and Zhuang 2019a, 45; Renfrew and Liu 2018). The settlements that made up Liangzhu were interconnected by 30 km of canals that formed part of a complex water-management system that also included dams, levees, ditches, and other features (Liu, Qin, and Zhuang 2019a).

The rectangular-shaped Mojiaoshan Complex is dominated by a 30 ha rectangular earthen platform. The foundations of three large buildings are found on top of the platform, along with a 7 ha plaza (Liu, Qin, and Zhuang 2019a, 25–29). Although referred to as 'palaces' by the excavators, the function of the buildings remains undetermined because only their stone foundations were recovered. Canals radiate out of the Mojiaoshan Complex like the spokes on a wheel. The canals pass through the Complex's stamped earth enclosing wall via eight water gates. The only land-based gate was on the compound's southern side.

Most people were buried in cemeteries located outside of the Mojiaoshan Complex, with the notable exception of three mounds. The richest of these was the Fanshan Mound located adjacent to the main platform. Fanshan appears to be an elite cemetery with burials containing large amounts of worked jade (Qin 2019). Among these burials is that of the 'king', who was buried on a platform surrounded by several anthropogenic ponds (Qin 2019, 50). Among the king's offerings were more than five hundred jade objects. 'Palace', 'king', and other terms used by the excavators of Liangzhu implicitly suggest the existence of a hierarchical, centralized government and this argument for a state-level society is also explicitly made by Colin Renfrew and Liu Bin (2018) for *c.* 2500 BC Liangzhu.

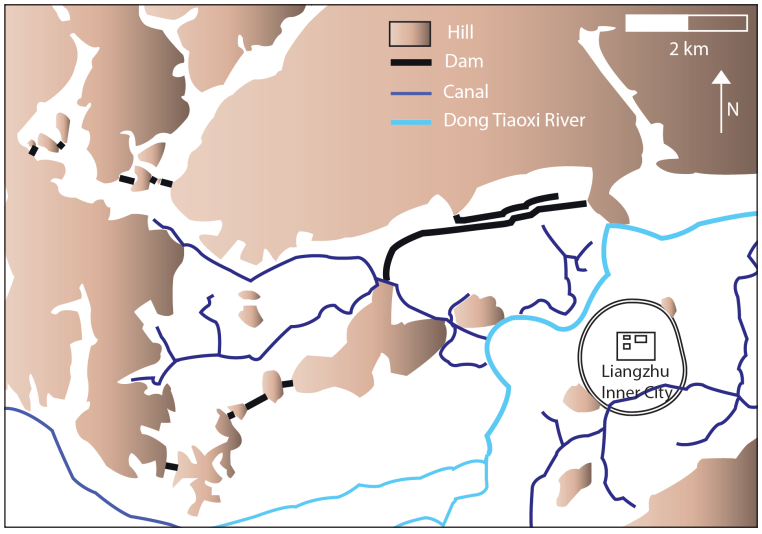

Figure 2.4. Map of Liangzhu and some of the major water-management features associated with the site. The rectangular feature inside the walls of the inner city is the Mojiaoshan Complex. Map by Justin Jennings.

The first walled compounds emerged in the region by the beginning of the fourth millennium BC (Liu, Qin, and Zhuang 2019b). Like Liangzhu, most of these smaller compounds have a central platform located within their walls and are ringed by surrounding villages. Irrigation and drainage systems are also associated with these earlier settlement clusters. There is no evidence, however, for centralized water management at these earlier sites. Rice was the staple crop, and rice paddies were maintained via slash-and-burn agriculture (Qui and others 2016). The low yields produced in this manner were supplemented by other crops, foraged food, and slaughtered game to meet a family's subsistence needs (Qui and others 2016). Each village thus autonomously orchestrated its subsistence practices. The relationship between villagers and the walled compounds is unclear, but status differences were muted throughout the region. The walled compounds might have served a ceremonial function that intermittently united associated villages to maintain canals or participate in other collective projects.

Seen in this light, early Liangzhu began as just another version of these earlier settlement clusters. The city's higher population concentration was made possible by increased water management. For the first three hundred years, these efforts appear to have been locally driven with each village in the Liangzhu cluster tapping into surrounding streams and rivers to cultivate their existing land with greater efficiency (Zhuang, Ding, and French 2014). After

3000 BC, there was an extension of the paddy system associated with Liangzhu and intensification of existing areas of cultivation via longer periods of water saturation and more manuring. The extensification and intensification of rice agriculture was made possible through a massive water-management project that enabled the more consistent flooding and draining of fields (Wang and others 2017; Zhuang, Ding, and French 2014).

The shift in rice farming was enabled by the construction of a 5 km long, 20 m wide irrigation channel to supplement the existing waterways (Renfrew and Liu 2018, 979–81). By better controlling run-off water from the surrounding mountains, the Liangzhu people were able to supplement their existing water sources, allowing for a further expansion of rice agriculture. Constructed between 3100 and 2700 BC, the canal's construction required millions of hours of labour (Liu, Qin, and Zhuang 2019a, 39–40). Its construction corresponds with the increasing opulence of elite burials in Liangzhu. The connection between elite status and the canal was inscribed at its beginning by elite burials associated with an extensive masonry stone production area (Renfrew and Liu 2018, 961). This production area was also responsible for the manufacture of jade grave goods that are interpreted as markers of status. As the major canal was constructed, more people moved into the settlements that composed Liangzhu, and neighbourhoods proliferated within the Mojiaoshan Complex (Liu, Qin, and Zhuang 2019a). Many of the Complex's residents were of a higher status, and areas of craft specialization proliferated throughout the site.

Since Liangzhu became larger, more densely populated, and more heterogeneous after 3000 BC, it might be tempting to argue that the settlement only passed the urban threshold when we have more compelling evidence for a state-like organization. Denying the urban character of early Liangzhu, however, obscures the preceding system of locally controlled rice agriculture that generated a surplus sufficient enough to enable the construction of the Mojiaoshan Complex, dozens of smaller canals, and increasing specialization. Early Liangzhu might be more appropriately seen as a different kind of city that was supported by a decentralized subsistence regime evocative of those used at Jenne-jeno and San Lorenzo. The late Liangzhu state was formed by dismantling this pre-existing regime.

Discussion

Jenne-jeno, San Lorenzo, and Liangzhu are among the first cities on their respective continents. The histories of other very early cities of course differ in detail, but we argue that our case studies offer a better understanding of the urban transition than examples that come after long traditions of city- and state-building. Settlements like Rome, Babylon, and Cuzco are often characterized as 'early cites' (e.g. Yoffee 2015). Although doing so allows for wider comparison, the practice risks a false equivalence between first- and subsequent-generation cities that reinforces the conceptualization of civilization as a uniform stage of development (Jennings 2017).

Taken together, the data from Jenne-jeno, San Lorenzo, and Liangzhu suggest that taken-for-granted assumptions about subsistence change and urban revolution need to be re-evaluated. States and other kinds of regionally organized polities were *not* needed to feed cities. Jenne-jeno was a city for at least six hundred years, without any evidence for social stratification or centralized power. More centralized political structures developed at San Lorenzo and Liangzhu, but these came into being after both cities first formed. Massive infrastructural investments at Liangzhu allowed the city to grow further by increasing rice production. At least at San Lorenzo and Djenné (the site that replaced Jenne-jeno), however, the later changes in food production that occurred alongside political consolidation do not seem to be primarily related to fulfilling basic subsistence needs.

It is important to underline the considerable effort needed to produce the food required to sustain cities (e.g. Mandich 2019; Manzanilla 2017). Generating more food tends to require more work (Morrison 1994), often of a back-breaking variety. As Émile Durkheim (1997 [1893]) noted more than a century ago, urbanization also changes the way that people work, such that over time specialization and interdependencies inevitably grow (also see Ortman, Blaire, and Peregrine 2020). The more dispersed settlement patterns at Jenne-jeno, Liangzhu, and, to a lesser degree, San Lorenzo may reflect efforts to retain a degree of household autonomy — lower population densities left more accessible land for independent food production — but the intensification and extensification required to feed more people in one place rapidly changed the countryside (Yoffee 2005). In all three case studies, it appears that people had to work harder and in different ways once cities formed. Our point is that they initially tried to do more of what they were already doing.

Jenne-jeno's subsistence strategy remained about the same throughout its occupation (Stone 2015, 156). Specialization appears to have increased over time — fisher-folk spent more time fishing, farmers spent more time farming, etc. — but these changes would have been subtle across lifetimes, and there is little evidence for any efforts to centrally coor-

dinate economic affairs until the move to Djenné. Hunting, gathering, fishing, and gardening fed those living in and around San Lorenzo (VanDerwarker 2006). The subsistence regime would have been familiar to those living in the region before urbanization, and the major change that occurred was in increased maize production to foster ritual activities that they felt were necessary to sustain life. Those who supported the city of Liangzhu continued to farm their rice paddies in the ways they had done before (Qui and others 2016). Villagers may have expended more effort to widen and lengthen some of their existing irrigation canals, yet there is no evidence of outsiders interfering with their affairs.

If regionally organized polities were not there from the beginning to coerce or at least coordinate heightened subsistence efforts, why would people choose to support cities? That people would be willing to work harder to achieve a shared goal should not be surprising. Research clearly demonstrates the routine capacity of non-state actors to build elaborate subsistence systems and impressive monuments (e.g. Burger and Rosenwig 2012; Kealhofer and Grave 2008; Wright 2012). Participants not only directly invested their labour, but provided the food and drink to sustain construction efforts that could unfold across years. Families participated because the end results were seen as beneficial to them. In the case of monumental centres, the work to create them was often episodic, ritually charged, and organized around competing subgroups (Stanish 2017). Rosemary Joyce (2004) suggests that the unintended consequences of making these early centres is that they can then be subsequently hijacked for political gains that run counter to the more egalitarian communal ethos that the centres initially celebrated.

The reasons behind urbanization undoubtedly varied in the earliest cities. In the case of Jenne-jeno, the settlement may have coalesced around an aggregation centre where itinerant potters, metalworkers, and other specialists came together periodically to serve the surrounding population (McIntosh 1993). San Lorenzo and Liangzhu appear to have begun more as ceremonial centres that were built by groups whose members at least initially volunteered to drag basalt boulders great distances and shovel mound after mound of earth because of the existential benefits that these sites provided. In all three cases, the cities emerged from a context of much smaller rival centres that served similar functions. People could therefore choose which of these centres to support with their patronage, and their repeated patronage was critical to creating the shared civic identities that made further cooperation possible.

Why Jenne-jeno, San Lorenzo, and Liangzhu grew so much more then their rivals remains unclear, but further aggregation brought considerable subsistence challenges that demanded changes to the status quo. Leaders quickly emerged to coordinate some activities within urban centres. These leaders are most clearly seen at San Lorenzo where an aspiring elite likely sponsored feasts and other ritually charged events on the top of the salt hill. Elites on the platform in Liangzhu's Mojiaoshan Complex may have played a similar role in rituals associated with the flow of water. The locus of Jenne-jeno ritual performance and decision-making is more difficult to identify because differences in status were so actively resisted: families did not want to make a ritually charged centre that could then be usurped for other purposes. Leaders in all three cities may have created incentives for people to make more food, but it does *not* appear that they initially had much control over the actual production of that food.

We emphasize again that the development of regionally organized polities around Jenne-jeno, San Lorenzo, and Liangzhu was a centuries-long process occurring after urbanization first began. During much of this time, society may have been arranged against the state (Clastres 1990). There were at least tensions between city and countryside in San Lorenzo as maize production eroded traditional lifeways, and Roderick McIntosh (2005, 206) explicitly talks about a 'heterarchical grid of authority' that served as a barrier to state formation at Jenne-jeno. Greater stratification and centralization was nonetheless a by-product of aggregation that ultimately proved impossible to forever contain: even Jenne-jeno's residents finally crowned a chief, and the demise of the city quickly followed when this chief moved to nearby Djenné and began to reshape herding practice.

The development of regionally organized polities in the wake of urbanization was difficult in the earliest cities because food producers were often dispersed and largely self-sufficient. They opted into producing a surplus because of the benefits that a city provided, and leaders were faced with the challenge of getting people to increase their surplus production over time as society became more urban. With increasing specialization and stratification, some people needed to work the countryside harder to support those who were spending less time in subsistence activities. Aware of the escalating sacrifices required to create a city, scholars have long argued that producers needed to be compelled to support urban development. They thought that coercion was needed either through outright violence or control over the means of production. Yet we find no evi-

dence for coercion in these case studies at the outset of urbanization. There were nonetheless longer-term trends of centralization and stratification that would slowly alter the relationships between elites and food producers.

By the end of our case studies, food production had changed in ways that were beneficial to elites. Centuries after their respective cities formed, Liangzhu's leaders embarked on a massive water-management project that created a reliance on state-built infrastructure to maintain rice agriculture, San Lorenzo's leaders finished rejigging subsistence regimes to mass-produce maize beer, and Djenné's early leaders engineered a shift away from locally raised cattle. These later developments may have generated a larger food surplus, but they also concentrated more decision-making power in the hands of the elite. If there was an 'urban revolution' to surplus-generating institutions, then it was as a *reaction* to the initial adjustments made to sustain urbanism. The impetus for the changes, at least in part, was to consolidate elite power by creating greater dependency.

Re-evaluating Cities, Surplus, and the State

For more than three hundred years, Western scholars have argued that the first city could not form without a food surplus, and a food surplus could not form without the first state. Documenting one was thus the same as finding all three: together they formed an early civilization (Jennings 2017; Smith 2009). If cities can be defined as permanent collectives with (1) large population size, (2) dense interpersonal interactions, and (3) high heterogeneity in the social roles of inhabitants, then the first part of this equation seems undeniable: more people doing non-subsistence-related activities means that those producing food have to make more. The second part of the equation, however, is based on the idea that food producers would be unwilling to create a surplus on their own and unable to reliably supply this surplus to city dwellers. Was this also the case? Is city life only made possible under the auspices of a functioning state or other kind of regionally organized polity?

We know very little about the earliest cities in the world. It is therefore tempting to fill in the considerable gaps in our knowledge with what can be gleaned from later examples. Many of these later cities were associated with state governments, and the rich historical and archaeological datasets associated with these regimes provide a much better sense of how their residents were fed (e.g. Hunt 1988). To project these better-known subsistence practices back in time to the beginning of the earliest cities, however, is to argue, at least implicitly, that analogous political structures were also in place at the outset of urbanization. Our case studies suggest that these structures were not in place: cities, at least in the examples discussed in this article, preceded the development of states and other kinds of regionally organized polities.

Jenne-jeno, San Lorenzo, and Liangzhu fit our definitions of cities and are widely recognized as such by scholars working in these regions. Neither the ultimate organizations of these particular cities nor the later political structures commonly found in these regions were employed to feed the populations of Jenne-jeno, San Lorenzo, and Liangzhu when the cities first formed. The rise of a more centralized and hierarchical society was instead held in check for centuries. A more active resistance is most clearly seen at San Lorenzo and Jenne-jeno where the cities went into decline after elites made changes that curtailed the countryside's autonomy. Liangzhu's original subsistence regime also ensured greater village independence through slash-and-burn agriculture and locally maintained canals. In the case of Liangzhu, however, the later infrastructural investments associated with state development were better received: the city expanded and became more prosperous.

Michael E. Smith (2020b), Roland Fletcher (2020), and others have worked over the last two decades to widen our definitions of ancient cities. Some of the distinctions made could relate to different long-term development societal pathways, such as the oppida of Iron Age Europe that served to downplay social differences (Moore 2017, 297). Yet some of this variability appears to reflect at least in part differences in urban structures that played out across time. Greater nucleation, for example, occurred over time in our case studies, adding to the burden of food producers and likely leading to calls in some quarters for elite-led innovation and interventions. A city like Liangzhu could go from low to high density through its occupation and see more hierarchical ties develop over time. Why some of the first cities prospered after subsistence practices were overhauled and others declined is an important research question. This question, along with many others regarding incipient urbanization and state formation, can only be effectively addressed by decoupling cities from states.

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